INFORMACIJA

o

Ugovorima o izvođenju radova na primjeni mjera energetske efikasnosti u objektima iz klastera III (O.Š."Ristan Pavlović" Pljevlja, Srednja stručna škola Pljevlja, Gimnazija "Miloje Dobrašinović" Bijelo Polje, O.Š."Mustafa Pećanin" Rožaje i S.M.Š."Bećo Bašić" Plav) i klastera IV (O.Š."Branko Božović" Podgorica, O.Š."Vuko Jovović" Danilovgrad i O.Š."Oktoih" Podgorica) u okviru „Programa energetske efikasnosti u javnim zgradama“

1.Opšte Informacije

„Program energetske efikasnosti u javnim zgradama“ se realizuje po osnovu:
-Ugovora o kreditu i finansijskom doprinosu (donacije), potpisanog 23.11.2011.godine između Njemačke banke za razvoj (KfW) i Ministarstva finansija, i
-Posebnog ugovora potpisanog 22.11.2011.godine između Njemačke banke za razvoj (KfW) i Ministarstva ekonomije.

Posebnim ugovorom Ministarstvo ekonomije je zaduženo da koordinira realizaciju Programa i u vezi sa tim da obrazuje Koordinacioni odbor, u čijem sastavu će biti dva predstavnika Ministarstva ekonomije (predsjednik i član), dva predstavnika Ministarstva prosvjete i predstavnik Ministarstva finansija.

"Program energetske efikasnosti u javnim zgradama" je uvršten u Operativni plan energetske efikasnosti organa državne uprave za 2015.godinu.

Ukupna vrijednost Ugovora o kreditu i finansijskom doprinosu (donaciji) iznosi 13,44 miliona eura, od čega je iznos kredita 11,5 miliona, dok je iznos finansijskog doprinosa 1,94 miliona eura. Realizacija projekta je počela u januaru 2012. godine. Rok za završetak projekta je decembar 2015. godine.

Cilj projekta je poboljšanje uslova rada, kao i unaprijeđenje energetske efikasnosti u objektima koji su u vlasništvu Ministarstva prosvjete(osnovne, srednje i specijalne škole, vrtići, studentski domovi i sl.).

2.Aktivnosti sprovedene od početka realizacije projekta

Od početka realizacije projekta (januar 2012.godine) do sada sprovedene su sledeće aktivnosti:

-Ministarstvo ekonomije je Rješenjem br. 0601-73/112 od 15.12.2011.godine, formiralo Koordinacioni odbor zadužen za praćenje realizacije „Programa energetske efikasnosti u javnim zgradama“.

-Za potrebe realizacije projekta angažovan je konsultantski tim koji čini konzorcijum Fichter GmbH&Co.KG Štutgart (Njemačka), SEEC doo Beograd (Srbija) i Exergia S.A. (Grčka). Obaveze konsultantskog tima su: vršenje energetskih pregleda, priprema tehničke dokumentacije, priprema tenderske dokumentacije, učestvovanje u tenderskoj proceduri, evaluacija tendera, nadzor nad

izvođenjem radova i verifikacija rezultata nakon izvršene rekonstrukcije. Ugovor sa Konsultantom je potpisan 28.12.2011.godine.

-Formirana je lista od 40 obrazovnih ustanova, koji su preliminarno analizirani kako bi se napravila rang lista za rekonstrukciju objekata, odnosno implementaciju mjera za poboljšanje energetske efikasnosti.

-Nakon preliminarne analize i ocjenjivanja stanja svakog od 40 objekata , izvršen je izbor 30 objekata koji će biti razmatrani u okviru ovog projekta. Ocjenjivanje stanja objekata je izvršeno na osnovu prethodno usvojene metodologije. Metodologijom za evaluaciju predviđeno je bodovanje objekata u skladu sa kriterijumima, prema kojima je najveći broj bodova dat objektima u kojima ne postoji sistem grijanja, zatim objektima u kojima je moguće uz primjenu mjera energetske efikasnosti postići uštedu od najmanje 20% i objektima u kojima termalni komfor nije na zadovoljavajućem nivou. Osim navedenog uzeta je u obzir i specifična godišnja potrošnja, broj korisnika, radno vrijeme objekta, stanje objekta, kvalitet održavanja i sl.

-Lista od 30 objekata je podjeljena na dva dijela, prvi dio čini grupa od pet objekata, koji su tretirani kao „pilot projekti“, i predstavljaju osnov za dalje definisanje kriterijuma za vršenje energetskih pregleda, pripremu projektne i tenderske dokumentacije za ostale objekte.

-U toku 2013.godine završeni su radovi na primjeni mjera energetske efikasnosti u pet škola O.Š.“Maksim Gorki“ Podgorica, O.Š.“Vlado Milić“ Podgorica, O.Š.“Njegoš“ Spuž, Danilovgrad, O.Š.“Vuk Karadžić“ Podgorica i O.Š.“ Salko Aljković“ Pljevlja, čija ukupna vrijednost je iznosila 2,7 miliona eura.

-U toku 2014.godine završeni su radovi na primjeni mjera energetske efikasnosti u osam obrazovnih ustanova, koje se nalaze u Nikšiću, Ulcinju, Herceg Novom i Kotoru (O.Š.“Jagoš Kontić“ Nikšić, O.Š.“Milija Nikčević“ Nikšić, O.Š.“Mileva Lajović Lalatović“ Nikšić, O.Š.“Braća Ribar“ Nikšić, O.Š.“Maršal Tito“ Ulcinj, S.M.Š.“Bratstvo i jedinstvo“ Ulcinj, O.Š.“Dašo Pavičić“ Herceg Novi i Studentski dom „Spasić – Masera“ Kotor). Ukupna vrijednost radova je iznosila 5 miliona eura.

-Okončan je tenderski postupak za izbor izvođača radova na pet objekata iz klastera III (O.Š.“Ristan Pavlović“ Pljevlja, Srednja stručna škola Pljevlja, O.Š.“Mustafa Pećanin“ Rožaje, Gimnazija „Miloje Dobrašinović“ Bijelo Polje i S.M.Š. “Bećo Bašić“ Plav) i tri objekta iz klastera IV (O.Š.“Branko Božović“ Podgorica, O.Š.“Oktoih“ Podgorica i O.Š.“Vuko Jovović“ Danilovgrad).

Sprovođenje tenderske procedure za izvođenje radova na primjeni mjera energetske efikasnosti i odabir izvođača radova se vrši u skladu sa pravilima Njemačke razvojne banke(KfW).

-U januaru 2015.godine počela je realizacija druge faze "Programa energetske efikasnosti u javnim zgradama" kojim će biti obuhvaćene obrazovne ustanove, socijalne ustanove i administrativni objekti.

3.Obrazloženje uz Predloge ugovora o izvođenju radova na primjeni mjera energetske efkasnosti u obrazovnim ustanovama iz klastera III (O.Š."Ristan Pavlović" Pljevlja, Srednja stručna škola Pljevlja, O.Š."Mustafa Pećanin" Rožaje, Gimnazija „Miloje Dobrašinović" Bijelo Polje i S.M.Š. "Bećo Bašić" Plav) i klastera IV (O.Š."Branko Božović" Podgorica, O.Š."Oktoih" Podgorica i O.Š."Vuko Jovović" Danilovgrad)

Poziv za predkvalifikaciju za klastere III i IV je objavljen 17.02.2014. godine, dok je rok za dostavljanje ponuda bio 07.04.2014. godine. Kvalifikovani ponuđači su pozvani 13.06.2014. godine da otkupe tendersku dokumentaciju. Rok za dostavljanje ponuda za izvođenje radova na primjeni mjera energetske efikasnosti u objektima iz klastera III i IV je bio do 01.09.2014. godine.

Tender za izvođenje radova na primjeni mjera energetske efikasnosti, kao i izbor izvođača radova se vrši u skladu sa procedurama KfW banke. Odabrana je tenderska procedura sa predkvalifikacijom. Na odluku o izboru izvođača radova, kao i na cijeli tenderski proces, dobijena je saglasnost Njemačke razvojne banke (KfW), što je u skladu sa Posebnim ugovorom.

Takođe odluka o izboru izvođača radova je usvojena i od strane Koordinacionog odbora za realizaciju Programa.

Nakon završene evaluacije ponuda, kao prvorangirani ponuđač za klaster III odabran je JV Roaming, koji čine preduzeća Roaming doo Nikšić, LD Gradnja doo Nikšić, Ening doo Nikšić i Ramel doo Nikšić, a za klaster IV odabran je JV Fidija, koji čine preduzeća IGP Fidija doo Podgorica i Bombeton doo Cetinje.

Pregled vrijednosti radova za oba ugovora je dat u tabeli:

Red.br.		Vrijednost radova
1.	Ugovor o izvođenju radova na objektima iz klastera III	**3.212.042,13**
2.	Ugovor o izvođenju radova na objektima iz klastera IV	**2.042.200,67**

Ugovor o izvođenju radova je po sistemu „ključ u ruke", a za opšte uslove ugovora koriste se FIDIC Uslovi ugovora za projekte po sistemu „ključ u ruke" - srebrna knjiga (FIDIC Silver book – Conditions of Contract for EPC/Turnkey Projects). Jezik komunikacije u projektu „Program energetske efikasnosti u javnim zgradama" je engleski.

Na osnovu odredbi Posebnog ugovora, Ministarstvo ekonomije je ovlašćeno za potpisivanje Ugovora o izvođenju radova sa prvorangiranim ponuđačima. Prije potpisivanja, Predlozi ugovora, sa pratećom dokumentacijom se dostavljaju Vladi na razmatranje i usvajanje. Kako je jezik komunikacije u okviru projekta engleski, sva dokumentacija se dostavlja na engleskom jeziku. Za potrebe usvajanja Ugovora od strane Vlade Crne Gore prevedena je sledeća dokumentacija: Ugovori, Opšti i Posebni uslovi.

Ostala dokumentacija, koja je dio Ugovora, kao što su: zapisnik sa sastanka o pregovorima, pojašnjena tenderske dokumentacije, tehnički opisi i tehnički zahtjevi, i finansijska ponuda se dostavljaju na engleskom jeziku. Skenirana tehnička ponuda i tehnička dokumentacija (crteži), koji su sastavni dio ugovora, se ne dostavljaju na usvajanje.

4. Prilozi

Prilog br.1 – Zapisnik sa XIX sjednice Koordinacionog odbora
Prilog br.2 – Mišljenje Ministarstva finansija
Prilog br.3 – Saglasnost Njemačke razvojne banke
Prilog br.4 – Predlog ugovora o izvođenju radova na objektima iz klastera III, između JV Roaming i Ministarstva ekonomije
Prilog br.5 – Predlog ugovora o izvođenju radova na objektima iz klastera IV, između JV Fidja i Ministarstva ekonomije

Zapisnik sa XIX sjednice Koordinacionog odbora

Projekat:	Program energetske efikasnosti u javnim zgradama u Crnoj Gori (EEPPB)
Predmet:	XIX sjednica Koordinacionog odbora za realizaciju "Program energetske efikasnosti u javnim zgradama u Crnoj Gori"
Datum:	Utorak, 31.03.2015.god
Učesnici:	**Ministarstvo ekonomije:** Dragica Sekulić, Predsjednik Koordinacionog odbora Žana Radulović, član Koordinaciong odbora **Ministarstvo prosvjete:** Vesna Krivokapić, član Koordinaciong odbora **Ministarstvo finansija:** Dragan Darmanović, član Koordinacionog odbora **Jedinica za implementaciju projekta/ PMU:** Sandra Šipčić Toma Siništaj

XIX sjednica Koordinacionog odbora za realizaciju "Programa energetske efikasnosti u javnim zgradama u Crnoj Gori" (u daljem tekstu EEPPB) je održana 231.03.2015.godine sa sledećim dnevnim redom:

1. Informacija o rezultatima tendera za izbor izvođača radova na primjeni mjera energetske efikasnosti u objektima iz klastera III i IV i usvajanje zaključaka komisije za evaluaciju o odabiru najpovoljnijeg ponuđača

1. Informacija o rezultatima tendera za izbor izvođača radova na primjeni mjera energetske efikasnosti u objektima iz klastera III i IV i usvajanje zaključaka komisije za evaluaciju o odabiru najpovoljnijeg ponuđača

Poziv za predkvalifikaciju za tender za izvođenje radova na rekonstrukciji objekata iz klastera III i IV je objavljen 17.02.2014.godine. Rok za dostavljanje aplikacija je bio 07.04.2014.godine. Aplikacije je dostavilo 5 ponuđača. Svi ponuđači su se kvalifikovali za tender za izvođenje radova na objektima iz klastera III i IV.

Poziv kvalifikovanim ponuđačima da otkupe tendersku dokumentaciju upućen je 13.06.2014.godine. Rok za dostavljanje ponuda je bio 01.09.2014.godine. Ponude za klaster III su dostavila dva ponuđača, i to JV Roaming i JV Bitermo, dok su za klaster IV ponude dostavila tri ponuđača, i to JV Fidija, JV Bitermo i JV Normal.

Evaluacija ponuda je izvršena od strane Konsultanta (Fichtner) u saradnji sa Komisijom za evaluaciju ponuda, koju je formiralo Ministarstvo ekonomije. Na dostavljene izvještaje o evaluaciji ponuda dobijena je saglasnost KfW banke.

Nakon završene evaluacije ponuda, kao prvorangirani ponuđač za klaster III odabran je JV Roaming, koji čine preduzeća Roaming doo Nikšić, LD Gradnja doo Nikšić, Ening doo Nikšić i Ramel doo Nikšić. Ponuđena vrijednost radova za rekonstrukciju obrazovnih ustanova iz klastera III iznosi :

	Naziv obrazovne ustanove - klaster III	Vrijednost radova
1.	Srednja stručna škola Pljevlja	1.107.303,85
2.	O.Š."Ristan Pavlović" Pljevlja	608.831,06
3.	Gimnazija "Miloje Dobrašinović" Bijelo Polje	582.503,40
4.	O.Š."Mustafa Pećanin" Rožaje	655.842,65
5.	S.M.Š."Bećo Bašić" Plav	257.561,17
	Ukupno - klaster III	**3.212.042,13**

Nakon završene evaluacije ponuda, kao prvorangirani ponuđač za klaster IV odabran je JV Fidija, koji čine preduzeća IGH Fidija doo Podgorica i Bombeton doo Cetinje. Ponuđena vrijednost radova za rekonstrukciju obrazovnih ustanova iz klastera IV iznosi :

	Naziv obrazovne ustanove - klaster IV	Vrijednost radova
1.	O.Š. „Branko Božović" Podgorica	745.594,67
2.	O.Š."Vuko Jovović" Danilovgrad	628.361,18
3.	O.Š."Oktoih" Podgorica	668.244,82
	Ukupno - klaster IV	**2.042.200,67**

Rok za izvođenje radova za oba klastera je 5 mjeseci.
Planirano je da radovi na objektima iz klastera IV počnu krajem aprila ili početkom maja 2015.godine, a na objektima iz klastera III početkom juna 2015.godine.

Izvještaji o evaluaciji biće dostavljeni članovima Koordinacioonog odbora na uvid.

ZAKLJUČAK

1. Koordinacioni odbor je usvojio informaciju o rezultatima evaluacije ponuda za izbor izvođača radova na primjeni mjera energetske efikasnosti u objektima iz klastera III i IV i predložio potpisivanje ugovora.

Zapisnik usvojen od strane:

Dragica Sekulić, predsjednik

Vesna Krivokapić, član

Žana Radulović, član

Dragan Darmanović, član

Црна Гора
МИНИСТАРСТВО ЕКОНОМИЈЕ
ПОДГОРИЦА
Примљено: 09.3.2015
Орг. јед. | Број | Прилог | Вриједност
069-66/24

CRNA GORA
MINISTARSTVO FINANSIJA

Broj: 01-03-1931 /1
Podgorica, 06. 03. 2015. godine

MINISTARSTVO EKONOMIJE
-n/r generalne direktorice, g-đe Dragice Sekulić-

Poštovana,

Povodom Vašeg dopisa br: 0601-66/14, a u vezi zahtjeva za davanje mišljenja koje se odnosi na ugovore o izvođenju radova, koji se realizuju u sklopu „Programa energetske efikasnosti u javnim zgradama" obavještavamo Vas sljedeće:

Ministarstvo finansija nije u nadležnosti da dostavlja mišljenje na ugovore o izvođenju radova, već Ministarstvo ekonomije realizaciju vrši u skladu sa Ugovorom o kreditu i finansijskom doprinosu i u skladu sa Ugovorom koji je potpisan 22.11.2011. godine između Njemačke razvojne banke (KFW) i Ministarstva ekonomije.

S poštovanjem,

Црна Гора МИНИСТАРСТВО ФИНАНСИЈА ПОДГОРИЦА

GENERALNI DIREKTOR
Nikola Vukićević

81000 Podgorica, ul. Stanka Dragojevića br. 2
tel: +382 20 242 835; fax: +381 81 224 450; e-mail: mf@mif.gov.me

KfW Bankengruppe, Postfach 111141, 60046 Frankfurt am Main

Ministry of Economy
Dragica Sekulić
Deputy Minister
Department for Energy Efficiency
Podgorica
Montenegro

Cc:
Sandra Šipčić, Department for Energy Efficiency;
Mr. U. Becker, Fichtner GmbH& Co KG

Date: 08/04/2015

Business area
KfW Entwicklungsbank

Kathrein Tallowitz
Our ref.: TRAK
Phone: +49 69 7431-2844
Fax: +49 69 7431-662844
kathrein.tallowitz@kfw.de

»» Financial Cooperation between Germany and Montenegro
"Energy Efficiency Programme in Public Buildings"
BMZ-No. 2020 80 554

Dear Mrs. Sekulić,

Referring to the above mentioned Programme and the tender for Cluster III, we acknowledge receipt of the draft contract for the first ranked bidder.

We hereby give you our No Objection to the draft contract.

With kind regards

KfW

Florian Sekinger
Head of Division

Kathrein Tallowitz-Rojas Arteaga
Procurement Manager

KFW

Ministarstvo ekonomije
Dragica Sekulić
Pomoćnik ministra
Sektor za energetsku efikasnost
Podgorica
Crna Gora

CC:
Sandar Šipčić, Sektor za energetsku efikasnost
U.Becker, Fichtner GmbH&Co.KG

Finansijska saradnja između SR Njemačke i Crne Gore
"Program energetske efikasnosti u javnim zgradama"
BMZ-No. 2020 80 554

Datum: 08/04/2015
Poslovni sektor
KfW
Kathrein Tallowitz
Our ref: TRAK
Phone: +49 69 7431-2844
Fax: +49 69 7431-662844
kathrein.tallowitz@kfw.de

Poštovana g-đo Sekulić,

u skaldu sa gore pomenutim Programom i Tenderskom dokumentacijom za Klaster III, obavještavamo Vas da smo primili Predlog ugovora za prvorangiranog ponuđača.

Ovim dopisom dajemo saglasnost na dostavljeni Predlog ugovora.

S poštovanjem,

KfW

Florian Sekinger
Rukovodilac odsjeka

Kathrin - Tallowitz Rojas Artega
Rukovodilac nabavke

KfW Bankengruppe, Postfach 111141, 60046 Frankfurt am Main

Ministry of Economy
Dragica Sekulić
Deputy Minister
Department for Energy Efficiency
Podgorica
Montenegro

Cc:
Sandra Šipčić, Department for Energy Efficiency;
Mr. U. Becker, Fichtner GmbH& Co KG

Date: 01/04/2015

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kathrein.tallowitz@kfw.de

»» Financial Cooperation between Germany and Montenegro
"Energy Efficiency Programme in Public Buildings"
BMZ-No. 2020 80 554

Dear Mrs. Sekulić,

Referring to the above mentioned Programme and the tender for Cluster IV, we acknowledge receipt of the draft contract for the first ranked bidder.

We hereby give you our No Objection to the draft contract, recommending you to list the annexes 1-5 (with their respective names) under an additional clause 5 at the end of the Minutes of Negotiation (Contract Recommendation).

With kind regards

KfW

Dr. Frank Albert
Head of Division

Kathrein Tallowitz-Rojas Arteaga
Procurement Manager

KFW

Ministarstvo ekonomije
Dragica Sekulić
Pomoćnik ministra
Sektor za energetsku efikasnost
Podgorica
Crna Gora

CC:
Sandar Šipčić, Sektor za energetsku efikasnost
U.Becker, Fichtner GmbH&Co.KG

Finansijska saradnja između SR Njemačke i Crne Gore
"Program energetske efikasnosti u javnim zgradama"
BMZ-No. 2020 80 554

Datum: 01/04/2015
Poslovni sektor
KfW
Kathrein Tallowitz
Our ref: TRAK
Phone: +49 69 7431-2844
Fax: +49 69 7431-662844
kathrein.tallowitz@kfw.de

Poštovana g-đo Sekulić,

u skaldu sa gore pomenutim Programom i Tenderskom dokumentacijom za Klaster IV, obavještavamo Vas da smo primili Predlog ugovora za prvorangiranog ponuđača.

Ovim dopisom dajemo saglasnost na dostavljeni Predlog ugovora i preporučujemo da se u izvještaju o pregovorima sa provorangiranim ponuđačem u okviru stavke 5 navedu nazivi aneksa 1-5 (Predlog za potpisivanje ugovora).

S poštovanjem,

KfW

Dr.Frank Albert
Rukovodilac odsjeka

Kathrin - Tallowitz Rojas Artega
Rukovodilac nabavke



Montenegro
Ministry of Economy,
Directorate for Energy Efficiency

Energy Efficiency Program in Public Buildings (EEPPB)

Cluster III
Contract Documents

April 2015

A.Contract agreement

Contract Agreement

Contract Agreement No. .....

This Contract Agreement made on ...../...../ 2015
between

Ministry of Economy
Directorate for Energy Efficiency
Rimski Trg 46
81000 Podgorica
Montenegro

(hereinafter referred to as "the Employer")

OF THE FIRST PART

and

JV Roaming (Roaming Montenegro doo Nikšić, LD Gradnja doo Nikšić, Ening doo Nikšić and Ramel doo Nikšić), represented by Roaming Montenegro doo Nikšić

a corporation organized and doing business under the Law of Montenegro, with its registered business office at

Roaming Montenegro doo
Trg Slobode 27
81400 Nikšić
Montenegro

(hereinafter referred to as "the Contractor")

OF THE SECOND PART

Witnessed that the parties covenant, promise and agree each with the other as follows:

1. The Contractor agrees:

To do all specified works for the “Energy Efficiency Project in Public Buildings - Cluster III” as “Turn Key Project” in accordance with the terms, conditions and requirements of the Bid documents and papers set forth below, which are included in, attached to, and form part of this agreement, and which have been signed in duplicate for identification by both parties.

Contract Documents entitled “Energy Efficiency Project in Public Buildings – cluster III” dated ...../...../2015 shall be deemed to include:

a) Contract Agreement
b) Minutes of the Contract Negotiations
c) Clarification to Bidding Documents
d) Particular Conditions of Contract
e) General Conditions of Contract
f) Project Description and Procedures, with Technical Requirements
g) Contractor's Bid
h) Drawings

Document precedence from Contract Documents is according to above stated sequence.

The said Contract Agreement is intended to cover and provide for first class completed work in all respects; and everything necessary to carry out this intent which may be reasonably implied from the Contract Agreement shall be done by the Contractor, even if not particularly referred to in the Contract Agreement.

2. The Employer agrees:

To make to the Contractor the Payments as set forth in Clause 14 of "Particular Conditions" of the Contract Agreement.

3. It is mutually agreed:

(a) That the Work as herein before set forth shall be performed and completed in full compliance with the terms and conditions of the Contract Agreement.

(b) That the Contract comes into force at the Commencement Date. Commencement date will be when the conditions from "Particular Conditions" of the Contract Agreement, Sub-clause 1.6 are fulfilled”.

(c) That this Contract Agreement shall extend to, the binding upon, and ensure to the benefits of the successors and assigns of the parties hereto.

(d) A last-dated document in this contract shall always have precedence over any other document of an earlier date.

(e) That the Contract Price is:

(in figures) **EUR 3,212,042.13**

(in words) (Three million two hundred twelve thousand forty two Euro and thirteen Eurocents).

This amount is broken down in "Revised Price Schedules" which are the integral part of this Contract Agreement.

In witness whereof the Contractor and the Employer have respectively affixed the hands of their proper officers on the day and year first above written.

For and on behalf of
Ministry of Economy

……...	……...
Mr. Vladmir Kavarić	Ms. Dragica Sekulić
Minister of Economy	Director General of the Directorate for Energy Efficiency

For and on behalf of
Roaming Montenegro doo Nikšić

……...	……...
Mr. Dalibor Milović	Mr. Nebojša Lalatović
Director	Legal representative

Ugovor

Ugovor br. .....

Ovaj ugovor je potpisan dana ...../...../ 2015
između

Ministarstva ekonomije
Direktorat za energetsku efikasnost
Rimski Trg 46
81000 Podgorica
Crna Gora

(u daljem tekstu; "Investitor")

sa jedne strane

i

JV Roaming (Roaming doo Nikšić, LD Gradnja doo Nikšić, Ening doo Nikšić and Ramel doo Nikšić), koji predstavlja Roaming Montenegro doo Nikšić

udruženja koje je organizovano i posluje u skladu sa zakonima Crne Gore, i ima sjedište na sledećoj adresi:

Roaming Montenegro doo
Trg Slobode 27
81400 Nikšić
Crna Gora

(u daljem tekstu; "Izvođač")

Sa druge strane

Potvrđujemo da ugovorne se strane obavezuju i slažu u vezi sledećeg:

1. Izvođač je saglasan da:

Izvede sve navedene radove u okviru projekta “Program energetske efikasnosti u javnim zgradama-klaster I” po sistemu “ključ u ruke” u skladu sa uslovima i zahtjevima tenderskog dokumenta, kao i ostalih dolje navedenih dokumenata, koji su uključeni, priloženi i sastavni su dio ove ponude, a koji su potpisani kao duplikat od obje strane.

Ugovor pod nazivom “Program energetske efiksanosti u javnim zgradama– klaster III ” od ...../...../ 2015 obuhvata sledeće:

i) Ugovor

j) Zapisnik sa sastanka o pregovorima uključujući:

k) Pojašnjenje tenderske dokumentacije

l) Posebne uslove ugovora

m) Opšte uslove ugovora

n) Opis projekta i procedure, sa tehničkim zahtjevima

o) Ponudu ponuđača

p) Crteže

Prioritet dokumenata je u skladu sa gore navedenim redoslijedom.

Navedenim ugovorom se namjerava obuhvatiti i obezbjediti prvoklasno izvođenje radova, u svakom pogledu i sve ostale neophodne radnje prouzrokovane ugovorom, moraju biti izvedene od strane Izvođeča, čak iako nisu posebno navedene u ugovoru.

2. Investitor je saglasan:

Da izvrši plaćanje u skladu sa klauzulom 14, Posebnih uslova ugovora

3. Investitor i Izvođač su saglasni:

(a) Da će radovi biti izvedeni i završeni, u skladu sa odredbama i uslovima ovog ugovora.

(b) Da ugovor stupa na snagu na dan početka radova.
Dan početka radova je dan kada se ispune uslovi iz podklauzule 1.6, Posebnih uslova ugovora.

(c) Da se ovaj ugovor primjenjuje i da je obavezujući za strane potpisnice

(d) Poslednji usvojeni dokument u okviru ovog ugovora će uvijek imati prioritet u odnosu na, ranije usvojene, dokumente.

(e) Ugovorena vrijednost radova je:

(brojevima) **EURA 3,212,042.13**

(slovima) (tri miliona dvjesta dvanaest hiljada četrdeset dva eura i trinaest centi).

Ovaj iznos je dat u jediničnim cijenama u okviru revidovane finansijske ponude, koja je sastavni dio ovog ugovora.

Mi, dolje potpisani smo svjedoci da su se izvođač i investitor saglasili dana, koji je gore naveden.

U ime Ministarstva ekonomije

……...	……...
G-din Vladmir Kavarić	G-đa Dragica Sekulić
Ministar ekonomije	Generalna direktorica
	Direktorata za energetsku efikasnost

U ime
Roaming Montenegro doo Nikšić

……...	……...
G-din Dalibor Milović	G-din Nebojša Lalatović
Direktor	Pravni zastupnik

B1. Contract negotiations report



Montenegro
Ministry of Economy,
Directorate for Energy Efficiency

Energy Efficiency Program in Public Buildings (EEPPB)

Bid Report
Contract Recommendation

Cluster III

Project financed by:

KfW Development Bank

Project implemented by:

Fichtner GmbH & Co. KG
Germany

South East Europe Consultants (S.E.E.C.) Ltd.
Serbia

EXERGIA S.A.
Greece

March 2015

Issue and Revision Record

No.	Date	Originator	Checker	Description
A	19/03/2015	S. Sipcic/U. Becker	P. Stojcic	-

Fichtner GmbH & Co.KG

Head Office:		Project Office: c.o. KOPRING PMC d.o.o.	
Sarweystrasse 3		Jovana Tomaševića 9 / 2-11	
70191 Stuttgart, Germany		20000 Podgorica, Montenegro	
Phone:	+49-711-8995-520	Phone:	+382-20-203-265
Fax:	+49-711-8995-530	Fax:	+382-20-203-266
Mobile:	+382-69-892-955	Contact:	Nebojsa Zizic
E-mail:	ubecker@fibaucon.de	E-mail	n.zizic@kopringpmc.com

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Preamble

This report was prepared by Fichtner and approved by the MoE Evaluation Committee.
It is approved by the Client and the Bidder JV Roaming

On behalf of MoE evaluation committee	On behalf of Fichtner evaluation team	On behalf of JV Roaming
Dragica Sekulić	Udo Becker	Dalibor Milović
Žana Radulović		
Sandra Šipčić		

4/21

0. Summary and Recommendation

This evaluation report covers the contractual recommendation of the Bid of JV Roaming, for the **Cluster III** of the project “MNE EEPPB”**.**

For details on the previous procedure, please refer to the following approved documents:

- **Qualification evaluation** - “Report on the Evaluation of the Qualification Documents”;
- **Bid opening** - “Protocol on opening of the Bids”;
- **Technical evaluation** - “Technical evaluation report”:
- **Commercial evaluation** - “Commercial evaluation report”.

As result of these contract negotiations, it is **recommended to sign the contract with JV Roaming**.

1. Introduction

1.1 General

The Project Executing Authority/Employer, Ministry of Economy, uses funds provided by KfW Development Bank within the scope of German Financial Co-operation towards financing the implementation of the Project “MNE EEPPB - Energy Efficiency Program in Public Buildings in Montenegro”.

The project comprises the execution, on a turnkey basis, of the below supplies and services.

Cluster III
In a group of five schools in Pljevlja (two facilities), Bijelo Polje, Rožaje and Plav, energy efficiency measures shall be implemented, comprising the following works: Thermal insulation of external walls and the roof, including partial replacement of the roof structures; installation of new windows, doors and façade elements; renovation of an existing or installation of a new heating system, renovation of the sanitary facilities, and installation of an energy management system. The works shall be executed between beginning of April and end of August 2015.

After a separate pre-qualification process the bidding procedure comprises two envelopes with the financial and technical part. Bidders should submit one bid containing the two envelopes.

1.2 Basic Data Sheet

The key information of the tendering process is compiled in the ***Basic Data Sheet*** below.

Project Title	Energy Efficiency Program in Public Buildings EEPPB
Reference No. (BMZ ID)	202080554
Invitation for Bids issued	13/06/2014
Site visit & pre-bid meeting	07 and 08/07/2014;10/07/2014
Time extension issued on	No extension
Bid Closing date and time	01/09/2014, 12:00 p.m.
Number of Bids received	2
Bid validity	180 days
Clarifications to the Tender Documents	Clarification no. 1 dated 23/07/2014
Clarification to Bids	Clarification no. 1 dated 15/08/2014

2. Contract negotiations

2.1 General

As a result of the technical and commercial evaluation of the Bids, the Bidder JV Roaming was invited to the contract negotiations on 04/03/2015. The contract negotiation was held on 09/03/2015.

At the meetings were present

- for the Client: Dragica Sekulic, Sandra Sipcic;
- for the PC: Udo Becker;
- for the Bidder: Dalibor Milovic, Monika Međedović, Veljko Nikolic, Ilija Nikolic.

2.2 Contract negotiation procedure

With the invitation to the contract negotiations, the Bidder received a clarification list, containing open topics were additional information and confirmations were listed.

In the meeting on 09/03/2015 the following topics were addressed:

1. Price schedule,
2. The offered sum,
3. Technical data,
4. Start of works (question raised by JV Roaming during the meeting).

For details refer to Annex1 – “Invitation to contract negotiations”.

JV Roaming submitted the requested clarifications on 19/03/2015 (Annex 2 - 4).

3. Clarifications by the Bidder

3.1 Price schedule

The Bidder provided the requested corrected pages of the price schedule, duly signed and stamped.

3.2 The offered price

The Bidder corrected all mistakes in the price schedule, which resulted in a new total price of **EUR 3,212,042.13.** The respective letter from JV Roaming with the corrected financial offer is attached in Annex 2.

3.3 Technical data

The Bidder has provided a statement on principal technical data for doors and windows in English language (Annex 3).

The Bidder has also provided a statement on technical data for the thermal insulation in English language (Annex 4).

3.4 Other topics

(1) The start of works is presently scheduled for end of May 2015. A Kick-off meeting of the PC's supervising team with the Contractor's Project Manager and Site Managers, as well as of the Client's project team will be organized prior to the commencement of the works on the sites.

(2) The Bidder has been informed that the installation of the boiler in the Secondary school "Miloje Dobrašinović" in Bijelo Polje will be excluded from the scope of works. Details will be announced at the Kick-off meeting.

(3) JV Roaming was asked to submit an extended tender guarantee with validity until 30/04/2015. The new guarantee was received on 19/03/2015 (Annex 2)

(4) The Bidder did not have comments on the General and Particular Conditions of the Contract.

4. Conclusion

As a result of the contract negotiations, **it is recommended to invite JV Roaming for contract signature**.

5. Annexes

Annex 1 - Invitation for contract negotiations

Annex 2 - Extended tender guarantee and corrected financial offer

Annex 3 – Statement on principal technical data for doors and windows

Annex 4 – Statements on technical data for the thermal insulation

Annex 1 – Invitation for contract negotiations

Crna Gora
Ministarstvo ekonomije

Ref No: 069 - 241/2
Podgorica, 04/03/2015

Roaming Montenegro doo
Attention: Mr. Dalibor Milović
Trg Slobode 27
83000 Nikšić
Montenegro

Energy Efficiency Program in Public Buildings
Tender for energy efficient reconstruction and modernisation of five educational buildings of cluster III

Invitation for contract negotiation

Dear Mr. Milović,

Herewith we inform you that according to the evaluation of the Bids for reconstruction of five educational buildings of cluster III, under the EEPPB project, the Bid of JV Roaming is considered as first ranged. Therefore we invite you to the contract negotiations, which will be held in the premises of the Ministry of Economy (Rimski Trg 46, Podgorica) on 09/03/2015, starting at 11:00 a.m.

At the contract negotiations the Bidder shall be requested to clarify the following:

1. **Price schedule**
   The price schedule shall be updated as follows:

   1. A5.1.1 – The amounts of the positions 6.15 (EUR 435.65) and 6.27 (EUR 9,471.00) have not been calculated. In consequence, the total of chapter VI shall be EUR 140,960.00 instead of EUR 133,200.11.
   2. A5.2.1 – The total of chapter III shall be EUR 93,459.35 instead of EUR 92,516.35 and the total of chapter VI shall be EUR 2,312.84 instead of EUR 2,058.64 (sum errors).

Rimski trg 46, 81000 Podgorica
Tel: (+382) 20 482 238; 482 446 Fax: (+382) 20 234 081
Web: www.minekon.vlada.cg.yu

3. A5.2.3 - The unit price of position 2.1 has not been offered. A price of EUR 1,230.60 has been derived from the bidder JV Bitermo. In consequence, the total of chapter 2 shall be EUR 10,520.76 instead of EUR 9,290.16.
4. A5.3.1 - The total of chapter III shall be EUR 102,981.35 instead of EUR 96,573.55 (positions 3.01 and 3.05 are not included in the calculation = sum error). In the summary of costs for chapter VI (Spare Parts) the total shall be EUR 437.00 instead of EUR 48,256.74.
5. A5.4.1 - The total of chapter II shall be EUR 102,716.33 instead of EUR 101,457.08 (part of position 2.14 is not included in the calculation = sum error).
6. A5.5.1 - The total of chapter I shall be EUR 56,016.16 instead of EUR 51,083.76 (positions 1.01-1.04 are not included in the calculation = sum error). The total of chapter IV shall be EUR 26,710.78 instead of EUR 26,139.78 (positions 4.01-4.03 are not included in the calculation = sum error).

2. **The offered sum**
   Due to the aforementioned, the offered sum shall be 3.209.165,28 Euro.

3. **Technical data**

   1. The Bidder has to provide a statement on principal technical data for doors and windows in English language.

   2. The Bidder has to provide a statement on principal technical data for thermal insulation in English language.

The Bidder is also required to prepare comments, if any, to the General and Particular conditions of the Contract which are part of the tender documents (Tender documents, part A2 and A3).

The Bidder JV Roaming shall confirm, by Friday 06/03/2015, by 11:00am, if time and date proposed for the contract negotiations are acceptable for him. Information about the persons present at the contract negotiations shall be provided by the same date.

Tender evaluation committee

_____

Dragica Sekulić,
Chairperson

Annex 2 – Extended tender guarantee and corrected financial offer



MONTENEGRO ROAMING

Trg Slobode 27, 81400 Nikšić
PIB: 02451336
Bank

Tel.:+382 40 212 800
PDV: 40/31-01112-8

Fax: +382 40 213 136
žr: 540-1330-35 Erste

Name of Contract: Energy Efficiency Program in Public Buildings – Cluster III

To:

Ministry of Economy

Sector for Energy Efficiency

Rimski Trg 46

81000 Podgorica

Montenegro

Attention: Mrs Sandra Sipcic

Dear all,

Herewith we submit corrected financial offer and extended guarantee for Cluster III.

19. March 2015.

.....

(signature)

In the capacity of

Executive Director

Duly authorized to sign on behalf of

ROAMING MONTENEGRO

ERSTE Bank

ERSTE BANK AD Podgorica
Podgorica

Studentska bb, 81000

Tel: 020 440 440
Fax: 020 440 432

www.erstebank.me
info@erstebank.me

ERSTE BANK AD PODGORICA
FILIJALA NIKŠIĆ 3000
Broj 221/15
Nikšić, 18.03. 2015 god.

To:

Ministry of economy
sector for energy efficiency
Rimski trg 46
81000 Podgorica
Montengro

AMENDMENT NO.1 REGARDING OUR BID SECURITY No. 5400006373

Upon request of our client Roaming Montenegro D.o.o. Montenegro – Trg Slobode 27, 81400 Nikšić, Montenegro, we amend above mentioned Bid security no: 5400006373 dated August 27th, 2014 as follows:

We change expiry date into: not later than the 30th of May 2015. instead of: not later than the March 29th,2015.

All other details from our original Bid Security no.: 5400006373 dated August 27th, 2014. remain unchanged.

Podgorica, 18.03.2015.

(signatures)

ERSTE BANK AD PODGORICA
ERSTE Bank
FILIJALA NIKŠIĆ 3000

MONTENEGRO ROAMING

Trg Slobode 27, 81400 Nikšić Tel.:+382 40 212 800 Fax: +382 40 213 136 PIB: 02451336 PDV: 40/31-01112-8 žr: 540-1330-35 Erste Bank

Date 29/08/2014

Loan/Credit No.: |BMZ Nr.202080554|

KfW No.: |...|

Name of Contract:

Energy Efficiency Program in Public Buildings- Cluster III

To:

Ministry of Economy

Directorate for Energy Efficiency

Rimski Trg 46

81000 Podgorica

Montenegro

Phone: **+382 (20) 482 238**

Fax: **+382 (20) 234 081**

E-mail: **sandra.sipcic@ee-me.org**

Attention: **Mrs Sandra Sipcic**

Ladies and/or Gentlmen,

Having examinated the Bid documents, the receipt of which is hereby acknowledged, we, the undersigned, offer to perform construction works under the above named Contract in full conformity with the said Bid documents for the sum of:

(Three millions two hundred twelve thousand forty two point thirteen, Eur) for definite works **3212042.13 Eur)**

thereof

1107303.85 Eur for Educational building 1: Secondary Vocational School, Pljevlja **(One million one hundred seven thousand three hundred and three Eur and eighty five cents)**

608831.06 Eur for Educational building 2: Primary School "Ristan Pavlović", Pljevlja **(Six hundred and eight thousand eight hundred thirty one Eur and six cents)**

582503.40 Eur for Educational building 3: Secondary School "Miloje Dobrašinović", Bijelo Polje **(Five hundred eighty two thousand five hundred and three Eur and forty cents)**

655842.65 Eur for Educational building 4: Primary School "Mustafa Pećanin", Rožaje **(Six hundred fifty five thousand eight hundred forty two Eur and sixty five cents)**

257561.17 Eur for Educational building 5: Primary School "Mustafa Pećanin", Rožaje **(Two hundred fifty seven thousand five hundred sixty one Eur and seventeen cents)**

Or such other sums as may be determined in accordance with the terms and conditions of the Contract. The above amounts are in accordance with the price schedules attached herewith and are made part of this Bid.

We undertake, if our Bid is accepted, to commence the Facilities, and to achieve Completion within the respective times stated in the Bid documents.

If our bid is accepted, we undertake to provide an advance payment security and a performance security in the form and amounts, and within the times specified in the Bid documents.

We agree to abide by this Bid for a period of 180 days from the date fixed for submission of Bids as stipulated in the Bid documents, and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period

2

Until a formal contract is prepared and executed between us, this Bid, which consists of this letter and Attachments through hereto, together with your written acceptance thereof and your notification of award, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest, or any Bid you may receive.

Dated this 29 day of August 2014



.....

(signature)

In the capacity of

Executive Director

Duly authorized to sign this Bid for and on behalf of

ROAMING MONTENEGRO

3

žž

Annex 3 – Statement on principal technical data for doors and windows

MONTENEGRO ROAMING

Trg Slobode 27, 81400 Nikšić | Tel.:+382 40 212 800 | Fax: +382 40 213 136

PIB: 02451336 | PDV: 40/31-01112-8 | žr: 540-1330-35 Erste Bank

Ministry of Economy of Montenegro

CONFORMITY STATEMENT

Under full legal and financial responsibility we declare that doors and windows which are given in the offer in fully meet below requirements requested in the tender documentation:

- System window testing in line with 14351-1 and B 5300,
- Air permeability attest EN 12207 - Class 4,
- Water resistance attest EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,
- Mechanical requirements EN 12400 - Class 2,
- Sound proofing attest up to protection class 5,
- Heat transfer coefficient attest DIN EN 12412-2, U = 1.5 W / m2 K,
- Glass attest EN 673, minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%,
- Metal supporters attest V ENV 1627-1630, resistance class 3.

ROAMING MONTENEGRO

Executive director

.....



Annex 4 – Statements on technical data for the thermal insulation

MONTENEGRO ROAMING

Trg Slobode 27, 81400 Nikšić | Tel.:+382 40 212 800 | Fax: +382 40 213 136

PIB: 02451336 | PDV: 40/31-01112-8 | žr: 540-1330-35 Erste Bank

Ministry of Economy of Montenegro

CONFORMITY STATEMENT

Under full legal and financial responsibility we declare that expanded polystyrene, given in the offer has thermal conductivity coefficient of λmax = 0,037 W/mK, thickness 10cm, is produced by relevant EN standards and in fully meet requirements requested in the tender documentation.

ROAMING MONTENEGRO

Executive director

.....

MONTENEGRO ROAMING

Trg Slobode 27, 81400 Nikšić | Tel.:+382 40 212 800 | Fax: +382 40 213 136

PIB: 02451336 | PDV: 40/31-01112-8 | žr: 540-1330-35 Erste Bank

Ministry of Economy of Montenegro

CONFORMITY STATEMENT

Under full legal and financial responsibility we declare that XPS - extruded polystyrene, given in the offer has thickness d=10cm resilient to mechanical damages, with nominal thermal conductivity of λ =0,035-0,04 W/mK and in fully meet requirements requested in the tender documentation.

ROAMING MONTENEGRO

Executive director

.....

Trg Slobode 27, 81400 Nikšić | Tel.:+382 40 212 800 | Fax: +382 40 213 136
PIB: 02451336 | PDV: 40/31-01112-8 | žr: 540-1330-35 Erste Bank

Ministry of Economy of Montenegro

CONFORMITY STATEMENT

Under full legal and financial responsibility we declare that offered pressed mineral wool is A1 flammability class.

ROAMING MONTENEGRO

Executive director

.....



B2. Price schedule (updated)

MONTENEGRO ROAMING

Trg Slobode 27, 81400 Nikšić Tel.:+382 40 212 800 Fax: +382 40 213 136 PIB: 02451336 PDV: 40/31-01112-8 žr: 540-1330-35 Erste Bank

Date 29/08/2014

Loan/Credit No.: |BMZ Nr.202080554|

KfW No.: |...|

Name of Contract:

Energy Efficiency Program in Public Buildings- Cluster III

To:

Ministry of Economy

Directorate for Energy Efficiency

Rimski Trg 46

81000 Podgorica

Montenegro

Phone: +382 (20) 482 238

Fax: +382 (20) 234 081

E-mail: sandra.sipcic@ee-me.org

Attention: Mrs Sandra Sipcic

Ladies and/or Gentlmen,

Having examinated the Bid documents, the receipt of which is hereby acknowledged, we, the undersigned, offer to perform construction works under the above named Contract in full conformity with the said Bid documents for the sum of:

(Three millions two hundred twelve thousand forty two point thirteen, Eur) for definite works **3212042.13 Eur)**

thereof

1107303.85 Eur for Educational building 1: Secondary Vocational School, Pljevlja **(One million one hundred seven thousand three hundred and three Eur and eighty five cents)**

608831.06 Eur for Educational building 2: Primary School "Ristan Pavlović", Pljevlja **(Six hundred and eight thousand eight hundred thirty one Eur and six cents)**

582503.40 Eur for Educational building 3: Secondary School "Miloje Dobrašinović", Bijelo Polje **(Five hundred eighty two thousand five hundred and three Eur and forty cents)**

655842.65 Eur for Educational building 4: Primary School "Mustafa Pećanin", Rožaje **(Six hundred fifty five thousand eight hundred forty two Eur and sixty five cents)**

257561.17 Eur for Educational building 5: Primary School "Mustafa Pećanin", Rožaje **(Two hundred fifty seven thousand five hundred sixty one Eur and seventeen cents)**

Or such other sums as may be determined in accordance with the terms and conditions of the Contract. The above amounts are in accordance with the price schedules attached herewith and are made part of this Bid.

We undertake, if our Bid is accepted, to commence the Facilities, and to achieve Completion within the respective times stated in the Bid documents.

If our bid is accepted, we undertake to provide an advance payment security and a performance security in the form and amounts, and within the times specified in the Bid documents.

We agree to abide by this Bid for a period of 180 days from the date fixed for submission of Bids as stipulated in the Bid documents, and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period

Until a formal contract is prepared and executed between us, this Bid, which consists of this letter and Attachments through hereto, together with your written acceptance thereof and your notification of award, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest, or any Bid you may receive.

Dated this 29 day of August 2014



.....

(signature)

In the capacity of

Executive Director

Duly authorized to sign this Bid for and on behalf of

ROAMING MONTENEGRO

GROUP A5.1.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Secondary Vocational School in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	Secondary Vocational School Pljevlja
	Doc. origin:	Final Architectural Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings, drips, flashing sills, horizontal and vertical rain gutters, top gutter cisterns and gargoyles. Flashings have different developed widths and they are made of galvanized double interlock system metal sheet d=0,68 mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and transportation of debris to the town landfill up to 5 km distance. Calculation per m of dismantled flashing, gutters and their supporters.						
	Calculation per m and per piece.						
	drips						
	- building A						
	roof parapet - d.w. 60cm	m	44,20	x	1,03 €	=	**45,31 €**
	up the wall on the first floor - d.w. 40cm	m	29,24	x	1,03 €	=	**29,97 €**
	canopy - d.w. 35cm	m	15,50	x	1,03 €	=	**15,89 €**
	facade walls beneath the windows - d.w.25cm	m	278,68	x	1,03 €	=	**285,65 €**
	flashing sills						
	- building A - openings marked as N d.w. 25 cm	m	8,05	x	1,03 €	=	**8,25 €**
	- building B - all openings d.w. 25cm	m	131,09	x	1,03 €	=	**134,37 €**
	- building B - boiler room and garage d.w. 25cm	m	8,80	x	1,03 €	=	**9,02 €**
	vertical rain gutters						
	- building A - dim. 12x12cm	m	105,14	x	1,03 €	=	**107,77 €**
	- building B - dim. 12x12cm	m	32,70	x	1,03 €	=	**33,52 €**
	- building B - boiler room and garage dim 10x10cm	m	4,84	x	1,03 €	=	**4,96 €**
	- building B - boiler room and garage dim 10x7cm	m	8,92	x	1,03 €	=	**9,14 €**
	- building C - dim 12x12cm	m	41,70	x	1,03 €	=	**42,74 €**
	top gutter cisterns						
	- building A	pc	10	x	5,13 €	=	**51,25 €**
	- building B	pc	5	x	5,13 €	=	**25,63 €**
	- building B - boiler room and garage	pc	3	x	5,13 €	=	**15,38 €**
	- building C	pc	4	x	5,13 €	=	**20,50 €**
	horizontal rain gutters						
	- building A - dim 12x12cm	m	93,01	x	1,03 €	=	**95,34 €**
	- building B - dim 12x12cm	m	49,38	x	1,03 €	=	**50,61 €**

	- building B - boiler room and garage dim 10x10cm	m	6,50	x	1,03 €	=	**6,66 €**
	- building B - boiler room and garage dim 10x7cm	m	14,83	x	1,03 €	=	**15,20 €**
	- building C - dim 12x12cm	m	69,72	x	1,03 €	=	**71,46 €**
	gargoyles						
	- building A	pc	3	x	5,13 €	=	**15,38 €**
1.02.	Careful demolition of the existing walls: - boiler room and garage walls, d=30 cm, due to installation of new double-leaf door, -parapet walls (beneath five basement windows marked as 3 and one marked as 26 - drawing SS-ARH-08). Removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance, -inner walls in order to open the new door and ventilation opening for planned disabled person's toilet, and the new door for teaching preparation room nearby.						
	Calculation per m^3						
	boiler room and the garage	m^3	0,86	x	76,88 €	=	**66,11 €**
	parapet walls below the windows	m^3	2,96	x	76,88 €	=	**227,55 €**
	inner walls	m^3	0,67	x	76,88 €	=	**51,63 €**
1.03.	Stripping off the dilapidated plaster from the facade using scaffold (calculated as a percentage of complete plastered facade area). Removal and loading of debris onto a truck and transportation to a land fill up to 5 km distance.						
	Calculation per m2						
	building A	m2	20,00	x	5,64 €		**112,75 €**
	building B (5% of total facade area)	m2	34,36	x	5,64 €		**193,70 €**
	building B - reliefs (5%)	m2	1,57	x	5,64 €	=	**8,85 €**
	building B - boiler room and garage (5%)	m2	6,21	x	5,64 €	=	**35,01 €**
	building C (20%)	m2	122,40	x	5,64 €	=	**690,03 €**

1.04.	Clean the facade surface from dirt, moss and dust. Undertake the cleaning mechanically or chemically. During cleaning, be careful not to damage the surface. Surface strength and absorption shall be provided. Prior to this, dirty, wet and non-bearing surface shall be remedied. The interior mortar and coating shall set prior to commencing the works. Works to be conducted depending on the surface: *smooth surfaces furrowed, *bubbling brushed with dry brush, *wet surfaces dried and protected, *mildew and algae cleaned by using algae remover, *binding mortar cleaned and coated with flexible and cement free adhesive, *dusty surface brushed, cleaned under high pressure, washed with water and dried, *lime mortar removed and covered with equalization coating, *mortar remains mechanically removed, *joints between bricks filled with cement mortar, filled joints cleaned with foam, paint cleaned with water and dried. Calculation as per m2 of the cleaned surface. The unit price includes usage of scaffolding.				0,00 €		
	Calculation per m2				0,00 €		
	building A	m2	1.266,11	x	2,26 €	=	**2.855,08 €**
	building B	m2	823,70	x	2,26 €	=	**1.857,44 €**
	building B - boiler room and garage	m2	110,41	x	2,26 €	=	**248,97 €**
	building C	m2	523,62	x	2,26 €	=	**1.180,76 €**
1.05.	Purchase of material and construction of new walls: *building A: parapet walls at the end of corridors on first and second floor-near the external staircase, *building B: wall that partially closes existing window marked as 26, *building C: partial closing of the window in the staircase. Walls shall be made of brick blocks, dim. 19x19x25 cm, laid in gauge mortar 1:2:6, d=25 cm with proper connection to existing wall reinforcement and vertical and horizontal beams in line with regulations. Brick blocks shall be drenched before use. Cleaning of the joints after the work completion is required.						
	Calculation per m^3.						
	building A	m^3	1,02	x	105,58 €	=	**107,69 €**
	building B	m^3	1,38	x	105,58 €	=	**145,69 €**
	building C	m^3	0,78	x	105,58 €	=	**82,35 €**

1.06.	Purchase of the material and building the partition wall in the area of reconstruction of toilets for disabled persons and closing of the openings of the two dismantled doors. The walls shall be built by bricks in gauged mortar 1:2:6 in line with Design. During construction, connection shall be achieved by "working on a half-element" and the connection to the existing wall shall be done in line with regulations. The unit price includes necessary reinforcement beams above doors, proper connection to existing walls and vertical and horizontal beams in line with regulations and usage of the scaffold. Item to be calculated per m2.						
	wall 12 cm thick	m2	12,86	x	22,96 €	=	**295,27 €**
1.07.	Plastering of the existing damaged external walls, as well as the damages caused by the dismantling of the existing windows, doors and removal of the new parapets. This item also includes plastering of the newly built inner walls. Damaged surfaces shall be treated with two layers of cement mortar 1:3, previously treated with cement milk. The first layer shall be applied roughly and the second-fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges.						
	Calculation per m2.						
	damaged facade						
	building A	m2	20,00	x	8,00 €	=	**159,90 €**
	building B (5%)	m2	34,36	x	8,00 €	=	**274,71 €**
	building B - reliefs (5%)	m2	1,57	x	8,00 €	=	**12,55 €**
	building B - boiler room and garage (5%)	m2	6,21	x	8,00 €	=	**49,65 €**
	building C (20%)	m2	122,40	x	8,00 €	=	**978,59 €**
	around openings						
	building A	m2	270,25	x	8,00 €	=	**2.160,65 €**
	building B	m2	124,02	x	8,00 €	=	**991,54 €**
	building B - boiler room and garage	m2	7,62	x	8,00 €	=	**60,92 €**
	building C	m2	56,57	x	8,00 €	=	**452,28 €**
	new parapets						
	building A, B and C	m2	9,44	x	8,00 €	=	**75,47 €**
	wall in the area of newly built toilet for disabled persons	m2	25,72	x	8,00 €	=	**205,63 €**
1.08.	Dismantling and re-installation of cameras, lighting and antennas. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility.						
	Calculation as per piece.						
	building A						
	cameras	pc	3	x	46,13 €	=	**138,38 €**
	antennas	pc	2	x	46,13 €	=	**92,25 €**
	building B						
	cameras	pc	1	x	46,13 €	=	**46,13 €**

	lightning	pc	2	x	46,13 €	=	**92,25 €**
	building C						
	cameras	pc	1	x	46,13 €	=	**46,13 €**
	lightning	pc	2	x	46,13 €	=	**92,25 €**
1.09.	Production and installation of metal sheet flashings, on roof parapets, drips, flashing sills, rain gutters, top gutter cisterns and gargoyles made of ready made galvanized plastic-laminated steel metal sheets d=0,70 mm. The item includes surface preparation and complete binding following the regulations. Undertake the entire procedure in compliance with the Design and samples selected and approved by the Employer / Employer's Representative. Calculation per m of treated flashing, entire binding and joining material.						
	Calculation per m						
	drips						
	- building A -						
	roof parapet - d.w. 70cm	m	44,20	x	18,04 €	=	**797,37 €**
	to the wall of the first floor - d.w. 40cm	m	29,24	x	14,97 €	=	**437,58 €**
	canopy - d.w. 35cm	m	15,50	x	14,97 €	=	**231,96 €**
	on the facade, beneath the windows - d.w. 35cm	m	278,68	x	14,97 €	=	**4.170,45 €**
	- building C -						**0,00 €**
	roof - valley - d.w. 60cm	m	12,00	x	14,97 €	=	**179,58 €**
	roof- next to the skylight - d.w. 40cm	m	19,20	x	14,97 €	=	**287,33 €**
	roof - beneath the rain gutters - d.w. 50cm	m	75,34	x	14,97 €	=	**1.127,46 €**
	flashing sills						
	- building A - d.w. 25cm						
	basement	m	51,52	x	14,97 €	=	**771,00 €**
	lateral facade- the first and the second floor	m	5,24	x	14,97 €	=	**78,42 €**
	- building B - d.w. 35cm	m	129,89	x	14,97 €	=	**1.943,80 €**
	- building B - boiler room and garage - d.w. 25 cm	m	8,80	x	14,97 €	=	**131,69 €**
	- building C - d.w. 25cm	m	39,16	x	14,97 €	=	**586,03 €**
	vertical rain gutters						
	- building A - dim. 12x12cm	m	105,14	x	14,97 €	=	**1.573,42 €**
	- building B - dim. 12x12cm	m	55,00	x	14,97 €	=	**823,08 €**
	- building B - dim. 10x10cm	m	4,84	x	14,97 €	=	**72,43 €**
	- building B- dim. 10x7cm	m	8,92	x	14,97 €	=	**133,49 €**
	- building C - dim. 12x12cm	m	41,70	x	14,97 €	=	**624,04 €**
	top gutter cisterns						
	- building A -	pc	10	x	46,13 €	=	**461,25 €**
	- building B -	pc	7	x	46,13 €	=	**322,88 €**
	- building B -	pc	3	x	46,13 €	=	**138,38 €**
	- building C -	pc	4	x	46,13 €	=	**184,50 €**
	horizontal rain gutters						
	- building A - dim. 12x12cm	m	93,01	x	14,97 €	=	**1.391,89 €**
	- building B - dim. 12x12cm	m	71,69	x	14,97 €	=	**1.072,84 €**
	- building B - dim. 10x10cm	m	6,50	x	14,97 €	=	**97,27 €**
	- building B - boiler room and garage - dim. 10x7cm	m	14,83	x	14,97 €	=	**221,93 €**
	- building C - dim. 12x12cm	m	69,72	x	14,97 €	=	**1.043,36 €**
	gargoyles						
	- building A - canopy -	pc	3	x	66,63 €	=	**199,88 €**
	vertical dilatation						
	- building A - d.w. 25cm	m	10,00	x	14,97 €	=	**149,65 €**

	- building B - d.w. 25cm	m	6,50	x	14,97 €	=	**97,27 €**
	- building B - boiler room - d.w. 25cm	m	6,50	x	14,97 €	=	**97,27 €**
	- building C - d.w. 25cm	m	5,00	x	14,97 €	=	**74,83 €**
1.10.	On the external side, thermal insulation of reinforced concrete (hereinafter RC) and brick facade walls will be made of expanded EPS polystyrene having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm (5 cm thickness on the sides of the windows), produced in line with the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade walls reaching up to the height of h=1,6m from ground floor will be treated with stiffer insulating material, XPS- extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with heat transfer coefficient of λ=0,035-0,04 W/mK. Board steadiness: min. 500KPa.						
	Thermal panels shall have flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing), with vertical breaks 50 cm width, installed along facade area at maximum distance of 20 cm and, also, with horizontal breaks 50 cm width, above the openings, placed on the floor slabs which are made of TP mineral wool, flammability class A1.						
	Thermal panels are lap-joint, attached to facade wall with corresponding enriched mineral adhesive, anchored with relevant dowels. After the installation of the thermal-plates, installation of glass mesh and double layer of adhesive is foreseen.						
	Before setting up the thermal plates, the following works will be conducted: * all works on the roofs, including sheet metal works, *reduction of glazed areas by bricking new parapets / walls, *demolitions of the existing walls/ parapets, * facade joinery replacement, *setting up of all installations on the façade, *planned demolishing, and construction of the walls / window parapets, *covering and protection of all non-treated surfaces – glass, wood, aluminium...				0,00 €		

	*Control and testing of the existing facility surface: Use of impregnation- basic coating at the most critical points of the facility. When the basic coating sets, place the EPS cube of 5x5x5 cm using polystyrene adhesive. Once the adhesive has completely settled, minimum 3 days if working conditions are adequate, try to separate the cube manually. *Previous installation of all flashing sills is recommended.			0,00 €		
	If in the process of separating polystyrene only the adhesive separates and not parts of the basis- the basis is sufficiently strong, solid and stable. If in the process of separating polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.			0,00 €		
	If in the process of separating polystyrene, part of the adhesive and cradling is separated - it means that the basis is not strong enough and it will withstand a new layer of thermal insulation. Use the reinforcing mesh or corner profiles for the window corners and jambs.					
	Prior to the thermal plates installation, it is necessary to clean facade surface from the dust, mold and grease. At heights exceeding 8 meters, plates need additional anchoring with appropriate bolts. During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortars must not be applied in case of strong wind, rain or fog.					
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers.					
	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention. NOTE: As a level of the Building A will be changed by thermal insulation layer, the unit price shall include replacement of the maintenance doors. New doors shall be sampled and approved by Employer / Employer's Representative.					

	Calculation per m2.						
	- building A						
	EPS d=10cm	m2	596,58	x	13,43 €	=	**8.010,58 €**
	EPS d=5cm, sides of windows	m2	238,79	x	12,40 €	=	**2.961,59 €**
	XPS d=10cm	m2	132,58	x	18,55 €	=	**2.459,69 €**
	XPS d=5cm, sides of windows	m2	31,46	x	17,53 €	=	**551,42 €**
	mineral wool d=10cm	m2	187,07	x	16,50 €	=	**3.087,12 €**
	- building B						
	EPS d=10cm	m2	386,60	x	13,43 €	=	**5.191,07 €**
	EPS d=5cm, sides of windows	m2	98,90	x	12,40 €	=	**1.226,61 €**
	XPS d=10cm	m2	96,26	x	18,55 €	=	**1.785,86 €**
	XPS d=5cm, sides of windows	m2	25,12	x	17,53 €	=	**440,29 €**
	mineral wool d=10cm	m2	123,34	x	16,50 €	=	**2.035,42 €**
1.11.	Installation of thermal insulated panels made of extruded polystyrene boards, d=2 cm, thermal conductivity of λ=0,04 W/mK, with the layer made of reflecting Al sheet metal d=0,70 mm, painted in the same colour as the internal walls (paint must be thermal resistant). These panels shall be installed under the windows, behind radiators, in the height of the parapet walls and on the inner side of the facade walls of the building C. Works shall be performed in line with the Design and enclosed detail D3.						
	Calculation per m2.	m2	28,22	x	25,11 €	=	**708,67 €**
1.12.	Treatment of flashings of the roof edges, made of the wood trim covering, with suitable dissolvent. Remove the paint mechanically until the healthy wood is reached. Pay special attention not to damage the wood. Cleaned wood trim covering and strips shall be inspected and damaged elements shall be carefully disassembled. New elements shall be made of the same kind of wood and installed according to the original. Wood must be coated with the double layer of protective coating ("Sandolin" or equivalent) with wax for external surfaces. Color will be selected by the Employer / Employer's Representative.						
	The unit price includes purchase and installation of all materials, preliminary works and base preparation.						
	Calculation per m2.						
	building B	m2	80,20	x	9,84 €	=	**789,17 €**
	building B - boiler room and garage	m2	27,51	x	9,84 €	=	**270,70 €**
	building C	m2	86,64	x	9,84 €	=	**852,54 €**

1.13.	Processing of the facade surfaces with decorative ready-mixed lime-cement based render type "Bavalit" or equivalent material. Special attention need to be made to assure that the selected material is certified. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve better joining. One layer shall be applied with painting brush, and if the surface absorbs it quickly, another layer shall be applied. A layer of adhesive with mesh shall be applied to prepare the surface for works. Other layers are applied in the same way as in the previous item:						
	* contact coating, made based on emulsion of synthetic resin and water glass, as agent for impregnation of dried reinforced mortar, * finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in colour selected by the Employer / Employer's repre, fully in line with the Design details. The openings shall be protected with PVC membrane. The unit price includes the purchase, installation of complete material, preparatory works and surface preparation.						
	Calculation per m2.						
	building A	m2	1.135,72	x	6,56 €	=	**7.450,32 €**
	building B	m2	677,04	x	6,56 €	=	**4.441,38 €**
	building B - boiler room and garage	m2	124,24	x	6,56 €	=	**815,01 €**
	building C	m2	667,49	x	6,56 €	=	**4.378,73 €**
1.14.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulir plast") as splash guard (as indicated on the drawings). The existing mortar plinth has to be removed where it is peeling of from the substructure. Surface shall be cleaned, washed and sprinkled with acrylic base with granulate, color of the base by the color chart of the manufacturer determined by the Employer / Employer's Representative. Render shall be applied on cleaned and dried surface by manufacturer's instruction.						
	Calculation per m2.						
	building A	m2	207,91	x	15,58 €	=	**3.239,24 €**
	building B	m2	112,18	x	15,58 €	=	**1.747,76 €**

1.15.	Demolition of existing parapet walls in hallways in the building B and at the main staircase landing in the building A. Parapets are made of "Siporeks" blocks, d=10cm. The unit price includes all works, materials and transportation of debris to the town landfill up to 5 km distance.						
	Calculation per m2.						
	buildings A and B	m2	12,80	x	6,97 €	=	**89,22 €**
1.16.	Cleaning / washing the stone claded plinth of the building C with pressurized water. Water pressure must be such so as not to damage the façade and molding. Stains, patina, dust, salt and such must be cleaned. If required, chemical substances not damaging for the façade could be added.						
	Calculation per m2.						
	building C	m2	125,00	x	2,26 €	=	**281,88 €**
1.17.	Cleaning all external parts of the main chimney by use of steam, coming from the boiler room, and provide flexible building joint to the building B in line with ETICS façade, approved by Employer / Employer's Representative.						
	Calculated as lump sum.	lump sum	1,00	x	246,00 €	=	**246,00 €**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**87.764,72 €**
II	**THERMAL INSULATION OF THE FLOORS IN THE BUILDINGS B AND C**						
2.01.	Demolition of existing floors and sub-floor layers. Removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m2.						
	- building B - basement						
	wood cover	m2	233,60	x	2,87 €	=	**670,43 €**
	terrazzo	m2	60,28	x	3,59 €	=	**216,25 €**
	linoleum	m2	58,74	x	2,26 €	=	**132,46 €**
	concrete	m2	74,41	x	5,33 €	=	**396,61 €**
	- building B - ground floor						
	parquet	m2	263,79	x	2,87 €	=	**757,08 €**
	terrazzo	m2	18,90	x	3,59 €	=	**67,80 €**
	- building B -first floor						
	parquet	m2	262,36	x	2,87 €	=	**752,97 €**
	- building C- ground floor						
	wood cover	m2	204,16	x	2,87 €	=	**585,94 €**
	laminate floors	m2	25,52	x	2,87 €	=	**73,24 €**
	terrazzo	m2	13,14	x	3,59 €	=	**47,14 €**
	linoleum	m2	12,05	x	2,26 €	=	**27,17 €**
	- building C - first floor						
	wooden floor	m2	266,62	x	2,87 €	=	**765,20 €**

2.02.	Purchase and transportation of material, gravel filling and compression, in the basement in the building B. On the ground floor in the building C, beneath the floors, gravel and crushed stone shall be filled and compressed in layers. Layers of gravel and crushed stone shall be rammed manually and by machine if necessary to achieve total compactness.						
	Calculation per m^3.						
	building B - gravel- d=10cm	m^3	42,34	x	4,61 €	=	**195,29 €**
	building C - crushed stone 60-80cm (depending upon air space thickness)	m^3	202,24	x	19,48 €	=	**3.938,62 €**
	building C- gravel- d=20cm	m^3	50,56	x	9,23 €	=	**466,42 €**
2.03.	Purchase of material and concrete works on the RC slab with all necessary reinforcement, concrete type: MB20, d=10cm.						
	Calculation per m2.						
	building B- basement	m2	423,45	x	15,58 €	=	**6.597,35 €**
	building C- ground floor	m2	252,80	x	15,58 €	=	**3.938,62 €**
2.04.	Setting up of horizontal waterproofing under the floors, in the following layers (from the bottom up): - bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos. The unit price includes all works and materials following the description.						
	Calculation per m2.						
	building B - basement	m2	423,45	x	19,99 €	=	**8.463,71 €**
	building C- ground floor	m2	252,80	x	19,99 €	=	**5.052,84 €**
2.05.	Purchase of material and setting up of the floor thermal insulation made of extruded polystyrene, 4cm thick.						
	building B- basement	m2	423,45	x	6,87 €	=	**2.908,04 €**
	building C- ground floor	m2	252,80	x	6,87 €	=	**1.736,10 €**
2.06.	Purchase of material and preparation of the floor base for setting up parquet floor, granite tiles and ceramic tiles. Floor base shall be cement screed 1:3, 4 cm thick with mechanical injection of connective fibers simultaneously.						
	Calculation per m2.						
	building B- basement	m2	423,45	x	8,41 €	=	**3.559,10 €**
	building B-ground floor	m2	282,69	x	8,41 €	=	**2.376,01 €**
	building B- first floor	m2	262,36	x	8,41 €	=	**2.205,14 €**
	building C-ground floor	m2	252,80	x	8,41 €	=	**2.124,78 €**
	building C- first floor	m2	266,62	x	8,41 €	=	**2.240,94 €**

2.07.	Purchase of material and plastering of wall parts in the basement corridor, where terrazzo plinth used to be. Use gauged mortar 1:2:6 with previous treatment of walls with cement milk. The first layer shall be applied rough and the second one has to be floated. Plastered surfaces have to be smooth with no breaks and bumps, while edges have to be sharp and straight.						
	Calculation per m2.						
	building B- basement	m2	4,30	x	8,00 €	=	**34,38 €**
	building C- ground floor	m2	2,47	x	8,00 €	=	**19,75 €**
2.08.	Purchase and installation of class I oak parquet, d= 22 mm thick. Line the parquet flooring over the cement screed, in the manner approved by the Employer / Employer's Representative. This item includes base preparation, bonding, using proper non-heated adhesive, triple layer of scrubbing and varnishing and preliminary works. The angle strips shall be 8 cm height, fixed to the wall by bonding.						
	Calculation per m2.						
	building B- basement	m2	233,63	x	38,95 €	=	**9.099,89 €**
	building B - ground floor	m2	282,69	x	38,95 €	=	**11.010,78 €**
	building B -first floor	m2	262,36	x	38,95 €	=	**10.218,92 €**
	building C- ground floor	m2	252,80	x	38,95 €	=	**9.846,56 €**
	building C -first floor	m2	266,62	x	38,95 €	=	**10.384,85 €**
2.09.	Purchase of material and floor tiling using class I granite ceramics and ceramic tiles. Line the tiles in layer of adhesive, in joint bonding manner, with making of plinth, h=10 cm. The colour and tone will be selected by the Employer / Employer's Representative. The unit price includes installation of Al-strips on the connection of the two different floors.						
	Calculation per m2.						
	building B- basement- ceramic tiles	m2	143,06	x	27,88 €	=	**3.988,51 €**
	building B- basement- granite ceramics	m2	61,00	x	27,88 €	=	**1.700,68 €**
	TOTAL FOR THERMAL INSULATION OF FLOORS IN THE BUILDINGS B AND C						**106.599,58 €**
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away.						
	Calculation is done per m2 of dismantled joinery.						
	- building A						
	1,1a dim. 205/80cm	pc	20,00	x	11,50 €	=	**230,00 €**
	6 dim. 375/155cm	pc	1,00	x	11,50 €	=	**11,50 €**
	7 dim. 245/40+190cm	pc	80,00	x	11,50 €	=	**920,00 €**
	8 dim. 245/65cm	pc	4,00	x	11,50 €	=	**46,00 €**
	9 dim. 240/150cm	pc	1,00	x	11,50 €	=	**11,50 €**
	16 dim. 170/180cm	pc	2,00	x	11,50 €	=	**23,00 €**

	17	dim. 385/40+190cm	pc	2,00	x	11,50 €	=	**23,00 €**
	22	dim. 375/150+178cm	pc	1,00	x	11,50 €	=	**11,50 €**
	23	dim. 375/145+170cm	pc	1,00	x	11,50 €	=	**11,50 €**
	24	dim. 375/145cm	pc	1,00	x	11,50 €	=	**11,50 €**
	29	dim. 205/280cm	pc	1,00	x	11,50 €	=	**11,50 €**
	30	dim. 380/220+75cm	pc	1,00	x	11,50 €	=	**11,50 €**
	32	dim. 90/220+80cm	pc	2,00	x	11,50 €	=	**23,00 €**
	- building B							
	2	dim. 205/160cm	pc	6,00	x	11,50 €	=	**69,00 €**
	2*	dim. 205/160cm	pc	2,00	x	11,50 €	=	**23,00 €**
	3	dim. 205/70+160cm	pc	7,00	x	11,50 €	=	**80,50 €**
	4	dim. 205/75cm	pc	1,00	x	11,50 €	=	**11,50 €**
	5	dim. 324/90cm	pc	2,00	x	11,50 €	=	**23,00 €**
	5*	dim. 233/90+90/210+90cm	pc	1,00	x	11,50 €	=	**11,50 €**
	10	dim. 205/55+150cm	pc	10,00	x	11,50 €	=	**115,00 €**
	10*	dim. 205/55+150cm	pc	6,00	x	11,50 €	=	**69,00 €**
	12	dim. 315/55+150+90cm	pc	1,00	x	11,50 €	=	**11,50 €**
	14	dim. 205/55+115+45cm	pc	8,00	x	11,50 €	=	**92,00 €**
	14*	dim. 205/55+115+45cm	pc	8,00	x	11,50 €	=	**92,00 €**
	15	dim. 315/180cm	pc	1,00	x	11,50 €	=	**11,50 €**
	25	dim. 313/150+165+75cm	pc	1,00	x	11,50 €	=	**11,50 €**
	26	dim. 85/60+170cm	pc	1,00	x	11,50 €	=	**11,50 €**
	27	dim. 90/205cm	pc	1,00	x	11,50 €	=	**11,50 €**
	28	dim. 134/220+85cm	pc	1,00	x	11,50 €	=	**11,50 €**
	28'	dim. 134/220+85cm	pc	1,00	x	11,50 €	=	**11,50 €**
	33	dim. 350/220+60cm	pc	1,00	x	11,50 €	=	**11,50 €**
	- building C							
	11	dim. 130/240cm	pc	17,00	x	11,50 €	=	**195,50 €**
	11*	dim. 130/240cm	pc	10,00	x	11,50 €	=	**115,00 €**
	13	dim. 150/315cm	pc	1,00	x	11,50 €	=	**11,50 €**
	18	dim. 505/100cm	pc	2,00	x	11,50 €	=	**23,00 €**
	19&19'	dim. 130/100cm	pc	2,00	x	11,50 €	=	**23,00 €**
	20	dim. 120/157cm	pc	1,00	x	11,50 €	=	**11,50 €**
	21	dim. 80/100cm	pc	1,00	x	11,50 €	=	**11,50 €**
	31	dim. 160/220+90cm	pc	1,00	x	11,50 €	=	**11,50 €**
3.02.	Removal of existing protective bars from the facade before replacement of joinery and its refitting, upon new joinery is installed. Cleaning and scraping. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted.							
	Calculation as per piece.							
	- building A							
	1	dim. 205/80cm	pc	13,00	x	57,50 €	=	**747,50 €**
	1a	dim. 103/80cm	pc	1,00	x	57,50 €	=	**57,50 €**
	29	dim. 93/80cm	pc	2,00	x	34,50 €	=	**69,00 €**
	- building B							
	2	dim. 205/160cm	pc	8,00	x	34,50 €	=	**276,00 €**
	4	dim. 205/75cm	pc	1,00	x	57,50 €	=	**57,50 €**
	- building C							
	11	dim. 130/240cm	pc	5,00	x	57,50 €	=	**287,50 €**
	31	dim. 140/75cm	pc	1,00	x	34,50 €	=	**34,50 €**
	N	dim.125/160cm, on the kiosk window	pc	1,00	x	57,50 €	=	**57,50 €**
	N	dim.90/220cm, on the kiosk door	pc	1,00	x	57,50 €	=	**57,50 €**

3.03.	Purchase materials and construction of the new protective steel bars for the windows. The frames of the protective bars shall be made of steel box profiles dimensions 30*30 mm, and inner bars of full profile 10*10 mm. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted. Measures to be taken on the site. The unit price also includes removal of existing protective bars from the facade before replacement of joinery and its transportation to the town landfill or its handing over to the Employer / Employer's Representative (according to the future agreement) for storing away.						
	3 dim. 205/160cm	pc	5,00	x	161,00 €	=	**805,00 €**
	26 dim. 85/160cm	pc	1,00	x	143,75 €	=	**143,75 €**
3.04.	Due to the damages on the existing internal walls caused by the dismantling of existing joinery and plastering of new parapet walls, damaged surfaces shall be treated with double layer of cement mortar 1:3:9, with previous spraying of cement milk. Rough first layer and the second one has to be floated, with the use of scaffold. Plastered surfaces have to be smooth without breaks and bumps, while edges have to be sharp and straight.						
	Calculation per m2.						
	building A - around the openings	m2	270,25	x	8,97 €	=	**2.424,14 €**
	building A - new parapet walls	m2	4,08	x	8,97 €	=	**36,60 €**
	building B - around the openings	m2	124,20	x	8,97 €	=	**1.114,07 €**
	building B- around the openings- boiler room and garage	m2	7,62	x	8,97 €	=	**68,35 €**
	building B- basement- new parapet walls	m2	2,76	x	8,97 €	=	**24,76 €**
	building C- around the openings	m2	56,57	x	8,97 €	=	**507,43 €**
	building C- first floor stairs- new parapet wall	m2	2,60	x	8,97 €	=	**23,32 €**
3.05.	Skimming of internal walls on the part of added parapets. Skimming of walls damaged by dismantling of existing openings shall be done in two layers, using skimming compound and scaffold.						
	Calculation per m2.						
	building A- around the openings	m2	191,36	x	2,65 €	=	**506,15 €**
	building A - new parapet walls	m2	4,08	x	2,65 €	=	**10,79 €**
	building B- around the openings	m2	124,20	x	2,65 €	=	**328,51 €**
	building B- around the openings- boiler room and garage	m2	7,62	x	2,65 €	=	**20,15 €**
	object B - basement- new parapet walls	m2	2,76	x	2,65 €	=	**7,30 €**
	building C- around the openings	m2	56,57	x	2,65 €	=	**149,63 €**
	building C- first floor stairs- new parapet wall	m2	2,60	x	2,65 €	=	**6,88 €**

3.06.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frames, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4 +16 +4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes. NOTE: The items marked with * include glass coated with low emission coating as the protection against sunshine.							
	PVC part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill. Thermal conductivity must be maximum U=1,50 W/m2K and solar energy transmittance (solar factor) g≤ 65 %.							
	The item includes all the necessary cleaning and dumping at the landfill as well as all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is selected by the Employer / Employer's Representative. Measures must be taken on site, prior to production.							
	Calculation as per piece.							
	- building A							
	1 dim. 205/80cm	pc	19	x	419,75 €	=	**7.975,25 €**
	7 dim. 245/40+190cm lower parts of the window covered with white foil	pc	80	x	616,40 €	=	**49.312,00 €**
	8 dim. 245/65cm	pc	4	x	412,85 €	=	**1.651,40 €**
	9 dim. 240/150cm	pc	1	x	466,90 €	=	**466,90 €**
	17 dim. 385/40+190cm	pc	2	x	878,60 €	=	**1.757,20 €**
	26 dim. 85/60+170cm, lower parts of the window covered with white foil	pc	1	x	247,25 €	=	**247,25 €**
	- building B						
	2 dim. 205/160cm	pc	6	x	491,05 €	=	**2.946,30 €**
	2* dim. 205/160cm	pc	2	x	491,05 €	=	**982,10 €**
	3 dim. 205/60+170cm, lower parts of the window covered with white foil	pc	5	x	600,30 €	=	**3.001,50 €**
	3* dim. 205/60+170cm, lower parts of the window covered with white foil	pc	2	x	600,30 €	=	**1.200,60 €**
	4 dim. 205/75cm	pc	1	x	320,85 €	=	**320,85 €**

	10 dim. 205/55+150cm	pc	10	x	566,95 €	=	**5.669,50 €**
	10* dim. 205/55+150cm, lower parts of the window covered with white foil	pc	6	x	585,35 €	=	**3.512,10 €**
	14 dim. 205/55+115-160cm	pc	8	x	583,05 €	=	**4.664,40 €**
	14* dim. 205/55+115+160cm, lower parts of the window covered with white foil	pc	8	x	626,75 €	=	**5.014,00 €**
3.07.	Production and installation of the facade aluminium joinery. The unit price includes everything from the description: purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2,80 W/m2K, and solar energy transmittance (solar factor) g≤65%. -glass system 4+16+4mm, with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber are used for glazing. - aluminium jealousies if existing in joinery schemes, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	NOTE: The items marked with * include glass coated with low emission coating as the protection against sunshine.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Measures must be taken on site, prior to production.						
	Calculation as per piece of finished item.						
	- building A						
	1a dim. 205/80cm	pc	1	x	385,25 €	=	**385,25 €**
	6 dim. 375/155cm	pc	1	x	1.147,70 €	=	**1.147,70 €**
	16 dim. 170/180cm	pc	2	x	637,10 €	=	**1.274,20 €**
	22 dim. 375/150+178cm	pc	1	x	2.416,15 €	=	**2.416,15 €**
	23 dim. 375/145+170cm	pc	1	x	2.337,95 €	=	**2.337,95 €**
	24 dim. 375/145cm	pc	1	x	1.158,05 €	=	**1.158,05 €**
	29 dim. 205/280cm	pc	1	x	1.208,65 €	=	**1.208,65 €**
	30 dim. 380/220+75cm	pc	1	x	2.056,20 €	=	**2.056,20 €**
	32 dim. 90/220+80cm	pc	2	x	632,50 €	=	**1.265,00 €**
	- building B						
	5 dim. 323/90cm	pc	3	x	617,55 €	=	**1.852,65 €**
	12 dim. 315/55+150+100cm	pc	1	x	1.821,60 €	=	**1.821,60 €**
	15 dim. 315/180cm	pc	1	x	1.193,70 €	=	**1.193,70 €**
	25 dim. 315/300-380	pc	1	x	2.809,45 €	=	**2.809,45 €**
	26a dim. 220/220cm	pc	1	x	956,80 €	=	**956,80 €**
	27 dim. 90/205cm	pc	1	x	434,70 €	=	**434,70 €**

	28 dim. 134/220+85cm	pc	1	x	930,35 €	=	**930,35 €**
	28' dim. 134/220+85cm	pc	1	x	930,35 €	=	**930,35 €**
	33 dim. 350/220+60cm	pc	1	x	1.675,55 €	=	**1.675,55 €**
3.08.	Production and installation of the aluminium windshield. The unit price includes everything from the description: the purchase of material, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break - glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	- building A						
	34 dim. 370/305cm	pc	1	x	1.926,25 €	=	**1.926,25 €**
	35 dim. 193/305cm	pc	1	x	856,75 €	=	**856,75 €**
3.09.	Preparation and installation of Al profiled facade joinery skylights, coated in plastic layer, with thermal break as per joinery scheme and details, with high quality mechanism, fittings, hinges for opening and with the sill stool made of the same type of material as the windows. Window shall be wire-reinforced double-glazed (4+16+4mm), with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber are used for glazing. **NOTE:**The items marked with * include glass coated with low emission coating as the protection against sunshine.						
	Thermal conductivity must be maximum U=2,80 W/m2K and solar energy transmittance (solar factor) g≤65%.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						

	- building C							
	18	dim. 505/100cm- skylight	pc	2	x	1.312,15 €	=	**2.624,30 €**
	19 &19*	dim. 130/100cm- skylight	pc	2	x	338,10 €	=	**676,20 €**
3.10.	Purchase of materials, preparation and installation of wooden windows, shaped and colored as the old ones, as per joinery scheme and details, with high quality mechanism, fittings, hinges for opening, with sill stool. Joinery shall be made of high quality oak wood. The external window shall be single framed and single glazed, while the inner window shall be single framed, but double glazed. **NOTE:** The items marked with * include glass coated with low emission coating as the protection against sun heat.							
	Thermal conductivity must be maximum U=1,50 W/m2K.							
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, plastering and painting, edge strips - if required). Calculation is made per piece of finished item. Measures must be taken on site, prior to production.							
	Calculation as per piece.							
	- building C							
	11	dim. 130/240cm, lower parts of the window covered with white foil	pc	7	x	1.105,15 €	=	**7.736,05 €**
	11	dim. 130/240cm	pc	10	x	1.105,15 €	=	**11.051,50 €**
	11*	dim. 130/240cm	pc	5	x	1.113,20 €	=	**5.566,00 €**
	11*	dim. 130/240cm with protective foil	pc	5	x	1.105,15 €	=	**5.525,75 €**
	13	dim. 150/185cm	pc	1	x	1.094,80 €	=	**1.094,80 €**
	20	dim. 120/157cm	pc	1	x	667,00 €	=	**667,00 €**
	21	dim. 80/100cm	pc	1	x	342,70 €	=	**342,70 €**
	31	dim. 160/220+90cm	pc	1	x	2.199,95 €	=	**2.199,95 €**
	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper. **NOTE:** Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.							
3.11.	Production and assemblage of PVC sills (window benches) on the inner side of the new windows. Sills shall be made of PVC-profiles identical as the profiles used for windows.							
	Calculation per m.		m	269,66	x	12,65 €	=	**3.411,20 €**
	TOTAL FOR REPLACEMENT OF FACADE JOINERY							**168.501,93 €**
IV	**RECONSTRUCTION AND THERMAL INSULATION OF THE ROOFS**							

4.01.	Removal of the existing roof cover made of Al metal sheet. Storage location, after classification, shall be determined by the Employer / Employer's Representative. The unit price includes all works and transportation of debris to a construction material landfill up to 10 km distance.						
	Calculation per m2 of the orthogonal projection.						
	building A	m2	857,63	x	2,77 €	=	**2.373,49 €**
	building C	m2	530,00	x	2,77 €	=	**1.466,78 €**
4.02.	Removal of the existing wooden roof sub-structure. Storage location, after classification, shall be determined by the Employer / Employer's Representative. The unit price includes all works and transportation of debris to a construction material landfill up to 10 km distance.						
	Calculation per m2 of the orthogonal projection.						
	building A	m2	857,63	x	1,54 €	=	**1.318,61 €**
	building C	m2	530,00	x	1,54 €	=	**814,88 €**
4.03.	Demolition of existing attic structure - straw-based ceiling. The unit price includes all works and transportation of debris to a landfill up to 10 km distance.						
	Calculation per m2 of the orthogonal projection.						
	building C	m2	266,62	x	2,56 €	=	**683,21 €**
4.04.	Demolition of the existing canopy layers at the entrance of the building A up to the concrete floor slab, jointly with the following assumed layers: - waterproofing (3 layers of building paper and 4 layers with protection made of "albit fol"), - sloping layer (lean concrete). The unit price includes all works, required scaffold and transportation of debris to a landfill.						
	Calculation per m2						
	building A	m2	14,14	x	14,86 €	=	**210,16 €**
4.05.	Removal of existing thermal insulation layers from the roof parapet on the canopy. Transportation of debris to a landfill up to 5 km distance.						
	Calculation per m2.						
	building A	m2	7,66	x	3,59 €	=	**27,48 €**

4.06.	Purchase of material and construction of the wooden roof structure made of sound and dry fir as per valid standards for the: 1) roof cover made of trapezoid Al metal sheet in the building A and 2) for the flat seamed galvanized and plastic coated metal sheet in the building C. The unit price includes production of the supporting roof elements joints according to the regulations, with use of nails, bolts and other strengthening steel elements for the installation of the RC plate anchors. The anchors shall be coated with double layer of antirust paint, while the wooden elements shall be coated against decay, wormholes and fire, everything in accordance to the Design.						
	Calculation per m2 of orthogonal projection.						
	building A- roof	m2	820,74	x	14,15 €	=	**11.609,37 €**
	building C- roof	m2	418,86	x	14,15 €	=	**5.924,77 €**
4.07.	Purchase of material and installation of OSB plates over the roof rafters, thickness: d= 2 cm.						
	Calculation per m2 actual area of the sloped roof.						
	building A- roof	m2	857,63	x	11,89 €	=	**10.197,22 €**
	building C- roof	m2	462,19	x	11,89 €	=	**5.495,44 €**
4.08.	Purchase of material and setting up of the polythene foil, 2 mm (vapor barrier) over the previously cleaned reinforced concrete in the: building A-over the roof slab and canopy, building B-over the last floor ceiling, building C-over the roof construction.						
	Calculation per m2.						
	building A- canopy	m2	14,14	x	2,67 €	=	**37,68 €**
	building A- roof	m2	857,63	x	2,67 €	=	**2.285,58 €**
	building B- over the ceiling	m2	336,93	x	2,67 €	=	**897,92 €**
	building C- roof	m2	462,19	x	2,67 €	=	**1.231,74 €**
4.09.	Purchase of material and setting up of the thermal insulation on the roof of the building A and over the ceilings in the last floor in the buildings B and C, consisting of mineral wool 10 cm thick, with low water absorption.						
	Calculation per m2.						
	building A- roof	m2	857,63	x	10,05 €	=	**8.614,89 €**
	building B- over the ceiling	m2	336,93	x	10,05 €	=	**3.384,46 €**
	building C- over the ceiling	m2	266,62	x	10,05 €	=	**2.678,20 €**
4.10.	Purchase of materials and setting up the waterproof layer- vapor permeable foil. Foil is used as a backup protection for waterproof layer and it shall be placed under the metal sheet cover and over the OSB plates. In the building B, foil shall be installed in the attic, over the thermal insulation.						
	Calculation per m2.						

	building A- roof	m2	857,63	x	2,46 €	=	**2.109,77 €**
	building B- over the ceiling	m2	336,93	x	2,46 €	=	**828,85 €**
	building C- roof	m2	462,19	x	2,46 €	=	**1.136,99 €**
4.11.	Purchase of material and installation of wooden laths 5x8 cm, on the roof, over the OSB plates.						
	Calculation per m2 actual area of the sloped roof.						
	building A- roof	m2	857,63	x	3,49 €	=	**2.988,84 €**
4.12.	Purchase of material and installation of wooden laths 5X5 cm, in the opposite direction, on the roof covered with trapezoid Al metal sheet.						
	Calculation per m2 actual area of the sloped roof.						
	building A- roof	m2	857,63	x	1,95 €	=	**1.670,23 €**
4.13.	Purchase of material and installation of painted trapezoid Al metal sheet 40/230/0,8 in the building A and flat seamed galvanized and plastic coated metal sheet, over the base in the building C, jointly with installation of snow hurdles, including all necessary flashings and other smaller parts of construction.						
	Calculation per m2 and per m						
	building A- roof	m2	867,39	x	27,47 €	=	**23.827,20 €**
	building A- roof- two-part roof ridges, d.w. 50cm	m	45,60	x	19,68 €	=	**897,41 €**
	building A- roof- drip by the rain gutter, d.w. 50cm	m	93,01	x	19,68 €	=	**1.830,44 €**
	building C- roof	m2	539,28	x	18,04 €	=	**9.728,61 €**
4.14.	Purchase of the material and making the slope layer on the eave. The slope layer shall be made of lean concrete with added perlite and it shall be minimum 3 cm thick, as indicated on the drawings. Base shall be clean from dust and grease. Installment shall be done by spreading the fresh concrete mass and its flattening with metal levelers along pre-prepared slides. Due to the possible occurrence of a temperature spreading of hardened concrete, expansion groove shall be installed on the perimeter of the roof. In order to achieve better connection, it is allowed to spray the area with cement slurry, before pouring the concrete. Due the fact that concrete mass is foamy and soft, it shall be protected for seven days against mechanical loads and rapid drying. Rapid drying can be prevented by covering the fresh concrete PVC foil etc... It is also recommended that during the curing, concrete shall be sprayed by water.						
	Calculation per m2.						
	building A- canopy	m2	14,14	x	14,97 €	=	**211,61 €**

4.15.	Purchase of material and setting up the geotextile layer, 300g/m2 as a protection for the waterproofing.						
	Calculation per m2.						
	building A- canopy	m2	14,14	x	3,08 €	=	**43,48 €**
4.16.	Purchase of material and setting up final layer of horizontal waterproofing of the canopy, along with its raising up to the attic, up to 35 cm, made of PVC membrane, reinforced with polyester net. PVC membrane shall be resistant to aging, weather conditions and UV- radiation. Follow the instructions of manufacturer when installing.						
	Calculation per m2.						
	building A	m2	21,80	x	32,39 €	=	**706,10 €**
4.17.	Removal of debris from the canopy and transportation to a construction material landfill up to 10 km distance.						
	Calculation per m2.						
	building A- canopy	m2	14,14	x	9,02 €	=	**127,54 €**
4.18.	Purchase of material and construction of the last floor ceiling in the building C, made of fireproof plasterboards, 12 mm thickness and 30 minutes of fire resistance. Plasterboards shall be installed on the metal substructure, with installation of joint tape over the joints and with use of require scaffold.						
	Calculation per m2.						
	building C- last floor ceiling	m2	266,62	x	18,04 €	=	**4.809,82 €**
	NOTE: An alternative technology for flat roof covering can be offered as a deviation.						
	TOTAL FOR RECONSTRUCTION AND THERMAL INSULATION OF THE ROOFS						**110.168,77 €**
V	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
	DISMANTLING AND REINSTALLATION OF VERTICAL AND HORIZONTAL GUTTERS.						
5.01.	These items are described in chapter "Thermal insulation of façade walls", item number 1.01. and 1.09.						
	-DISMANTLING AND REINSTALLATION OF AIR CONDITIONING UNITS, CAMERAS, LIGHTING.						
5.02.	These items are described in chapter "Thermal insulation of façade walls", item number 1.08.						
	- DISMANTLING AND REINSTALLATION OF FLASING SILLS, PLASTERING AND PAINTING OF SIDELIGHTS.						

5.03.	These items are described in chapter "Thermal insulation of façade walls", item number 3.01. and item number 3.11. within the chapter "Replacement of façade joinery".						
	-DISMANTLING AND REINSTALLATION OF DRIPS AND FLASHINGS.						
5.04.	These items are described in chapter "Thermal insulation of façade walls", item number 1.01 and item number 1.09.						
	-DISMANTLING AND REINSTALLATION OF METAL PROTECTIVE BARS						
5.05.	These items are described in chapter "Replacement of façade joinery", item number 3.02.						
	-TREATMENT OF FLASHINGS OF THE ROOF EDGES MADE OF WOOD						
5.06.	These items are described in chapter "Thermal insulation of façade walls" item number 1.12.						
	-CONSTRUCTION OF THE NEW PAVEMENT						
5.07.	These items are described in chapter "Measures to enable higher comfort and better working conditions" items number 6.23.						
	-STEAM CLEANING OF THE CHIMNEY WITHIN THE BOILER ROOM						
5.08.	These items are described in chapter "Thermal insulation of façade walls" items number 1.17.						
VI	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
6.01.	Demolition of existing ceiling made of chipboard, jointly with its substructure in the first floor of the building B. Removal and loading of debris onto a truck and transportation to a construction material landfill up to 10 km distance. The unit price includes the usage of the scaffold.						
	Calculation per m2.						
	building B	m2	336,93	x	2,77 €	=	**932,45 €**
6.02.	Dismantling of existing interior wooden doors in sanitary facilities. Classification and its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away.						
	Calculation as per piece.						

	building A- basement						
	dim. 70/205cm	pc	6	x	10,25 €	=	**61,50 €**
	dim. 80/205cm	pc	2	x	10,25 €	=	**20,50 €**
	building A- ground floor						
	dim. 70/205cm	pc	7	x	10,25 €	=	**71,75 €**
	dim. 80/205cm	pc	4	x	10,25 €	=	**41,00 €**
	building A- first floor						
	dim. 70/205cm	pc	7	x	10,25 €	=	**71,75 €**
	dim. 80/205cm	pc	4	x	10,25 €	=	**41,00 €**
	building B- boiler room						
	dim. 70/205cm	pc	1	x	10,25 €	=	**10,25 €**
	dim. 90/205cm	pc	1	x	10,25 €	=	**10,25 €**
	dim 90/195+115	pc	1,00	x	10,25 €	=	**10,25 €**
	dim 90/195+80	pc	1,00	x	10,25 €	=	**10,25 €**
6.03.	Demolition of existing wall ceramic tiles (height h=220cm) in sanitary facilities jointly with base, using required scaffold. Debris shall be collected, removed, loaded onto a truck and dumped at construction material landfill – distance up to 10km.						
	Calculation per m2.						
	building A- basement	m2	131,05	x	3,59 €	=	**470,14 €**
	building A- ground floor	m2	130,04	x	3,59 €	=	**466,52 €**
	building A- first floor	m2	130,04	x	3,59 €	=	**466,52 €**
	building B- boiler room	m2	20,74	x	3,59 €	=	**74,40 €**
6.04.	Demolition of existing linoleum / vinyl floor in preparatory room (on the first floor of the building "A" nearby existing toilets) jointly with base. Debris shall be collected, removed, loaded onto a truck and dumped at construction material landfill – distance up to 10km.						
	Calculation per m2.	m2	17,67	x	3,59 €	=	**63,39 €**
6.05.	Demolition of existing floor ceramic tiles in toilets jointly with base. Debris needs to be collected, removed, loaded onto a truck and dumped at construction material landfill – distance up to 10 km.						
	Calculation per m2.						
	building A- basement	m2	32,23	x	3,59 €	=	**115,63 €**
	building A- ground floor	m2	28,61	x	3,59 €	=	**102,64 €**
	building A- first floor	m2	28,61	x	3,59 €	=	**102,64 €**
	building B- boiler room	m2	3,76	x	3,59 €	=	**13,49 €**
6.06.	Purchase of material and installation of base for ceramic tiles floors in toilets made of cement screed 1:3, along with simultaneous mechanic injecting of binding fibbers.						
	Calculation per m2.						
	building A- basement	m2	32,23	x	8,00 €	=	**257,68 €**
	building A- ground floor	m2	32,52	x	8,00 €	=	**260,00 €**
	building A- first floor	m2	28,61	x	8,00 €	=	**228,74 €**
	building B- boiler room	m2	3,76	x	8,00 €	=	**30,06 €**

6.07.	Preparation of horizontal waterproofing below floors in sanitary blocks in following layers from bottom to top: -bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos. Waterproofing shall be put up the walls for min h=25cm. In the areas of showers and urinals, waterproofing to be put against the wall for h= 200 cm. The unit price includes all the works and material as described.						
	Calculation per m2.						
	building A- basement	m2	57,34	x	19,99 €	=	**1.146,08 €**
	building A- ground floor	m2	53,87	x	19,99 €	=	**1.076,73 €**
	building A- first floor	m2	49,96	x	19,99 €	=	**998,58 €**
	building B- boiler room	m2	6,06	x	19,99 €	=	**121,12 €**
6.08.	Purchase of material and fitting of thermal insulation in the floors of sanitary blocks, using extruded polystyrene d=4 cm.						
	building A- basement	m2	32,23	x	6,87 €	=	**221,34 €**
	building B- boiler room	m2	3,76	x	6,87 €	=	**25,82 €**
6.09.	Purchase of materials and fitting of soundproofing 1 cm thick, made of termosilent, in the floors of sanitary blocks .						
	building A- ground floor	m2	32,52	x	2,67 €	=	**86,67 €**
	building A- first floor	m2	28,61	x	2,67 €	=	**76,25 €**
6.10.	Purchase of material and plastering of walls in sanitary facilities, on parts where existing ceramic wall tiles were (total height up to 220 cm), in two layers using gauged mortar 1:2:6 on previously sprayed with cement slurry base. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges.						
	Calculation per m2.						
	building A- basement	m2	149,07	x	8,00 €	=	**1.191,81 €**
	building A- ground floor	m2	159,90	x	8,00 €	=	**1.278,40 €**
	building A- first floor	m2	159,90	x	8,00 €	=	**1.278,40 €**
	building B- boiler room	m2	25,34	x	8,00 €	=	**202,59 €**
6.11.	Tiling the toilet walls with the class I ceramic tiles, while the size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster. The unit price includes installation of Al strips. Ceramic tiles shall be placed up to the ceiling height or to the top of the lower walls h=2,20m.						
	Calculation per m2.						
	building A- basement	m2	131,05	x	22,96 €	=	**3.008,91 €**
	building A- ground floor	m2	147,84	x	22,96 €	=	**3.394,36 €**

	building A- first floor	m2	130,04	x	22,96 €	=	**2.985,72 €**
	building B- boiler room	m2	20,74	x	22,96 €	=	**476,19 €**
6.12.	Tiling the toilet floors with the class I anti-slip ceramic tiles, while the size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster. The unit price includes installation of Al strips. In the toilets, consisting a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2.						
	building A- basement	m2	32,23	x	22,96 €	=	**740,00 €**
	building A- ground floor	m2	32,52	x	22,96 €	=	**746,66 €**
	building A- first floor	m2	28,61	x	22,96 €	=	**656,89 €**
	building B- boiler room	m2	3,76	x	22,96 €	=	**86,33 €**
6.13.	Preparation and installation of toilet doors made of hard highly resistant PVC profiles reinforced with stainless steel U-profiles coated in plastics, as per joinery scheme and details, with high quality mechanism, hardware, hinges for opening. PVC panels are used as infill.						
	The item includes all the necessary cleaning and dumping at the landfill as well as all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is selected by the Employer / Employer's Representative. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	building A- basement						
	1 dim. 70/205cm	pc	6	x	369,00 €	=	**2.214,00 €**
	2 dim. 80/205cm	pc	2	x	381,30 €	=	**762,60 €**
	building A- ground floor						
	1 dim. 70/205cm	pc	7	x	369,00 €	=	**2.583,00 €**
	2 dim. 80/205cm	pc	4	x	381,30 €	=	**1.525,20 €**
	3 dim. 90/205cm	pc	1	x	394,63 €	=	**394,63 €**
	4 dim. 105/205cm	pc	1	x	403,85 €	=	**403,85 €**
	building A- first floor						
	1 dim. 70/205cm	pc	7	x	369,00 €	=	**2.583,00 €**
	2 dim. 80/205cm	pc	4	x	381,30 €	=	**1.525,20 €**
	building B- boiler room						
	1 dim. 70/205cm	pc	1	x	381,30 €	=	**381,30 €**
	3 dim. 90/205cm	pc	1	x	394,63 €	=	**394,63 €**

6.14.	Purchase of material and construction of monolith ceiling on the last floor in the building B made of fire resistant plasterboards, 1.2 cm of thickness and 30 minutes of fire resistance. New ceiling shall be constructed on the metal substructure with installation of joint tape over the joints and with use of required scaffold.						
	Calculation per m2.						
	building B- first floor	m2	336,93	x	18,04 €	=	**6.078,22 €**
6.15.	Purchase of material and installation of new vinyl floor in the preparation room next to the toilet for disabled persons. Works shall include: *Applying self-leveling mass. Before applying the mass thoroughly clean the surface from dust. *Purchase and applying of vinyl floor. Adhesive shall be adequate for this type of floor. Before applying the adhesive thoroughly clean the surface from dust. The unit price includes applying of the stripes for vinyl floor on the room edges.						
	Calculation per m2	m2	13,45	x	32,39 €	=	**435,65 €**
6.16.	Demolition of mortar damaged during dismantling of existing floor slabs. This works refers to: walls of the last floor premises in the building B (50 % of total area) and the walls in the building C (100 % of total area). Removal and loading of debris onto a truck and transportation to a landfill up to 10 km distance.						
	Calculation per m2.						
	building B	m2	346,65	x	3,90 €	=	**1.350,20 €**
	building C	m2	962,50	x	3,90 €	=	**3.748,94 €**
6.17.	Plastering of walls damaged in the process of dismantling of the last floor ceilings in the buildings B (50%) and C (100%). Plastering shall be done in two layers using cement mortar 1:3 on previously sprayed with cement slurry base. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges.						
	Calculation per m2.						
	building B	m2	346,65	x	8,00 €	=	**2.771,47 €**
	building C	m2	962,50	x	8,00 €	=	**7.695,19 €**

6.18.	Scraping and skimming of old walls with emulsion putty. All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Firstly correct and fill minor damages and cracks. Apply flattening and skimming with emulsion putty for the first time. All the surfaces must be finally glassed, then flattened and skimmed with putty for the second time, using required scaffold.						
	Calculation per m2.						
	- walls						
	building A - basement	m2	1.278,18	x	2,36 €	=	**3.013,31 €**
	building A - ground floor	m2	1.399,27	x	2,36 €	=	**3.298,78 €**
	building A - first floor	m2	1.273,86	x	2,36 €	=	**3.003,12 €**
	building A - second floor	m2	1.273,86	x	2,36 €	=	**3.003,12 €**
	building B - basement	m2	1.026,82	x	2,36 €	=	**2.420,73 €**
	building B - boiler room-toilet	m2	11,52	x	2,36 €	=	**27,16 €**
	building B - ground floor	m2	693,30	x	2,36 €	=	**1.634,45 €**
	building B - first floor	m2	693,30	x	2,36 €	=	**1.634,45 €**
	building C - ground floor	m2	876,09	x	2,36 €	=	**2.065,38 €**
	building C -first floor	m2	951,71	x	2,36 €	=	**2.243,66 €**
	- ceilings						
	building A - basement	m2	658,13	x	2,36 €	=	**1.551,54 €**
	building A - ground floor	m2	661,34	x	2,36 €	=	**1.559,11 €**
	building A - first floor	m2	661,34	x	2,36 €	=	**1.559,11 €**
	building A - second floor	m2	666,52	x	2,36 €	=	**1.571,32 €**
	building B - basement	m2	423,45	x	2,36 €	=	**998,28 €**
	building B - ground floor	m2	252,80	x	2,36 €	=	**595,98 €**
	building B - boiler room-toilet	m2	3,76	x	2,36 €	=	**8,86 €**
	building C - ground floor	m2	334,52	x	2,36 €	=	**788,63 €**
6.19.	Purchase of materials and skimming of inner newly plastered walls and ceilings using emulsion putty. All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Flattening and skimming with putty minor damages and cracks. Flattening and skimming with emulsion putty first time. All the surfaces must be finally glassed, then flattened and skimmed with putty for the second time, using required scaffold.						
	Calculation per m2.						
	- walls						
	building B- first floor (50% of total area)	m2	346,65	x	2,36 €	=	**817,23 €**
	building C- first floor (100% of total area)	m2	962,50	x	2,36 €	=	**2.269,09 €**
	- ceilings						
	building B- first floor	m2	336,93	x	2,36 €	=	**794,31 €**
	building C- first floor	m2	266,62	x	2,36 €	=	**628,56 €**
6.20.	Inner walls and ceilings to be treated with double layer of semi-dispersed paint with use of scaffold. Colour of the paint will be selected by the Employer / Employer's Representative. The unit price includes the usage of scafold.						
	Calculation per m2.						
	- walls						
	building A - basement	m2	679,86	x	1,64 €	=	**1.114,97 €**
	building A - ground floor	m2	764,48	x	1,64 €	=	**1.253,75 €**
	building A - first floor	m2	689,99	x	1,64 €	=	**1.131,58 €**

	building A - second floor	m2	689,99	x	1,64 €	=	**1.131,58 €**
	building B - basement	m2	601,29	x	1,64 €	=	**986,12 €**
	building B - boiler room-toilet	m2	11,52	x	1,64 €	=	**18,89 €**
	building B - ground floor	m2	403,34	x	1,64 €	=	**661,48 €**
	building B - first floor	m2	406,34	x	1,64 €	=	**666,40 €**
	building A - around openings	m2	191,36	x	1,64 €	=	**313,83 €**
	building B - around openings	m2	34,85	x	1,64 €	=	**57,15 €**
	building B -boiler room - around openings	m2	7,62	x	1,64 €	=	**12,50 €**
	building C - ground floor	m2	533,54	x	1,64 €	=	**875,01 €**
	building C - first floor	m2	636,01	x	1,64 €	=	**1.043,06 €**
	- ceilings						
	building A - basement	m2	658,13	x	1,64 €	=	**1.079,33 €**
	building A - ground floor	m2	661,34	x	1,64 €	=	**1.084,60 €**
	building A - first floor	m2	661,34	x	1,64 €	=	**1.084,60 €**
	building A - second floor	m2	666,52	x	1,64 €	=	**1.093,09 €**
	building B - basement	m2	423,45	x	1,64 €	=	**694,46 €**
	building B - ground floor	m2	252,80	x	1,64 €	=	**414,59 €**
	building B - first floor	m2	336,93	x	1,64 €	=	**552,57 €**
	building B - boiler room toilet	m2	3,76	x	1,64 €	=	**6,17 €**
	building C - ground floor	m2	334,52	x	1,64 €	=	**548,61 €**
	building C - first floor	m2	266,62	x	1,64 €	=	**437,26 €**
6.21.	Inner walls to be treated with double layer of oil based paint up to the height of 1,6 m. Colour of the paint will be selected by the Employer / Employer's Representative.						
	Calculation per m2.						
	building A - basement	m2	598,32	x	3,33 €	=	**1.993,15 €**
	building A - ground floor	m2	598,32	x	3,33 €	=	**1.993,15 €**
	building A - first floor	m2	583,87	x	3,33 €	=	**1.945,02 €**
	building A - second floor	m2	583,87	x	3,33 €	=	**1.945,02 €**
	building B - basement	m2	425,53	x	3,33 €	=	**1.417,55 €**
	building B - ground floor	m2	289,96	x	3,33 €	=	**965,93 €**
	building B - first floor	m2	286,96	x	3,33 €	=	**955,94 €**
	building C - ground floor	m2	342,55	x	3,33 €	=	**1.141,12 €**
	building C - first floor	m2	315,69	x	3,33 €	=	**1.051,64 €**
	buildings A,B & C - walls behind radiators in the premises which are not planned for painting	m2	46,50	x	3,33 €	=	**154,90 €**
6.22.	Collect and remove debris from the sanitary facilities, loaded onto a truck and transported to a landfill up to 10 km distance.						
	Calculation per m2.						
	building A	m2	2893,39	x	1,03 €	=	**2.965,72 €**
	building B	m2	1095,10	x	1,03 €	=	**1.122,48 €**
	building C	m2	519,42	x	1,03 €	=	**532,41 €**

6.23.	Renovation / construction of the pavement: - around buildings A and B, -construction of new pavement around building C and pavement that connect external ramp and school yard, -construction of concrete surface drain structure in the uphill area of connection between buildings A and C. The newly constructed pavement around the buildings A and B shall have the same width as the existing one, and 80 cm width around building C. The item shall include, where necessary, all preparation works such as: cleaning off the overgrowth, stripping of the humus layer, preparation of the terrain for the construction of new pavement. Purchase and transportation of materials for gravel filling and concrete works. (Layer of gravel to be 10 cm of thickness. Gravel shall be rammed manually and by machine if necessary to achieve complete compactness). Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm. New pavement shall have inclination of 1,5% compared to the building.						
	Pavement has to be strained into the fields cca 1,5m2. Expansion joints shall be filled up with joint filler. The unit price includes all works and material.						
	Calculation per m2.	m2	136,00	x	15,79 €	=	**2.146,76 €**
6.24.	Construction of the ramp for disabled persons (dimensions 10 / 1.2 m, slope 5 %) on the main entrance of the building C. The item shall include preparation of the terrain for the construction of the ramp. Purchase and transportation of material for gravel filling and concrete works. (Gravel shall be rammed manually and by machine if necessary to achieve complete compactness of 20 Mpa). Putting plain concrete MB 15 with proper reinforcement mesh Q 131 in the both zones , d= 10 cm, with smoothing of area, d= 2 cm (total: 12 cm), as well as the installation of border beams 10/20 cm and dilatation points, sealed with bitumen and placed at 2 m.						
	Calculated as per lump sum	lump sum	1,00	x	353,63 €	=	**353,63 €**
6.25.	Purchase of the material, production and installation of internal ramp (dimensions 1.22 / 4.45m, slope 11%) for disabled persons in the connection area of the buildings B and C. Construction of the ramp shall be made of the wooden structure. Surface of the ramp shall be made of embossed galvanized metal sheet. The unit price includes all works and materials.						
	Calculated as per lump sum	lump sum	1,00	x	440,75 €	=	**440,75 €**

6.26.	Replacement of defect interior wooden doors in the basement of the building B by a sturdy, heavy duty wooden unit with smooth surface. This item includes a new frame and exactly adapted new laminated tubular chip board door leaf, the change of the door lock, the door handle set, the locking plate, the hinges and coating of frame and wing (process: grinding, primer, grinding, two layers of synthetic resin paint). All materials shall be of high quality. The unit price includes dismantling of the old doors from the same positions and their transportation to a landfill up to 5 km distance.						
	Calculated as per piece.						
	5 105 / 205	pc	4,00	x	123,00 €	=	**492,00 €**
	6 90 / 205	pc	3,00	x	97,38 €	=	**292,13 €**
	7 80 / 205	pc	5,00	x	97,38 €	=	**486,88 €**
6.27.	Purchase and installation of a wall mounted platform stair lift for disabled persons, with the following characteristics: - minimum loading capacitymax 300 kg, - speed approx. 0,10 m/s, - power approx. 0,5 kW. The lift shall be positioned in the connection zone of the main entrance hall to the building A, as indicated in drawing SSS-01-ARH-10. Total height difference of the two levels is approx. one meter. The unit price shall comprise the bearing connection devices to the walls, all necessary accessories ready to use the lift, and the electrical installations at the lift itself, the on wall supply cabling in PVC ducts connecting to the nearest switch board and the adjustments of the electrical switch board. All damages occured during the installation of the lift shall be remediated and the working areas shall be restored to their original condition.						
	Calculated as per piece.	pc	1,00	x	9.471,00 €	=	**9.471,00 €**
6.28.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers and painting of hydrant and switch boxes in oil based paint in two layers. The item also includes painting of metal bearing structures and handrails of all staircases in colour determined by Employer / Employer's Representative.						
	Calculated as lump sum	lump sum	1,00	x	240,88 €	=	**240,88 €**

6.29.	Two doors on the boiler room, which shall not be replaced, shall be painted, including previous cleaning and scraping. The doors shall be coated with double layer of basic, anti rust paint and with double layer of finishing colour, selected by the Employer / Employer's Representative. All the joints shall be coloured and protected against rust.						
	Calculation per m2.	m2	29,97	x	5,33 €	=	**159,74 €**
6.30.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative, in the school courtyard in front of the building A. Trees shall be planted on min 5 m distance and min. 4 m distance from the buildings and 3m high. Dig a pit for planting and throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting, cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of 3 kg per tree of peat enriched fertilizer. Having completed the planting of the seedlings, trees shall be well watered.						
	Calculation per piece	pc	10,00	x	51,25 €	=	**512,50 €**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**143.106,76 €**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VII	**LIST OF SPARE PARTS**						
7.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece.	pc	3,00	x	11,50 €	=	**34,50 €**
7.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece.	pc	1,00	x	11,50 €	=	**11,50 €**
7.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece.	pc	2,00	x	11,50 €	=	**23,00 €**
7.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece.	pc	2,00	x	28,75 €	=	**57,50 €**
7.05.	Purchase and delivery of lever operated opening mechanism for the windows at high points.						
	Calculated as per piece.	pc	5,00	x	28,75 €	=	**143,75 €**

7.06.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						
	wall	m2	1,00	x	13,80 €	=	**13,80 €**
	floor	m2	1,00	x	13,80 €	=	**13,80 €**
7.07.	Purchase and delivery of spare granite tiles. Calculated as per m2.	m2	1,00	x	18,40 €	=	**18,40 €**
	TOTAL FOR SPARE PARTS						**316,25 €**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

SUMMARY OF COSTS

I	THERMAL INSULATION OF FACADE WALLS	87.764,72 €
II	THERMAL INSULATION OF THE FLOORS IN THE BUILDINGS B AND C	106.599,58 €
III	REPLACEMENT OF FACADE JOINERY	168.501,93 €
IV	RECONSTRUCTION AND THERMAL INSULATION OF THE ROOFS	110.168,77 €
VI	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	142.434,52 €
VII	SPARE PARTS	316,25 €
	TOTAL PRICE, VAT EXCLUDED:	615.785,77 €
	VAT (19%):	116.999,30 €
	TOTAL PRICE, VAT INCLUDED:	**732.785,07 €**

GROUP A5.1.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Secondary Vocational School in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	Secondary Vocational School in Pljevlja
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity				Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: Siemens or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 15 m^3/h						
	Connector: DN50						
		pc	1	x	1.319,05 €	=	1.319,05 €
2	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: Siemens or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	2.472,50 €	=	2.472,50 €
3	Purchase, delivery and installation of electric solids flowmeter in silo.						
	Manufacturer: Siemens or equivalent						
	Type 7ML5440-0AB00-0AC1						
		pc	1	x	3.047,50 €	=	3.047,50 €
4	Software development and staff training.						
		pc	1	x	1.035,00 €	=	1.035,00 €
	TOTAL A - Energy management						**7.874,05 €**

B - HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS

B.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of existing equipment of the heating system: 2 ribbed coal-fired boilers Vulkan Super each 475kW, feeder and return pipes, two closed expansion vessel, two pumps on each branch separately, 12 valves over DN40 and other fittings and all pipes in the boiler room. The item includes removal and dumping dismantled equipment to a suitable place.						
	Calculated lump-sum	pc	1	x	3.450,00 €	=	3.450,00 €
2	Washing existing walls and floor to remove coal dust deposits in premises of the boiler room and fuel storage facilities. Mending holes in walls, plastering walls area 40 m2, fitting cement screed and tiling 60 m2 of floor.						
	Calculated lump-sum	pc	1	x	2.714,00 €	=	2.714,00 €
3	Preparation of concrete chimney for installation of new prefabricated funnel - penetration of openings for bonding new chimney, penetration of openings for fitting funnel, demolition of existing funnel 5.5 m long, construction of chimney base using brick, height 0.5m, making penetrations in wall between the boiler room and fuel storage room for conveyer belt for pellet, fitting of terminal cap made of steel galvanised sheet metal, removal of debris from the boiler room and its dumping to a suitable location.						
	Calculated lump-sum	pc	1	x	1.150,00 €	=	1.150,00 €
	TOTAL B.I - Dismantling of existing equipment and preliminary works						**7.314,00 €**
B.II	**Installation of new boiler room equipment**						
1	Purchase, delivery and installation of: biomass-fired boiler - wood pellet HERZ Firematic BioControl 250 or equivalent, rated capacity 251 kW (76.8-251 kW) for production of hot water, maximal temperature 95 °C.						

	HERZ Firematic consists of: - welded structure made of special boiler sheet metal thickness 6 mm - completely insulated body with mineral wool thickness 120 mm - stoker auger - frequency-driven smoke gases fan - safety temperature limiter - heat exchanger automatic cleaning (fire+smoke tubes) - usage of remaining heat - two-zone automatic cleaning grate - Burn-back protection RSE flap - intermediate hopper with fuel level maintenance - automatic ignition via electric heaters with hot air - automatic ashes removal from the combustion chamber and heat exchanger - integrated computer for control of boiler and system operating.						
	Microprocessor T-control with touch-LCD screen: - combustion control - heat accumulator control - preparation of domestic hot water - cold end protection with pump and mixing valve - Lambda probe oxygen sensor control - control and operating depending on outdoor conditions with 6 independent heating circuits (1 on) - automatic fuel, air dosing, maintaining necessary flame temperature, smoke gases, boiler temperature, minimal return temperature, hot water temperature in accumulator, water temperature in heating circuits - automatic frost protection - CAN-BUS operating						
	Safety elements : - back burn protection flap, no power, closed - Back-burn inhibitor sprinkler, sprinkler with water tank - back sparking protection, fuel supply block - measuring temperature in the combustion chamber - temperature metering in the storage room, intermediate hopper and dosing augers - safety boiler temperature limiters						

	Technical data for boiler: - Boiler thermal capacity = 251 kW (76.8-251), the boiler modulates between 30-100 % load - Maximal operating pressure = 3 bar - Maximal operating temperature = 95 °C - Boiler efficiency degree = 92 % - Minimal water temperature at entrance into the boiler = 60 °C - Boiler weight = 1750 kg - Power supply: ~230 V / 50 Hz, 16 A, 2.0 kW						
	HERZ module for heat accumulator control with T-control unit – it is delivered with boiler: - temperature sensor (for metering upper and lower accumulator zone) – 2 pcs - immersion coils for temperature sensors – 2 pcs - sensors are placed in uronske čaure and then fitted onto a vessel - T-control unit controls the operating						
	HERZ basic T-control module for 1 heating circuit driven by outdoor temperature.						
		set	2	x	47.822,75 €	=	95.645,50 €
2	HERZ additional module or equivalent, for control for T-control, for 1 heating circuit driven by outdoor temperature: - 2 x PT 1000 temperature sensor sensor temperature (feed and return) - 1x outlet for room temperature sensor - 3x relay outlet 230VAC: pump and mixing valve - control system T-control for operating control						
		pc	2	x	561,20 €	=	1.122,40 €
3	HERZ cascade operation or equivalent, for T-control						
		pc	1	x	1.934,30 €	=	1.934,30 €
4	HERZ set or equivalent, for protection from cold water for Firematic 250 boiler with boiler pump and 3-way mixing valve - pump WILO Stratos Para 50/1-12 - three-way flanged mixing valve, type HERZ 4037, DN 65, PN 16 - electric motor drive for three-way mixing valve, type ESBE, series 90, type 95, 1min/90° - 2 x ball valve, DN 40, non-return valve						
		pc	2	x	4.697,75 €	=	9.395,50 €
5	HERZ safety thermostatic valves or equivalent, for safety heat exchanger, no auxiliary power drive, 95 °C						
		pc	2	x	105,80 €	=	211,60 €

6	HERZ sound proofing or equivalent, for Firematic 250 boiler						
		pc	2	x	994,75 €	=	1.989,50 €
7	HERZ basic package or equivalent, transportation auger. It consists of : - agitator with pushing mechanism - climbing screw - 6m long screw - electric-motor drive - power supply 230 V						
		pc	2	x	4.011,20 €	=	8.022,40 €
8	Unit for connecting transportation auger and boiler and RSE flap						
		pc	2	x	235,75 €	=	471,50 €
9	HERZ hot water accumulator or equivalent, capacity 5000l, maximum operating pressure 3 bars, made of steel S235JR, with anti-corrosion protection on the outside, dimensions: Ø 1800 x 3035 mm. with connections : - DN100 3 pieces (2 at the top and 1 at the bottom), - DN15 3 pieces (for temperature sensors, at the bottom, middle and top).						
		pc	1	x	7.532,50 €	=	7.532,50 €
10	HERZ thermal insulation or equivalent, for accumulator capacity 5000 l, insulation thickness 100 mm with aluminium sheet metal coating thickness 0.7 mm						
		pc	1	x	2.512,75 €	=	2.512,75 €
11	Purchase, delivery and installation of wooden intermediate hopper for pellet cca 11 m³ , dimensions w=3.5m, l=3.0m, H=1.5m, with transport agitator at the bottom. Tanks sides are made of enriched chipboard thickness 20mm (coated mult-ilayer playwood) with smooth internal side, and supporting substructure and strengthening frames are made of wooden beams 5x5cm and 7x5cm (as indicated on the enclosed drawings).						
		pc	1	x	2.438,00 €	=	2.438,00 €
12	Purchase, delivery and installation of self-supporting expansions vessel Pneumatex Compresso CU 500.6 or equivalent, with flexible hose for connecting to the water side and ball service valve for fast charging, airproof non-permeable bubble from butyl tank is deareated from the top with condensate drain at the bottom.						
	Nominal volume VN 500 liters						
	Max. permitted pressure PS 6 bar						
	Max. permitted temperature 120°C						

	Max. permitted temperature of membrane 70°						
	Connection S Rp 1"						
	Water drainage connection SW G 3/4"						
	Diameter: D=680 mm, H=1669 mm						
		pc	1	x	3.018,75 €	=	3.018,75 €
13	Purchase, delivery and installation of Pneumatex Switzerland or equivalent, pressure maintenance system Compresso C 10.1-6 F, ±0.1 bar, with on-site excess temperature protection in case of power blackout.						
	The item includes assembly kit for the air-side connection of the TecBox with the primary vessel, valve manifold with 1 spill valve and safety valve, fillsafe water make-up monitoring, water, time and frequency control; BrainCube control.						
	Max. permitted pressure PS 6 bars						
	Max. permitted temperature 70 °C						
	Supply voltage 230 V/50, 0.6 kW						
		pc	1	x	3.353,40 €	=	3.353,40 €
14	SCHIEDEL chimney system ICS 25 or equivalent, made of twin-wall stainless steel W.Nr. 1.4404 wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature stable insulation material - Superwool. ICS chimney system includes all required elements: inspection port and boiler connection, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals.						
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS is made of stainless steel W.Nr. 1.4404 wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus.						
	All chimney elements are industrially produced for a particularly building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø300mm, total height 2x15.5 m (two risers), active height 13.6m.						

	Furnace flue ICS25 Ø250 mm, developed length 6m+2.6m						
		set	1	x	9.872,75 €	=	9.872,75 €
15	Purchase, delivery and installation of the duplex circulating pump with electronic frequency controller used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna3 D 40-120 F						
	Flow: 16 m^3/h (14.2m^3/h)						
	Thrust: 5.5 m (5m)						
	Type of connection: Flanged DN40						
	Power supply: V=1~230V						
	Maximum current: I=0.18 - 1.95A						
	Transferred power: P=16 - 439W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
		pc	1	x	2.512,75 €	=	2.512,75 €
16	Three-way mixing and diverting valve for constant control of systems with hot and cold water, maximal operating temperature of fluid 140°C						
	DN 50 PN16; Kvs=42						
		pc	12	x	207,00 €	=	2.484,00 €
	Valve electric-motor drive for continuous control with typical curve selection * power supply: 24V DC / 230V AC * control: impulse * max. force: 2000N						
		pc	2	x	287,50 €	=	575,00 €
17	Purchase, delivery and installation of compact water softener. Compact casing contains ion-exchange resin which is being automatically regenerated once its capacity is spent, properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Aquaset 1000						
	Max. flow: 2.0 m^3/h						
	Amount of resin: 25 l						
	Softening capacity (for 18°dH) 98m^3						
	Salt consumption per regeneration: 4 kg						
	Operating pressure: 1,4 – 8 bar						
	Operating temperature: 4-40 °C						
	Connections 1"						
	Power supply 220V/50Hz						
	Dimensions						
	l: 432 mm, w: 324mm, h: 1170 mm						
	Unit is delivered with protective pre-flitted which consists of casing with 25 microns protective mesh.						
		pc	1	x	1.554,80 €	=	1.554,80 €

18	Electric air convector, capacity 9kW, power supply 400V, for maintaining minimum temperature in the boiler room and prevention of installation from freezing at low outdoor temperatures in the period when the heating system is not running, installation together with thermostat for activation.						
		pc	1	x	480,70 €	=	480,70 €
19	Purchase, delivery and installation of angle safety valve for installation in front of expansion vessel, with following properties:						
	Rated outlet: DN32						
	Overflow outlet: DN40						
	Rated pressure: 6 bars						
	Maximal discharge flow: 18000 kg/h						
	Operating pressure 4 bars						
	Working temperature: -10 °C to +220 °C						
	Max. operating pressure: 16 bars						
	Coefficient: K=0,05						
	Overpressure calibration: 10% from the set pressure						
	Max. counter pressure: 1,031 bar						
		pc	1	x	105,80 €	=	105,80 €
20	Purchase, delivery and fitting of feeder and receiver pipes for radiator and calorifer heating circuits, with following dimensions:						
	Diameter 273.0x5.0 mm						
	Feeder length 1550 mm						
	Returen pipe length 1350 mm						
	Connections: DN65 x 1pcs DN80 x 2pcs DN100 x 1pcs R3/4" x 2pcs R1/2" x 2pcs						
		pc	2	x	787,75 €	=	1.575,50 €
21	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN100 PN6						
		pc	5	x	97,29 €	=	486,45 €
	DN80 PN6						
		pc	16	x	85,33 €	=	1.365,28 €
	DN65 PN6						
		pc	2	x	68,08 €	=	136,16 €
22	Purchase, delivery and installation valves for riser pipes and metering differential pressure, inclined model with metering outlets, connection size:						
	DN80 PN6 - Kvs 70.5						

		pc	2	x	264,50 €	=	529,00 €
23	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets, following dimensions of connections:						
	DN80 PN6						
		pc	6	x	184,00 €	=	1.104,00 €
24	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets, with following dimensions of connections:						
	DN80 PN6						
		pc	4	x	128,80 €	=	515,20 €
25	Purchase, delivery and installation of fixed aluminium jealousies, dimensions 600x400mm, to be installed in boiler room doors (allows free flow of air required for fuel combustion in the boiler), type Hidria Slovenia AZR-3 600x400 or equivalent.						
		pc	2	x	56,35 €	=	112,70 €
26	Purchase, delivery and installation of water gauge at fresh water feeder from the water mains into the softener, with flow control scale and number disk for total flow registration, connection dimensions 1".						
		pc	1	x	102,01 €	=	102,01 €
27	Purchase, delivery and installation of glass thermometer in brass casing and sleeve for fitting into the pipeline, metering range 0-120°C.						
		pc	8	x	28,75 €	=	230,00 €
28	Purchase, delivery and installation of pressure gauge complete with manometer flow-through valve, metering range 0-6 bars.						
		pc	8	x	29,90 €	=	239,20 €
29	Purchase, delivery and installation of threaded backflow preventer, connection size:						
	DN25 PN6						
		pc	1	x	13,23 €	=	13,23 €
30	Purchase, delivery and installation of automatic valve for water fill in the system, with block valve and ball backflow valve filter and manometer with following characteristics:						
	connection dimensions 1"						
	Control range 0.3 – 4 bar						
	Maximal flow at inlet 16bar						
	Maximal temperature at inlet 50°C						
		pc	1	x	46,00 €	=	46,00 €

31	Purchase, delivery and assemblage of air-release vessels with overflow pipe and valve DN 15, made of black steel pipe, DN150 length 300 mm.						
		pc	3	x	40,25 €	=	120,75 €
32	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	5	x	9,61 €	=	48,07 €
33	Purchase of material and installation of piping for connecting boiler room equipment made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø 114,3x3,6						
		m	23	x	29,67 €	=	682,41 €
	Ø 88,9x3,2						
		m	17	x	22,77 €	=	387,09 €
	Ø 60,3x2,9						
		m	10	x	14,95 €	=	149,50 €
	Ø 42,4x2,6						
		m	8	x	9,78 €	=	78,20 €
34	Joining, tightening material and brackets, elbows, branches and such are calculated as 50% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 50% of the previous item		0,5	x	1.297,20 €	=	648,60 €
35	Purchase of material and production of insulation for pipes, feeders and receivers using rock wool, thickness 50 mm in AL coating thickness 0.5 mm, complete with fitting material. Fire resistance flammability class A1 in line with SIST EN 13501-1 i JUS U.J1.050. Calculated as per m^2 of insulation measured on the exterior of the pipe.						
		m^2	38	x	33,35 €	=	1.267,30 €
36	Purchase and installation of PP-R water pipes for connecting equipment for chemical water treatment, for operating pressure of 10 bars with all required fittings. Pipes need to be fixed to walls with double pipe clips at every 1.5 to 2.0 m. Pipes on branching need to be insulated with "plamafleksom" to prevent condensation. Pipes are welded with butt welded joint. Pipe diameter is rated diameter of DN25.						
		m	12	x	10,35 €	=	124,20 €
	TOTAL B.II - Installation of new boiler room equipment						**165.194,74 €**

C - EFFICIENCY OF THE DISTRIBUTION SYSTEM							
C.I	**Installation of thermostatic and balancing valves**						
1	Purchase, delivery and installation of thermostatic radiator valve, connection size:						
	1/2" (inclined and straight)						
		pc	197	x	13,94 €	=	2.745,79 €
	3/4" (inclined and straight)						
		pc	13	x	20,01 €	=	260,13 €
2	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without having to remove protective cap. The thermostat has liquid sensor.						
	Temperature range from 8 °C to 26 °C						
	No. of channels: four						
	Closing time 24 min.						
		pc	210	x	15,67 €	=	3.291,65 €
3	Purchase, delivery and installation of radiator angle valves, connection size						
	1/2" (inclined and straight)						
		pc	197	x	12,49 €	=	2.461,01 €
	3/4" (inclined and straight)						
		pc	13	x	16,79 €	=	218,27 €
4	Purchase, delivery and installation of riser control valves with metering outlets in brass casing, presetting with digital reading (fitted on feeder of the manifold), size and properties:						
	DN40 PN6 - Kvs 19.2						
		pc	3	x	89,70 €	=	269,10 €
	DN32 PN6 - Kvs 14.2						
		pc	1	x	78,20 €	=	78,20 €
5	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
	DN40, Kvm 12.8						
		pc	3	x	166,75 €	=	500,25 €
	DN32, Kvm 8.5						
		pc	1	x	149,50 €	=	149,50 €
	TOTAL C.I - Installation of thermostatic and balancing valves						**9.973,89 €**

C.II	**Repair of existing heating system pipes in the school and installation of new pipes in C building**						
1	Flushing of the entire heating system in buildings A, B and C. Dismounting of all radiators (208 steel ribbed radiators with 4 to 36 ribs and 2 aluminium radiators each 15 ribs), flushing to remove deposits from the bottom of the radiators, cleaning of air-release valves, remounting of radiators with installation of new radiator brackets.						
	Calculated lump-sum	pc	1	x	7.187,50 €	=	7.187,50 €
2	Dismantling of existing piping for hot water distribution towards the radiators in building C, dismantling of horizontal manifold in free space and all risers towards the radiators, as well as part of the pipes beneath the entry lobby that connects buildings A, B and C. Total of 160 m of steam pipes is dismantled.						
	Calculated lump-sum	set	1	x	920,00 €	=	920,00 €
3	Dismounting of existing control valves on riser and horizontal manifolds in the basement of building A, total of 20 pairs dimensions up to 1", as well as stop valves on certain manifolds of the piping connection size 2" and 3". Pipes will be fitted instead of dismounted valves.						
	Calculated lump-sum	set	1	x	460,00 €	=	460,00 €
4	Purchase of material and piping (horizontal manifold is fitted beneath the ceiling of the ground floor, and risers are fitted on the same positions as the existing) made of steel seamless pipes in compliance with JUS C.B5.221 or DIN 2448, dimensions:						
	Ø 48,3x2,6	m	20	x	11,39 €	=	227,70 €
	Ø 42,4x2,6	m	90	x	9,78 €	=	879,75 €
	Ø 33,7x2,6	m	60	x	8,34 €	=	500,25 €
	Ø 26,9x2,3	m	60	x	7,06 €	=	423,66 €
	Ø 21,3x2,0	m	280	x	6,44 €	=	1.803,20 €
	Ø 17,2x1,8	m	10	x	5,52 €	=	55,20 €
5	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures.						

	Calculated as 60% of the previous item		0,6	x	3.889,76 €	=	2.333,86 €
6	Relocation of one radiator in the upstairs hallway of building C to a more suitable place, drilling holes through slab to pull through pipes and connect to the existing air-release network.						
	Calculated lump-sum	set	1	x	92,00 €	=	92,00 €
	TOTAL C.II - Repair of existing heating system pipes in the school and installation of new pipes in C building						**14.883,12 €**
C.III	**Preliminary and finishing works**						
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
		lump-sum	1	x	460,00 €	=	460,00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves.						
		lump-sum	1	x	460,00 €	=	460,00 €
3	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.						
		lump-sum	1	x	230,00 €	=	230,00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.						
		lump-sum	1	x	172,50 €	=	172,50 €
5	Issuing of certificate for entire installed material and equipment.						
		lump-sum	1	x	230,00 €	=	230,00 €
6	Preparation of "As-built" design.						
		lump-sum	1	x	575,00 €	=	575,00 €
7	Installation of framed and glazed scheme of connections on a visible place in the boiler room.						
		lump-sum	1	x	230,00 €	=	230,00 €
8	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with the fire protection standards.						
		lump-sum	1	x	115,00 €	=	115,00 €

9	Making holes in walls and ceilings of the building C for putting heating pipes, including mending works at penetration points for bringing walls and ceilings in proper condition.(12 penetration points on the walls and 7 on the ceilings)	lump-sum	1	x	575,00 €	=	575,00 €
	TOTAL C.III - Preliminary and finishing works						**3.047,50 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**7.874,05 €**
B	**HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS**	**172.508,74 €**
B.I	Dismantling of existing equipment and preliminary works	7.314,00 €
B.II	Installation of new boiler room equipment	165.194,74 €
C	**EFFICIENCY OF THE DISTRIBUTION SYSTEM**	27.904,51 €
C.I	Installation of thermostatic and balancing valves	9.973,89 €
C.II	Repair of existing heating system pipes in the school and installation of new pipes in C building	14.883,12 €
C.III	Preliminary and finishing works	3.047,50 €
	TOTAL PRICE, VAT EXCLUDED	**208.287,30 €**
	VAT (19 %)	**39.574,59 €**
	TOTAL PRICE, VAT INCLUDED	**247.861,89 €**

GROUP A5.1.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Secondary Vocational School in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	Secondary Vocational School in Pljevlja
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures above blackboards in classrooms and for lighting fixtures in buildings "B" and "C". Cables for light fitting for building "A" shall be connected to existing junction box in classroom and for buildings "B" and "C" as per attached drawings. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Control for light fixtures above blackboard is performed from existing control point. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	7,00				
	Works and material:	pc	270	x	24,15	=	6.520,50 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	14,00				
	Works and material:	pc	29,00	x	48,30	=	1.400,70 €
1.3.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	404	x	3,45	=	1.393,80 €

1.4.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	197	x	92,00	=	18.124,00 €
1.5.	Delivery and mounting of ceiling mounted luminaries 2/35W T16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	104	x	115,00	=	11.960,00 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	70	x	157,55	=	11.028,50 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	50	x	103,50	=	5.175,00 €
1.8.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	50	x	131,10	=	6.555,00 €
1.9.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	2	x	80,50	=	161,00 €
1.10.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	9	x	86,25	=	776,25 €
1.11.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	29	x	103,50	=	3.001,50 €

1.12.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	87	x	101,20	=	8.804,40 €
1.13.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	7	x	205,85	=	1.440,95 €
1.14.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	9	x	205,85	=	1.852,65 €
1.15.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP65 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	13	x	211,60	=	2.750,80 €
1.16.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 2M - pcs 1						
	Total for works and material	pc	16	x	5,75	=	92,00 €
1.17.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 1M - pcs 2						
	Total for works and material	pc	4	x	6,90	=	27,60 €
1.18.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	two-way switch 2M - pcs 1						
	Total for works and material	pc	4	x	6,33	=	25,30 €
1.19.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	two-way switch 1M - pcs 2						
	Total for works and material	pc	4	x	8,05	=	32,20 €
1.20.	Delivery and installation of modular installation accessories, white						
	PVC box 3M						
	armature 3M						
	decorative mask 3M						
	ordinary switch 1M - pcs 3						
	Total for works and material	pc	18	x	9,20	=	165,60 €

1.21.	Delivery and installation of modular installation accessories, white						
	PVC box 6M						
	armature 6M						
	decorative mask 6M						
	ordinary switch with indication 1M - pcs 6						
	Total for works and material	pc	1	x	19,55	=	19,55 €
1.22.	Delivery and installation of infrared motion sensors 180° IP 54. Total for works and material	pc	1	x	79,35	=	79,35 €
	Total for lighting installation						**81.386,65 €**
2	**ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION**						
2.1.	Delivery and mounting of switch box **"RT-C1"**, ready-made, with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of the equipment. The following equipment shall be installed in switchbox:						
	disconnector switch INS 1-0, 40A, 3P	pc	1				
	automatic switch iC60N 20A, 6 kA, 1P	pc	3				
	automatic switch iC60N 16A, 6 kA, 1P	pc	8				
	automatic switch iC60N 10A, 6 kA, 1P	pc	6				
	contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-C1":	pc	1	x	287,50	=	287,50 €
2.2.	Delivery and mounting of switchbox **"RT-C2"**, ready-made, with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of the equipment. The following equipment shall be installed in switchbox:						
	differential current protective device iID 25/0,0	pc	1				
	automatic switch iC60N 16A, 6 kA, 1P	pc	12				
	automatic switch iC60N 10A, 6 kA, 1P	pc	6				
	contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-C2":	pc	1	x	322,00	=	322,00 €
2.3.	Delivery and mounting of switchbox **"RT-ST"**, ready-made, with a lock. The board is wall mounted for the installation of 24 modules (2x12M). The price includes all material required for installation of the equipment. The following equipment shall be installed in switchbox:						
	differential current protective device iID 25/0,0	pc	1				
	automatic switch iC60N 16A, 6 kA, 3P	pc	3				
	automatic switch iC60N 16A, 6 kA, 1P	pc	5				
	automatic switch iC60N 10A, 6 kA, 1P	pc	3				
	The price includes all material required for installation of this equipment. Total switch box "RT-C2":	pc	1	x	258,75	=	258,75 €

2.4.	Delivery and mounting of equipment within switchbox "**RT-BP**". The price includes all material required for installation of this equipment. The price includes dismantling of old equipment. The following equipment shall be installed in switchbox:						
	discontector switch INS 1-0, 80A, 3P	pc	1				
	automatic switch iC60N 32A, 6 kA, 3P	pc	3				
	automatic switch iC60N 25A, 6 kA, 1P	pc	6				
	automatic switch iC60N 16A, 6 kA, 1P	pc	15				
	automatic switch iC60N 10A, 6 kA, 1P	pc	16				
	automatic switch iC60N 6A, 6 kA, 1P	pc	2				
	contactor iCT 1NO, 16A, 230V	pc	3				
	contactor iCT 3NO, 16A, 230V	pc	1				
	Selector switch CM 1-0-2, 10A	pc	1				
	programmable time switch IHP 24 hours + 7 days	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-BP":	pc	1	x	506,00	=	506,00 €
2.5.	Delivery and mounting of equipment in existing switchbox **RT-BS**. The price includes all material required for installation of this equipment. This item also includes dismantling of old automatic switches for lighting. The following equipment shall be installed in switchbox:						
	automatic switch iC60N 10A, 6 kA, 1P	pc	7				
	contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment.	pc	1	x	69,00	=	69,00 €

2.6.	Delivery and installation of power supply cables from RT-BP to RT ST and RT C1, and from RT C1 to RT C2. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. The price includes complete delivery with installation, connection and testing of conductors:						
	PPY 5x6 mm2	m	59	x	5,75	=	339,25 €
	PPY 5x4 mm2	m	5	x	4,60	=	23,00 €
2.7.	Delivery and installation of three phase connection points with PPY 5x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average length of laid down cable per one connection point is 12m. Work and material to be included:	pc	3	x	55,20	=	165,60 €
2.8.	Delivery and installation of one phase connection points with PPY 3x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average length of laid down cable per one connection point is 14m. Work and material to be included:	pc	61	x	48,30	=	2.946,30 €
2.9.	Delivery and installation of 2-modular accessories, white						
	PVC box Ø 60						
	armature 2M						
	decorative mask 2M						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	59	x	6,90	=	407,10 €
					- €		
2.10.	Delivery and installation of 4-modular accessories, white						
	PVC box 4M						
	armature 4M						
	decorative mask 4M						
	outlet 2P+E 16A, 2M white - pcs 2						
	Total for works and material	pc	2	x	11,50	=	23,00 €
2.11.	Delivery and installation of three phase outlet 16A/400V, JUS N.EO.350. Total for works and material:	pc	3	x	9,20	=	27,60 €
	Total electrical installations for general consumption						**5.375,10 €**

3	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
3.1.	Delivery and mounting of prefabricated wall mounted IP 55 switchbox in boiler room "RT KO" with appropriate dimensions and completely equipped with following parts:						
	Disconnector switch INS 1-0, 40A, 3P	pc	1,00				
	Motor protection switch GV2 ME, 1.6 - 2.5 A	pc	2,00				
	automatic switch 3p iC60N 20A 6 kA	pc	1,00				
	automatic switch 1p iC60N 16A 10 kA	pc	15,00				
	automatic switch 1p iC60N 16A 10 kA	pc	3,00				
	The price includes all material required for installation of this equipment.						
	Total switch box "RT-KO"	pc	1,00	x	517,50	=	517,50 €
3.2.	Delivery and laying of cables in wall installations with PVC rigid installation pipes and galvanized cable trays in boiler room, for construction of the electrical circuits of electrical consumers in the boiler room through cable trays and partly through rigid PVC pipes in wall installation. Works and material are calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	25,00	x	2,19	=	54,63 €
	PP-Y 3x2,5 mm2	m	152,00	x	2,76	=	419,52 €
	PP-Y 5x2,5 mm2	m	23,00	x	3,11	=	71,42 €
	PP-Y 5x4 mm2	m	14,00	x	4,60	=	64,40 €
	Outlet three phase 3P+N+PE 16A/400V IP55	pc	1,00	x	9,20	=	9,20 €
	Outlet 2P+E / 230V/ IP 55	pc	2,00	x	8,05	=	16,10 €
	Ordinary switch 10A, IP44	pc	2,00	x	5,75	=	11,50 €
	Two-way switch IP44 10A	pc	2,00	x	6,90	=	13,80 €
	Serial switch 10A IP44	pc	1,00	x	5,75	=	5,75 €
	Delivery and mounting of ceiling mounted emergency luminaries with electronic control gear, 8W,IP 65, 1h.Works and material to be included per unit:	pc	1,00	x	40,25	=	40,25 €
3.3.	Delivery and mounting of deep galvanized cable trays according to the drawing layouts. Works include delivery, mounting of all necessary materials for connection and mounting. The unit measure is m' per the cable tray 100 mm.						
	PNK 100	m	18,00	x	14,95	=	269,10 €
	Total for power supply and electrical installation for boiler room and heating equipment						**1.493,16 €**

4	**POTENTIAL EQUALIZATION INSTALLATION**						
4.1.	Delivery and mounting of deep galvanized tape Fe-Zn 25x4 mm for potential equalization in boiler room, according to the installation drawing layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	24,00	x	2,30	=	55,20 €
4.2.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	22,00	x	5,75	=	126,50 €
4.3.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	m	5,00	x	4,60	=	23,00 €
4.4.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	14,00	x	3,45	=	48,30 €
4,5	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	60,00	x	5,75	=	345,00 €
	Total potential equalization installation						**598,00 €**
5	**LIGHTING AND GROUNDING INSTALLATION**						
5.1.	Dismantling of existing lightning protection system.	lump sum	1	x	230,0	=	230,00 €
5.2.	Delivery and installation of lightning descending system, round conductors made of Al/Mg with diameter of 10 mm, for the replacement of obsolete lightning descending conductors. Lightning descending conductors shall be mounted from outlet of foundation grounding system to the position of lightning installations at the roof, according to technical recommendation and regulations. Works and material to be calculated per unit:	m	58,00	x	2,3	=	133,40 €
5.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	22,00	x	5,75	=	126,50 €

	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	38,00	x	5,75	=	218,50 €
	Holders for vertical mechanical protection of lightning conductors:	pc	4,00	x	5,75	=	23,00 €
5.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-wire	pc	2,00	x	5,75	=	11,50 €
	linking clamp wire-wire	pc	4,00	x	5,75	=	23,00 €
	groove clamp (for crossing over horizontal gutters)	pc	20,00	x	5,75	=	115,00 €
		pc					
5.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	2,00	x	28,75	=	57,50 €
5.6.	Delivery and mounting of prefabricated lightning installation system with air terminal SI60 INTERCEPTOR ERITECH or equivalent. Sections of the mast are 2m and 1 x 2m. Mast is connected to the wall in accordance to the technical drawings. Works and material to be included in price:						
	AIR TERMINAL INTERCEPTOR SI 60	pc	1	x	1667,5		1.667,50 €
	2M section 1	pc	1	x	11,5		11,50 €
	2M section 2	pc	1	x	11,5		11,50 €
	console for air terminal	pc	3	x	57,5		172,50 €
	junction part for connection with grounding tape	pc	1	x	11,5		11,50 €
5.7.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	130,00	x	2,30	=	299,00 €
5.8.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measurement unit.	pc	16,00	x	9,20	=	147,20 €
	Total for lighting and grounding installation						**3.259,10 €**
6	**SPARE PARTS**						
6,1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	6,4	=	12,88 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	5,4	=	10,81 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	5,4	=	10,81 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	5,3	=	10,58 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	5,2	=	10,35 €
	Total for spare parts:						**55,43 €**

7	**TESTING**						
7,1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	230,00 €	=	230,00 €
7,2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	345,00 €	=	345,00 €
	Total for testing:						**575,00 €**
8	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**345,00 €**	=	**345,00 €**

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	81.386,65 €
2	ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION	5.375,10 €
3	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	1.493,16 €
4	POTENTIAL EQUALIZATION INSTALLATION	598,00 €
5	LIGHTING AND GROUNDING INSTALLATION	3.259,10 €
6	SPARE PARTS	55,43 €
7	TESTING	575,00 €
8	PREPARATION OF MAINTENANCE DESIGN	345,00 €
	TOTAL PRICE, VAT EXCLUDED	93.087,44 €
	VAT (19%)	17.686,61 €
	TOTAL PRICE, VAT INCLUDED	**110.774,05 €**

GROUP A5.1.4 **BILL OF QUANTITIES** *on Indoor Water Supply and Sewerage Services in Secondary Vocational School in Pljevlja*	*Client:*	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Secondary Vocational School, Pljevlja
	Documentation:	Final Design of Indoor Water Supply and Sewerage Services
	Date:	30 May 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1,01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	16,00	x	10,25 €	=	164,00
1,02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	17,00	x	10,25 €	=	174,25
1,03	Removal of existing toilet bowels with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	1,00	x	10,25 €	=	10,25
1,04	Removal of existing shower faucets, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2,00	x	15,38 €	=	30,75
1,05	Removal of existing faucets above concrete lavatories, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	8,00	x	51,25 €	=	410,00
1,06	Removal of existing showers, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2,00	x	35,88 €	=	71,75
1,07	Removal of existing urinals, with siphon trap and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	8,00	x	10,25 €	=	82,00

1,08	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are inciuded within the price.						
	Calculation as per m'	m'	62,42	x	7,18 €	=	447,86
1,09	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	6,00	x	15,38 €	=	92,25
1.10.	Removal of existing water heating cylinders, and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	3,00	x	10,25 €	=	30,75
	TOTAL REMOVAL WORKS						**1513,86**
II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
2,01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dØ20mm(DN15)	m	47,03	x	3,59 €	=	168,72
	dØ25mm(DN20)	m	26,61	x	4,61 €	=	122,74
2,02	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dØ20mm(DN15)	piece	30,00	x	12,30 €	=	369,00
	dØ25mm(DN20)	piece	10,00	x	14,35 €	=	143,50
2,03	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	25,00	x	12,30 €	=	307,50

2,04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	73,64	x	2,05 €	=	150,96
2,05	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works shall be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	73,64	x	3,59 €	=	264,18
2,06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1,00	x	153,75 €	=	153,75
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**1680,35**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
	Toilets 1, 2, 3 and 4:						
3,01	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1,00	x	512,50 €	=	512,50
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	6,00	x	30,75 €	=	184,50
	Toilet 5 (for disabled persons):						
3,03	Purchase and installation of PP sewage pipes for interior installations, together with all required sealing equipment for proper network operation. Pipe connecting shall performed by rubbers. Upon finished pipes assembling to rinse pipelines and performed distribution lines has to be waterproof tested. All chase cuttings and hole perforations within walls, slabs and structures, as well as bringing the walls back into original state shall be incalculated within the unit price. Calculation as per m' of installed pipes.						
	DN50mm	m	1,70	x	6,15 €	=	10,46
	DN110mm	m	2,60	x	9,02 €	=	23,45

3,04	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	1,00	x	30,75 €	=	30,75
3,05	Conducting water pressure test of all newly installed sewage pipes, as per appicable regulation (refer to chapter "Technical conditions for works execution" of this tender document). Pump the water into the respective foul drainage network. If the network is defective, all deficiencies must be repaired.						
	Calculation per m'.	m	4,30	x	153,75 €	=	661,13
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**1422,78**
IV	**SANITARY EQUIPMENT**						
4,01	Purchase and installation of toilet bowl completely made of ceramics, type "simplon", with plastic low mounted water tank, connection pipes, sealing and gaskets, including all other bits and pieces necessary for proper installation of the toilet bowl. Calculation as per piece.						
	Type: "Simplon"	piece	2,00	x	170,15 €	=	340,30
4,02	Purchase and mounting of shower bath, 80x80cm. The shower bath shall be mounted and connected with outflow siphon trap of 5/4", with plug and chain, including chrome plated hot and cool water tap with rise up shower. The shower bath colour shall be purchased as per Employer / Employer's Representative choice. Calculation as per shower bath piece.						
	dimensions 80x80cm	piece	2,00	x	287,00 €	=	574,00
4,03	Purchase and installation of faucet above concrete lavatory, for cold water only, together with gaskets and all other bits and pieces necessary for assembling.						
	Calculation as per piece.	piece	8,00	x	246,00 €	=	1968,00
4,04	Purchase and delivery of first class ceramic wall toilette urinal. The toilette urinal shall be fixed by means of rubber spacers, suitable wall plugs and brass screws. To install chrome plated stop valve and siphon trap. The siphon trap shall be ordered as per Employer / Employer's Representative decision. Calculation as per piece.						
	toilette urinal	piece	8,00	x	138,38 €	=	1107,00

4,05	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network shall be connected by siphon trap of Ø100. Water tank shall be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette shall be ordered as per Employer / Employer's Representative decision.						
	Calculation as per piece.	piece	17,00	x	123,00 €	=	2091,00
4,06	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation.						
	Calculation as per piece.	piece	17,00	x	138,38 €	=	2352,38
4,07	Purchase and installation of vertical water heating cylinder of 80 l capacity, a wall mounting type, connectors and other accessories for proper operation.						
	Calculation as per piece.	piece	2,00	x	148,63 €	=	297,25
	TOTAL SANITARY EQUIPMENT						**8729,93**

SUMMARY OF COSTS

I	REMOVAL WORKS	1513,86
II	WATER-SUPPLY INDOOR INSTALLATIONS	1680,35
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	1422,78
IV	SANITARY EQUIPMENT	8729,93
	TOTAL PRICE, VAT EXCLUDED	13346,92
	VAT (19 %)	2535,92
	TOTAL PRICE, VAT INCLUDED	**15882,84**

GROUP A5.2.1 BILL OF QUANTITIES of building and trade works for energy efficiency improvement in "Ristan Pavlović", Secondary School in Pljevlja	***Investor:***	**Ministry of Economy of Montenegro, Energy**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Sub-Consultant:	**KOPRING PMC, Podgorica**
	Facility:	**Primary school "Ristan Pavlović", Pljevlja**
	Documentation:	**Final Architectural Design**
	Date:	**April 2014.**

	GENERAL TERMS
1	Works to be conducted according to applicable technical regulations, standards and required standards applicable for construction of such facilities.
2	Use materials with a quality certificate that meet required standards.
3	Apply measures promptly for safety of the facility and works, equipment and investment material, workers, passengers, traffic and surrounding facilities.
4	Obey technical documentation, based on which a building permit was granted.
5	Item unit price includes all expenses for works, materials, transport, cleaning of the facility after construction, tax liabilities, profits and all other non mentioned expenses for the completion of works under documents of the Agreement, technical regulations and applicable average standards in the construction industry.

Item	Description of the Item	Unit of measure	Quantity		Unit price (€)		Amount (€)
SCHOOL AND GYM							
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings and vertical gutters. Flashings have different developed widths and they are made from galvanized, coloured sheet with double interlocking, d=0,68mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and debris transportation to the town depot. Calculation is based on a m1 of dismantled flashings, gutters, and their supporters.						
	horizontal rain gutters, developed width up to 66 cm Calculation per m1	m1	109,80	x	1,03 €	=	**112,55**
	-vertical gutters, dim.15x15cm, developed width up to 66cm, including dismantling of top gutter cisterns. Calculation per m1	m1	26,23	x	1,03 €	=	**26,89**
	-attic-wall flashings, developed width d.w.= 41-50cm. Calculation per m1	m1	124,22	x	1,03 €	=	**127,33**
	-roof and wall valleys, developed width up to 66cm. Calculation per m1	m1	117,38	x	1,03 €	=	**120,31**
	-flashing sill, developed width 41-50cm. Calculation per m1	m1	160,05	x	1,03 €	=	**164,05**
	-funnel flashing, developed width 50cm. Calculation per m1	m1	16,14	x	1,03 €	=	**16,54**

1.02.	Repair of damages in the parapet walls d=25cm and more, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheet and PVC sills. The unit price includes all works and materials.						
	Calculation per m1	m1	271,85	x	6,66 €	=	**1811,20**
1.03.	Repair of jamb damages d=25cm, caused by dismantling of the joinery. Surfaces shall be treated with lime cement mortar 1:2:6, previously sprinkled with low density cement mortar, to prepare the item for installation of new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheets and PVC sills. The unit price includes all works and materials.						
	Calculation per m1	m1	640,27	x	6,66 €	=	**4265,80**
1.04.	Dismantling and re-installation of cameras, lighting, and other facade devices and equipment. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility.						
	Calculation as per piece.	pc	5,00	x	59,45 €	=	**297,25**
1.05.	Production and installation of the roof eave flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm. Developed width shall be 60cm. The item includes surface preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the Design, sample and the color of the material shall be selected and aproved by the Employer / Employer's Representative.						
	Calculation per m1	m1	151,70	x	14,97 €	=	**2270,19**
1.06.	Production and installation of funnel flashing, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, developed width 50cm. The item includes base preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the Design, sample and the color of the material shall be selected and approved by the Employer / Employer's Representative.						
	Calculation per m1	m1	5,50	x	14,97 €	=	**82,31**

1.07.	Production and installation of the parapet sills, made of ready made plastic-laminated galvanized steel metal sheets=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 50 cm. The item includes surface preparation and complete binding following the regulations. Undertake the entire procedure in compliance with the Design, sample and the color of the material shall be selected and approved by the Employer / Employer's Representative.						
	Calculation per m1	m1	271,85	x	14,97 €	=	**4068,24**
1.08.	Production and installation of horizontal gutters of 150/150mm square section and vertical downpipes, round (d=160mm) plastic-laminated galvanized steel metal sheets d=0,70mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material. The unit price includes manufacturing of top gutter-cisterns at the joint of vertical and horizontal gutters.						
	Calculation per m1	m1	119,89	x	14,97 €	=	**1794,15**
1.09.	Production and installation of lying horizontal rain gutters, made of ready painted galvanized metal sheets, d=0,68cm, developed width 66 cm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with 0,5% slope towards rainwater downpipes.						
	Calculation per m1	m1	126,42	x	14,97 €	=	**1891,88**
1.10.	Setting up "Demit" thermal facade. External thermal insulation of the facade walls will be conducted with expanded EPS polystyrene, having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm, produced by the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	Gym facade walls and stone claded facade walls of the ground floor of the main school object (all parapets in the ground floor, pillars and parts of the full wall) will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK.						

	Thermal boards with B1 flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing) to be used. Install panels and vertical breaks of 50 cm width along the entire facade, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.						
	Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the facade opening. Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:						
	* first layer – refined mortar based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene boards will be filled with polyurethane foam.						
	Reinforcing mesh with adequate overlapping and extra protection at the facade openings and corners is placed in a fresh layer of this mortar. In case additional mechanical anchoring is required, impact bolt through the reinforcing mesh shall be used 24 hours after applying this layer.						
	* reinforcing mesh, * second layer of mortar, apply same procedure as with the first layer. This mortar is laid to well- dried first layer and polished afterwards, * contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar,						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour defined by the Employer / Employer's Representative, while the entire procedure will be conducted according to the design details.						
	Before setting up the thermal plates, the following works will be conducted: * All works on the roofs, including sheet metal works, *reduction of windows/glazed areas, * replacement of façade joinery, * placing the entire envisaged installation in the facade,						

	*covering and protection of all non-treated surfaces – glass, stone... *Control and testing of the existing facility surface, including: Use the means of impregnation- basic coating at the most critical points of the facility. When the basic coating dries out, set up the EPS cube of 5x5x5 cm by using polystyrene adhesive. Once the adhesive completely settles, minimum 3 days after the working conditions are adequate, try to separate the cube manually.						
	If in the process of separating expanded polystyrene only the adhesive separates and not parts of the basis - the basis is sufficiently strong, solid and stable.						
	If in the process of separating expanded polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.						
	If in the process of separating expanded polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough, and shall not withstand new layer of thermal insulation.						
	Use the reinforcing mesh or angle profiles for the window corners and jambs. Facade ends along the plinth must have U-profile strip, adjusted to the thickness of thermal-plate.						
	Before setting the plates, thoroughly clean the facade surface from dust, greasy deposits and mortar. At heights over 8 meters, plates need additional anchoring with appropriate bolts.						
	During the works on the facade, surface, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortar shall not be applied in the event of heavy wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Treatment of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be in line with the appropriate EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						

	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	EPS	m2	805,89	x	19,99 €	=	**16107,73**
	XPS	m2	935,91	x	25,11 €	=	**23503,04**
	Pressed mineral wool	m2	124,02	x	23,06 €	=	**2860,21**
1.11.	Setting up "Demit" thermal facade on the ceiling of the bay of the school. All the materials and works shall be in line with description of the item 1.10.						
	Calculation per m2	m2	72,52	x	19,99 €	=	**1449,49**
1.12.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned (ceiling of canopies at the entrance, porch ceiling in front of the gym entrance). Type and colour of the render will be selected by the Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, and if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	***contact coating** made of the emulsion of synthetic resins and water-glass (liquid sodium silicate) used for impregnation of the set reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This layer shall be made in fine grained and smooth structure, painted in colour determined by the Employer / Employer's Representative, fully in line with the Design details.						
	The openings shall be protected with PVC foil. The unit price includes the purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.						
	Calculation per m2	m2	193,08	x	12,10 €	=	**2335,30**

1.13.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulie") as splash guard (as indicated on the drawings). Surface shall be cleaned, washed and sprinkled with acrylic base with granulate, color of the base by the color chart of the manufacturer determined by the Employer / Employer's Representative. Render shall be applied on cleaned and dried surface by manufacturer's instruction.						
	Calculation per m2	m2	101,58	x	15,58 €	=	**1582,62**
1.14.	Closing window opening at the external entrance to the boiler room by gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics) with proper connection to existing wall and reinforcement. Dimension of the opening is 90 / 145 cm. Preparing the surface for installation of thermal facade from the external side and plastering from the internal side. One ventilation opening with fly screen of 100 cm2 shall be inserted in the facade in that area. Ventilation opening shall be sturdy quality.						
	Calculation lump sum.	lump sum	1,00	x	87,13 €	=	**87,13**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**64974,19**
II	**THERMAL INSULATION AND ISTALLATION OF THE NEW ROOF ON THE MAIN SCHOOL BUILDING**						
2.01.	Removal of existing roof cover made of painted trapezoid metal-sheet and small beams 8/10cm, lined at the distance up to 1.00 m until the wooden roof structure is reached. The unit price includes all the work and debris transportation to the town landfill.						
	Calculation per m2 actual area of the sloped roof.	m2	748,90	x	4,31 €	=	**3224,01**
2.02.	Demolition of multi-pitched wooden roof structure (roof posts, rafters, struts, tie beams...). Removed roofing timber to be classified and hand over to the Employer / Employer's Representative. Calculation per m2 of horizontal projection of the roof. The unit price includes all material and transportation of debris to a town landfill.						
	Calculation per m2	m2	756,35	x	3,90 €	=	**2945,98**
2.03.	Dismantling of the RC horizontal beams and vertical pilars (concrete is old over 10 years). The unit price includes all the work and usage of the scaffold, transportation of the debris to the town landfill.						
	Calculation per m3	m3	9,77	x	77,90 €	=	**761,08**

2.04.	Dismantling of the gable walls and roof parapet walls made of brick (d=25cm) laid in gauged mortar. Walls are plastered from both sides. The unit price includes all the work and scaffold, transportation of the debris to the town landfill.						
	Calculation per m3	m3	36,48	x	38,95 €	=	**1420,90**
2.05.	Dismantling the part of the chimney which is going through the attic and above the roof. Chimney is made of compact brick laid in gauged mortar. The unit price includes all the work and debris transportation to the town landfill, as well as usage of the scaffold.						
	Calculation per m3	m3	1,87	x	49,20 €	=	**92,00**
2.06.	Making the opening in the ceiling slab (made of reinforced concrete d=15cm) for entrance to the attic. Dimension of the opening shall be 60x60 cm.						
	Calculation as per piece	pc	1,00	x	117,88 €	=	**117,88**
2.07.	Extension of the height of the existing chimney (one which is starting from the boiler room) due installation of the new roof by brick d=25cm laid in the gauged mortar 1:2:6, simultaneously with the plastering of the chimney channel. Joints on the part of the chimney which is higher than roof shall be filled with cement plaster 1:3. The unit price includes all works, materials, usage of the scaffold and also production and installation of the chimney top made of the concrete d=10cm thick.						
	Calculation per m3	m3	4,45	x	169,13 €	=	**752,61**
2.08.	Installation of RC beams above the second floor and cantilever cornices d=10cm and 30cm width. Beams and cornices shall be made of reinforced concrete MB30 in necessary smooth formwork. The unit price includes all works, materials, anchoring to existing RC beams and usage of necessary scaffold.						
	Calculation per m3	m3	15,14	x	169,13 €	=	**2560,55**
2.09.	Purchase, straightening, cutting, cleaning, bending and mounting of the armature GA240/360 and RA400/500, all in line with static analysis. Quantity of the armature is calculated approximately, and precise quantity shall be determined through the detailed graphical review of the reinforcement. The unit price includes all works and materials.						
	Calculation per kg	kg	900,00	x	1,23 €	=	**1107,00**

2.10.	Production and installation of roof trusses with inclination of 30 and 33°. Trusses shall be up to 2,00m distance, made of softwood lumber, class II, dried and coated against insects. Linear bearers in the uper and lower zone of the truss- 16/20 cm, struts- 14/16 cm, bracings and bonding beams- 16/20 cm, to be placed along the whole length. It, also, shall be equiped with necessary shackles, everything in line with structural analysis. The unit price includes all work, material and treatment of wood with 1st class fire-resistant coating. Calculation per m2 of horizontal projection of the roof.						
	Calculation per m2	m2	795,51	x	17,22 €	=	**13698,68**
2.11.	Procurement and installation of purlins, at 1,80 m distance, made of "Z" profiles 100/50/5 mm. Purlins to be cleaned from the corrosion, treated with red lead coating, and painted with double layer of paint for metal. Quantity of the armature is calculated approximately, and precise quantity shall be determined through the detailed graphical review of the reinforcement. The unit price includes all works and materials.						
	Calculation per kg	kg	5.100,00	x	2,56 €	=	**13068,75**
2.12.	Covering the multi-pitched roof using pre-painted Al sheet metal Al.Tr. 40/230/0,7 mm. Upon installation, execute the following works: roof ridge flashing, roof hip flashing and gutters flashing and, also, setting up of snowhurdles. Calculation per m2 of actual inclined roof area. The price includes all work and material in line with the description.						
	Calculation per m2	m2	917,83	x	28,50 €	=	**26153,57**
2.13.	Setting up thermal insulation of the attic will be conducted with mineral wool d=10, having heat transfer coefficient of λmax = 0,037 W/mK. Thermal insulation shall be placed over concrete slab and vapour barier and protected by PVC foil with overlaps 10-15 cm. The unit price includes all the work and materials.						
	Calculation per m2	m2	795,51	x	12,10 €	=	**9621,69**
2.14.	Making of cement screed in the central area of the attic as the protection for thermal insulation. Calculation per m2. The price includes setting up of the mesh with 5 cm overlap (1,08m2/m2) and smoothing as the final treatment, with 5 cm of creed thickness.						
	Calculation per m2	m2	185,72	x	10,97 €	=	**2036,88**
2.15.	Production and installation of the metal ladders and climbers for entrance to the attic and roof. Ladders and climbers shall be painted with doble layer of paint and treated with red lead coating.						
	Calculation as per piece.	pc	2,00	x	128,13 €	=	**256,25**

2.16.	Production and installation of the metal cover for entrance to the attic and roof with all necessary elements. Cover shall be painted with doble layer of paint and treated with red lead coating, and to be thermaly insulated from the bottom side.						
	Calculation as per piece.	pc	1,00	x	117,88 €	=	117,88
	TOTAL FOR THERMAL INSULATION AND WATERPROOFING OF THE ROOF						77935,72
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery.						
	340/180	pc	16,00	x	11,50 €	=	184,00
	200/75	pc	5,00	x	11,50 €	=	57,50
	340/100	pc	1,00	x	11,50 €	=	11,50
	400/135	pc	4,00	x	11,50 €	=	46,00
	400/135	pc	7,00	x	11,50 €	=	80,50
	450/100	pc	1,00	x	11,50 €	=	11,50
	185/100	pc	1,00	x	11,50 €	=	11,50
	390/70	pc	1,00	x	11,50 €	=	11,50
	340/230	pc	16,00	x	11,50 €	=	184,00
	400/230	pc	20,00	x	11,50 €	=	230,00
	366/280	pc	1,00	x	11,50 €	=	11,50
	366/280	pc	1,00	x	11,50 €	=	11,50
	300/220+60	pc	1,00	x	11,50 €	=	11,50
	300/190	pc	1,00	x	11,50 €	=	11,50
	200/140	pc	2,00	x	11,50 €	=	23,00
	300/280	pc	1,00	x	11,50 €	=	11,50
	190/220+80	pc	1,00	x	11,50 €	=	11,50
	300/715	pc	2,00	x	11,50 €	=	23,00
3.02.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frames, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4+16+4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes.						

	- include internal PVC sill of required width in the item, - PVC profile colour - white.						
	1. 340/180	pc	5,00	x	759,00 €	=	**3795,00**
	2. 200/75	pc	3,00	x	791,20 €	=	**2373,60**
	3. 340/100	pc	1,00	x	623,30 €	=	**623,30**
	4. 400/135	pc	4,00	x	702,65 €	=	**2810,60**
	4'. 400/135	pc	7,00	x	434,70 €	=	**3042,90**
	5. 450/100	pc	1,00	x	634,80 €	=	**634,80**
	6. 185/100	pc	1,00	x	282,90 €	=	**282,90**
	7. 390/70	pc	1,00	x	501,40 €	=	**501,40**
	8. 340/230	pc	14,00	x	1.050,0 €	=	**14699,30**
	10. 340/230	pc	2,00	x	718,8 €	=	**1437,50**
	11. 340/180	pc	1,00	x	580,75 €	=	**580,75**
3.03.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - low emission, double glazing, 4+16+4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes. NOTE: External glazing to be coated by special low emission layer as protection against sunshine.						
	- include internal PVC sill of required width in the item, - PVC profile colour - white.						
	1'. 340/180	pc	10,00	x	759,00 €	=	**7590,00**
	2. 200/75	pc	2,00	x	791,20 €	=	**1582,40**
	9. 400/230	pc	20,00	x	1.179,9 €	=	**23598,00**

3.04.	Production and installation of the facade aluminium joinery. The unit price includes everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Measures must be taken on site. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2,30 W/m2K - aluminium jealousies if existing in joinery schemes, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium.						
	A1 and A1'. 366/280	pc	2,00	x	2.139,0 €	=	**4278,00**
	A2. 300/220+60	pc	1,00	x	1.650,3 €	=	**1650,25**
	A3. 155/190	pc	1,00	x	653,20 €	=	**653,20**
	A4. 200/140	pc	2,00	x	657,80 €	=	**1315,60**
	A5. 300/280	pc	1,00	x	1.543,3 €	=	**1543,30**
	A6. 190/220+80	pc	1,00	x	1.200,60 €	=	**1200,60**
	A7. 300/715	pc	2,00	x	5.359,0 €	=	**10718,00**
3.05.	Removal of existing protective bars from the facade in the area of the gym and ground floor of the main school building before replacement of joinery and its refitting, after new joinery is installed. Cleaning and scraping. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted. The unit price includes possible replacement of the defective parts.						
	190/80	pc	1,00	x	57,50 €	=	**57,50**
	185/100	pc	1,00	x	57,50 €	=	**57,50**
	200/75	pc	2,00	x	57,50 €	=	**115,00**
	340/100	pc	1,00	x	92,00 €	=	**92,00**
	340/180	pc	3,00	x	92,00 €	=	**276,00**
	390/70	pc	1,00	x	80,50 €	=	**80,50**
	400/135	pc	8,00	x	103,50 €	=	**828,00**
	450/100	pc	1,00	x	103,50 €	=	**103,50**

3.06.	Production and installation of the windshield aluminium joinery. The unit price includes everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - plastic coated aluminium construction system without thermal break, -glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	A8. 634/305	pc	1,00	x	3.313,2 €	=	**3313,15**
	A9. 200/305	pc	1,00	x	964,9 €	=	**964,85**
	A10. 200/305	pc	1,00	x	894,7 €	=	**894,70**
	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper. **NOTE:** Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.						
3.07.	Production and installation of meshes manufactured from ropes. Meshes shall be attached on ceilings / walls over the windows in the gym, as a glass protection. Before installation meshes shall be sampled and approved by Employer / Employer's Representative.						
	opening dim. 400/135cm POS 4 & 4*	pc	11,00	x	74,75 €	=	**822,25**
	REPLACEMENT OF FACADE JOINERY						**93459,35**
IV	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
4.01.	Breaking out an opening for boiler room door through stone wall, 55cm thick (built in cement mortar). Wall parts shall be demolished carefully, so the wall structure remains undamaged. The unit price includes all works, removal and loading of debris onto a truck and transportation to a landfill at 5 km distance.						

	Calculation per m3	m3	0,30	x	128,13	=	**38,44**
4.02.	Demolition of the plain concrete (d=10cm) pavement (plateau), placed over the layer of gravel d= 10 cm, between school and gym entrance. The unit price includes all works, removal and loading of debris onto a truck and transportation to a landfill at 5km distance.						
	Calculation per m2	m2	60,11	x	4,51		**271,10**
4.03.	Clearing the field for pavement making, 1m width, along with manual excavation 10-20cm of depth. The unit price includes all works, removal and loading of excavated material onto a truck and transportation to a landfill at 5km distance.						
	Calculation per m2	m2	17,25	x	7,18		**123,77**
4.04.	Gravel filling and compression in the area beneath the floor of the pavement, d=10 cm. Filled layer of gravel shall have accurately determined width and right cross-section, with precision of ±1cm. The unit price includes all works and materials.						
	Calculation per m3	m3	7,73	x	31,78	=	**245,62**
4.05.	Concrete works shall include putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. In some parts of pavement there will be openings for illumination of basement windows. These parts have to be reinforced by using mesh reinforcement Q 188. Pavement has to be strained into the fields CCA 1,5m2. Expansion joints shall be filled up with joint filler. Note: The concrete structure at the coal reception shall be removed and replaced by concrete pavement. The unit price includes all works and materials.						
	Calculation per m2	m2	77,36	x	17,84	=	**1379,72**
4.06.	Removal of brick chimneys on the roof of the school building up to the slab level. Closing the chimney flue holes with concrete. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance. Preparing of surfaces for installation of the new roof. Removal works shall be done very carefully, in order to avoid damages of the ceiling RC slab						
	Calculation as per piece.	pc	4,00	x	63,55 €	=	**254,20**
	MEASURES						**2312,84**
V	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						

	RENEVAL OF THE DRESSING ROOMS						
5.01.	Removal of wood trim covering from the walls along with wooden lath substructure and loading of debris onto a truck with transportation to a landfill up to 5 km distance.						
	Calculation per m2	m2	16,20	x	3,59 €	=	**58,12**
5.02.	Removal of existing rotten plaster from the walls in dressing rooms and the gym- 20% of total area. The unit price includes removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance, and using of the scaffolding.						
	Calculation per m2 511.47*20%	m2	102,29	x	3,59 €	=	**366,97**
5.03.	Scraping of the old paint from the internal ceilings and walls in dressing rooms and the gym. Removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2	m2	471,00	x	0,51 €	=	**241,39**
5.04.	Scraping of the old oil based paint from the internal walls in the dressing rooms and the gym using gas burner ("brener"), removal and loading of the debris onto a truck and transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2	m2	259,89	x	1,85 €	=	**479,50**
5.05.	Dismantling of the existing joinery- doors of dressing rooms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative for storing away. Calculation is done per m2 of dismantled joinery.						
	90/205 pc 2	m2	3,69	x	6,15 €	=	**22,69**
5.06.	Plastering parts of existing walls and ceilings in dressing rooms and the gym - 20% of total area, with gauged mortar 1:2:6 in two layers, with the previous spraying of cement slurry. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges. The unit price includes usage of scaffold.						
	Calculation per m2	m2	102,29	x	8,00 €	=	**817,81**

5.07.	Skimming, polishing and painting of the walls and ceilings in dressing rooms and the gym. The Employer / Employer's Representative will select the tone of semi dispersed water-based distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer. Calculation per m2, including all necessary work, materials and scaffolding.						
	dressing rooms	m2	573,28	x	4,00 €	=	**2291,69**
5.08.	Purchase of materials and painting the dressing rooms and the gym walls using oil based paint, up to the height of 1,5 m in two layers, colour will be selected by the Employer / Employer's Representative.						
	dressing rooms	m2	259,89	x	3,33 €	=	**865,76**
5.09.	Production and installation of internal single-leaf door, made of PVC. The unit price includes: the purchase of materials, manufacturing, transport and installation of fitting and blind frame. Measures must be taken on site. Calculation is based per piece of the installed joinery.						
	90/205	pc	2,00	x	404,88 €	=	**809,75**
	PAINTING WORKS OF THE WALLS AND CEILINGS						
5.10.	Stripping off dilapidated plaster (d=2,5cm) of from the walls and ceilings (10%), removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance and scaffolding.						
	Calculation per m2 3837.42x10%	m2	383,74	x	3,59 €	=	**1376,67**
5.11.	Scraping of the old oil based paint from the internal walls in the classrooms and corridors using gas burner ("brener"), removal and loading of the debris onto a truck and transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2						
	hall, corridors	m2	480,98	x	1,85 €	=	**887,41**
	classrooms and other premises	m2	851,89	x	1,85 €	=	**1571,74**
5.11.	Plastering parts of existing ceilings and treatment of damaged surfaces (10% of total area) with cement-lime plaster 1:2:6, previously treating the walls with cement milk. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges. The unit price includes usage of scaffold.						
	Calculation per m2	m2	383,74	x	8,00		**3068,00**

5.12.	Scraping and skimming of walls and ceilings with emulsion putty. All surfaces need to be scraped and washed and then smoothen, cleaned and impregnated. Inspect and remedy minor damages and cracks using putty. Flatten with putty and skim with emulsion putty for the first time. All surfaces need to be smoothen, then flatten with putty and skimmed with emulsion putty for the second time. Perform all the works using required scaffold.						
	Calculation per m2						
	-hall, corridors						
	ground floor						
	walls	m2	217,47	x	2,36 €	=	**512,69**
	ceilings	m2	209,07	x	2,36 €	=	**492,88**
	first floor						
	walls	m2	251,99	x	2,36 €	=	**594,07**
	ceilings	m2	249,64	x	2,36 €	=	**588,53**
	second floor						
	walls	m2	251,99	x	2,36 €	=	**594,07**
	ceilings	m2	249,64	x	2,36 €	=	**588,53**
	- classrooms and other premises						
	ground floor						
	walls	m2	398,97	x	2,36 €	=	**940,57**
	ceilings	m2	318,19	x	2,36 €	=	**750,13**
	first floor						
	walls	m2	368,62	x	2,36 €	=	**869,02**
	ceilings	m2	442,54	x	2,36 €	=	**1043,29**
	second floor						
	walls	m2	368,62	x	2,36 €	=	**869,02**
	ceilings	m2	442,54	x	2,36 €	=	**1043,29**
5.13.	Treatment of the walls with oil-based paint in height h=1.40m in two layers in colour selected by the Employer / Employer's Representative.						
	Calculation per m2						
	-hall, corridors						
	ground floor	m2	144,98	x	3,33 €	=	**482,96**
	first floor	m2	168,00	x	3,33 €	=	**559,65**
	second floor	m2	168,00	x	3,33 €	=	**559,65**
	- classrooms and other premises						
	ground floor	m2	290,89	x	3,33 €	=	**969,03**
	first floor	m2	280,50	x	3,33 €	=	**934,42**
	second floor	m2	280,50	x	3,33 €	=	**934,42**
5.14.	Painting internal ceilings with semi-dispersed water based distemper, by applying two layers of the paint, in colour selected by the Employer / Employers Representative, using scaffold.						
	Calculation per m2						
	-hall, corridors						
	ground floor						
	walls	m2	217,47	x	1,64 €	=	**356,65**
	ceilings	m2	209,07	x	1,64 €	=	**342,87**
	first floor						
	walls	m2	251,99	x	1,64 €	=	**413,26**
	ceilings	m2	249,64	x	1,64 €	=	**409,41**
	second floor						
	walls	m2	251,99	x	1,64 €	=	**413,26**
	ceilings	m2	249,64	x	1,64 €	=	**409,41**

	- classrooms and other premises						
	ground floor						
	walls	m2	398,97	x	1,64 €	=	**654,31**
	ceilings	m2	318,19	x	1,64 €	=	**521,83**
	first floor						
	walls	m2	368,62	x	1,64 €	=	**604,54**
	ceilings	m2	442,54	x	1,64 €	=	**725,77**
	second floor						
	walls	m2	368,62	x	1,64 €	=	**604,54**
	ceilings	m2	442,54	x	1,64 €	=	**725,77**
5.15.	Cleaning of the construction waste and its dumping to a construction material landfill at 5 km distance.						
	Calculation per m2	m2	1.911,80	x	1,03	=	**1959,60**
	VARIOUS WORKS						
5.16.	Repairing of the existing parquet floor. Machine sanding and varnishing of the parquet. Conduct these procedures three times by using color free lacquer. Before varnishing, thoroughly clean the surface from dust. Conduct varnishing with a brush, to avoid bubbles. The item includes installation and processing of the angular parquet batten.						
	Calculation per m2	m2	50,00	x	18,66 €	=	**932,75**
5.17.	Replacement of the collapsed wall ceramic tiles in recently renovated sanitary facilities with ceramic tiles class I. The size, colour and tone of the tiles will be similar to the existing ones sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them fully in line with existing ones with pointing the joints using pointing plaster.						
	Calculation per m2	m2	50,00	x	25,63	=	**1281,25**
5.18.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers and painting of hydrant and switch boxes in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculation per lump sum	lump sum	1,00	x	225,50 €	=	**225,50**

5.19.	Production and montage of the metal fences on the ends of the main corridors on the ground, first and second floor. Fences shall be 3m long and 1.10m high. Making and installation of new fences in accordance with the ironmongery scheme. The fences shall be fixed to the floor. The frame shall be made of steel box profiles dimensions 30*30 mm, and inner bars of full profile 10*10 mm. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, determined by Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted. The unit price shall include all works and necessary material for installation of the fences.						
	Calculated as per piece	pc	5,00	x	148,63 €	=	**743,13**
5.20.	Installation of new canopy (dimensions 300/120cm) above western entrance in the dentist area. Construction of the canopy shall be made of the box steel profiles dimension 40*40 mm and polycarbonate plate "Lexan" as a canopy cover. "Lexan" shall be fixed to the structure with screws with rubber washers. All used materials shall be sampled and aproved by Employer / Employer's Representative. The unit price includes removal of the old canopy and its transportation to the town landfill. Canopy shall be installed, in line with the ETICS facade.						
	Calculation as per lump sum	lump sum	1,00	x	497,13 €	=	**497,13**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**38004,64**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3,00	x	11,50 €	=	**34,50**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1,00	x	11,50 €	=	**11,50**
6.03.	Purchase and delivery wall / floor mounted door rubber stopper.						
	Calculated as per piece	pc	2,00	x	11,50 €	=	**23,00**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2,00	x	28,75 €	=	**57,50**

6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high.						
	Calculated as per piece	pc	1,00	x	28,75 €	=	28,75
6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high.						
	Calculated as per piece.	pc	5,00	x	28,75 €	=	143,75
	TOTAL FOR SPARE PARTS						**299,00**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing hand over document.						

SUMMARY OF COSTS

	SCHOOL AND GYM	
I	THERMAL INSULATION OF FACADE WALLS	**64974,19**
II	THERMAL INSULATION AND WATERPROOFING OF THE ROOF	**77935,72**
III	REPLACEMENT OF FAÇADE JOINERY	**93459,35**
IV	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	**2312,84**
V	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	**38004,64**
VI	SPARE PARTS	**299,00**
	TOTAL PRICE, VAT EXCLUDED:	**276985,74**
	VAT (19%):	**52627,29**
	TOTAL PRICE, VAT INCLUDED:	**329613,03**

GROUP A5.2.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Primary School "Ristan Pavlovic" in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Ristan Pavlovic" Pljevlja
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions. Manufacturer: Siemens or equivalent Type: "UH50 Ultraheat" Nominal flow: 10 m^3/h Connector: DN40	pc	1	x	1.319,05 €	=	1.319,05 €
2	Purchase, supply and installation of control unit with M-Bus communication and display. Manufacturer: Siemens or equivalent Type: "Climatix POL638"	pc	1	x	2.472,50 €	=	2.472,50 €
3	Purchase, delivery and installation of electric solids flowmeter in silo. Manufacturer: Siemens or equivalent Type 7ML5440-0AB00-0AC1	pc	2	x	3.047,50 €	=	6.095,00 €
4	Software development and staff training.	pc	1	x	1.035,00 €	=	1.035,00 €
	TOTAL A - Energy management						**10.921,55 €**

B - HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS							
B.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of existing equipment of the heating system: 2 ribbed coal-fired boilers Vulkan Super 326,4 kW, feeder and return pipes, open expansion vessel, pumps, valves and other fittings and all pipes in the boiler room. The item includes removal and dumping dismantled equipment to a suitable place.						
	Calculated lump-sum	pc	1	x	3.450,00 €	=	3.450,00 €
2	Washing existing walls and floor to remove coal dust deposits in premises of the boiler room and fuel storage facilities. Mending holes in walls through which installations, which will not be used presently, were pulled, plastering walls area 80 m^2, fitting cement screed and tiling 70 m^2 of floor. Construction of wall between the boiler room and pellet storage room using concrete block 20 cm width plastered on both sides 7x2.6m.						
	Calculated lump-sum	pc	1	x	3.740,03 €	=	3.740,03 €
3	Preparation of concrete chimney for installation of new prefabricated funnel - penetration of openings for bonding new chimney, penetration of openings for fitting funnel, construction of chimney base using brick, height 1m, fitting of terminal cap made of steel galvanised sheet metal, removal of debris from the boiler room and its dumping to a suitable location.						
	Calculated lump-sum	pc	1	x	1.150,00 €	=	1.150,00 €
4	Construction of steel doors between the boiler room and pellet storage made of black steel ZP profiles with steel sheet metal infill thickness 0.7 mm, dimensions 1x2.1m with a lock, door know, hinges, painted with double layer of paint and single layer of lacquer.						
	Calculated lump-sum	pc	1	x	138,00 €	=	138,00 €
5	Construction of metal stairs for external doors on the boiler room which will not be fixed. They are made of black steel box profiles 40x40x1.5mm with thread made of bent steel sheet metal 3mm thickness (as indicated on detail in the drawings).						
		kg	70	x	2,53 €	=	177,10 €
	TOTAL B.I - Dismantling of existing equipment and preliminary works						**8.655,13 €**
B.II	**Installation of new boiler room equipment**						

1	Purchase, delivery and installation of: biomass-fired boiler - wood pellet HERZ Firematic BioControl 150 or equivalent, rated capacity 150 kW (42,7-155 kW) for production of hot water, maximal temperature 95 °C.						
	HERZ Firematic consists of: - welded structure made of special boiler sheet metal thickness 6 mm - completely insulated body with mineral wool thickness 120 mm - stoker auger - frequency-driven smoke gases fan - safety temperature limiter - heat exchanger automatic cleaning (fire smoke tubes) - usage of remaining heat - two-zone automatic cleaning grate - Burn-back protection RSE flap - intermediate hopper with fuel level maintenance - automatic ignition via electric heaters with hot air - automatic ashes removal from the combustion chamber and heat exchanger - integrated computer for control of boiler and system operating.						
	Microprocessor T-control with touch-LCD screen: - combustion control - heat accumulator control - preparation of domestic hot water - cold end protection with pump and mixing valve - Lambda probe oxygen sensor control - control and operating depending on outdoor conditions with 6 independent heating circuits (1 on) - automatic fuel, air dosing, maintaining necessary flame temperature, smoke gases, boiler temperature, minimal return temperature, hot water temperature in accumulator, water temperature in heating circuits - automatic frost protection - CAN-BUS operating						
	Safety elements : - back burn protection flap, no power, closed - Back-burn inhibitor sprinkler, sprinkler with water tank - back sparking protection, fuel supply block - measuring temperature in the combustion chamber - temperature metering in the storage room, intermediate hopper and dosing augers - safety boiler temperature limiters						

	Technical data for boiler: - Boiler thermal capacity = 150 kW (42,7-155), the boiler modulates between 30-100 % load - Maximal operating pressure = 3 bar - Maximal operating temperature = 95 °C - Boiler efficiency degree = 92 % - Minimal water temperature at entrance into the boiler = 60 °C - Grate area = 0,307 m² - Heat exchanger area = 5,92 m² - Boiler volume = 254 liters - Boiler weight = 1370 kg - Power supply: ~230 V / 50 Hz, 16 A, 2,6 kW						
	HERZ module for heat accumulator control with T-control unit – it is delivered with boiler: - temperature sensor (for metering upper and lower accumulator zone) – 2 pcs - immersion coils for temperature sensors – 2 pcs - sensors are placed in immersion coils and then fitted onto a vessel - T-control unit controls the operating						
	HERZ basic T-control module for 1 heating circuit driven by outdoor temperature.						
		set	2	x	32.963,60 €	=	65.927,20 €
2	HERZ additional module or equivalent, for control for T-control, for 1 heating circuit driven by outdoor temperature: - 2 x PT 1000 temperature sensor sensor temperature (feed and return) - 1x outlet for room temperature sensor - 3x relay outlet 230VAC: pump and mixing valve - control system T-control for operating control						
		pc	1	x	455,40 €	=	455,40 €
3	HERZ or equivalent cascade operating for T-control						
		pc	1	x	1.989,50 €	=	1.989,50 €
4	HERZ set for protection from cold water for Firematic 150 boiler with boiler pump and 3-way mixing valve - pump WILO Stratos Para 40/1-12 - three-way flanged mixing valve, type HERZ 4037, DN 40, PN 16 - electric motor drive for three-way mixing valve, type 7712 - 2 x ball valve, DN 40, non-return valve						
		pc	2	x	3.153,30 €	=	6.306,60 €
5	HERZ safety thermostatic valves or equivalent, for safety heat exchanger, no auxiliary power drive, 95 °C						

		pc	2	x	89,70 €	=	179,40 €
6	HERZ sound proofing or equivalent, for Firematic 150 boiler						
		pc	2	x	960,25 €	=	1.920,50 €
7	HERZ basic package or equivalent, flexible transportation auger. It consists of : - agitator with press mechanism - climbing screw - electro-motor drive - power supply 230 V						
		pc	2	x	2.208,00 €	=	4.416,00 €
8	Auger axis with pressure release basis - extension L = 0,5 m						
		pc	2	x	212,75 €	=	425,50 €
9	Compact flexible transport hose with flexible screw L = 4 m, flexible screw L = 7,5 m						
		pc	2	x	327,75 €	=	655,50 €
10	HERZ hot water accumulator or equivalent, capacity 2500l, maximal operating pressure 3 bars, made of steel S235JR, with anti-corrosion protection on the outside, dimensions: Ø 1200 x 2443 mm. with connections : - DN80 2 pieces (at the top and bottom), - DN65 1 piece (at the top on the upper side), - DN40 4 pieces (distributed one above the other at equal distance from bottom to top), - DN15 3 pieces (for temperature sensors, at the bottom, middle and top).						
		pc	2	x	2.365,55 €	=	4.731,10 €
11	HERZ thermal insulation or equivalent, for accumulator capacity 2500 l, insulation thickness 100 mm						
		pc	2	x	747,50 €	=	1.495,00 €
12	Purchase, delivery and installation of wooden intermediate hopper for pellet cca 1,3 m³ , dimensions w=1m, l=1.75m, H=1m, with transport agitator at the bottom. Tanks sides are made of univer, thickness 20 mm, and supporting substructure and strengthening frames are made of wooden beams 5x5cm.						
		pc	2	x	1.748,00 €	=	3.496,00 €
13	Purchase, delivery and installation of membrane expansion vessel. Maximum permitted pressure is 6 bars, pre-set pressure is 3.5 bars, maximal permitted temperature is 120 °C.						

	Manufacturer: "Pneumatex", Switzerland or equivalent						
	Type: Statico SG 1000.6						
	Volume: 1000 lit						
	Dimensions:						
	diameter 850mm, height 2189mm weight 290kg, connection 6/4"						
		pc	1	x	4.823,10 €	=	4.823,10 €
14	SCHIEDEL chimney system ICS 25 or equivalent, made of twin-wall stainless steel W.Nr. 1.4404 wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature stable insulation material - Superwool. ICS chimney system includes all required elements: inspection port and boiler connection, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals. ICS system is fully in line with EN 1856.						
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS is made of stainless steel W.Nr. 1.4404 wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus. PRIMA PLUS system is fully in line with EN 1856.						
	All chimney elements are industrially produced in every detail as set out in technical documents for particular building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. The system passed GASTEC corrosion test. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø230mm, total height 2x14.8 m (two risers)						
	Furnace flue ICS25 Ø230 mm, developed length 7.6m+8.7m						
		set	1	x	9.259,80 €	=	9.259,80 €
15	Purchase, delivery and installation of the duplex circulation pump with electronic frequency controller, used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna3 D 40-100 F						

	Flow: 14,6 m^3/h Thrust: 4,5 m Type of connection: Flanged DN40 Power supply: V=1~230V Maximum current: I=0,19 - 1,61A Transferred power: P=18 - 361W Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.	pc	1	x	2.033,20 € =	2.033,20 €
16	Purchase, delivery and installation of three-stage circulating pump with fixed number of revolutions, with rotor made of composite materials and casing made of cast iron, for fluid temperatures up to 110 °C, following properties: Manufacturer: "Grundfos" or equivalent Type: UPS 32-50 F 220 Flow: 3,5 m^3/h Thrust: 2 m Type of connection: Flanged DN32 Power supply: V=1~230V Maximal current: I = 0.46A Transferred power: P = 105W	pc	1	x	249,55 € =	249,55 €
17	Purchase, delivery and installation of three-way mixing and diverting valve for constant control of systems with hot and cold water, maximal operating temperature of fluid 140°C					
	DN 50 PN16; Kvs=42	pc	1	x	207,00 € =	207,00 €
	DN 32 PN16; Kvs=18.5	pc	1	x	172,50 € =	172,50 €
	Valve electric-motor drive * Power supply: 24V AC/30 VA * control: impulse * max. force: 2000N * max. run: 45mm	pc	2	x	287,50 € =	575,00 €
18	Purchase, delivery and installation of compact water softener. Compact casing contains ion-exchange resin which is being automatically regenerated once its capacity is spent, properties: Manufacturer: Viessmann or equivalent Type: Aquaset 500 Max. flow: 1,5 m^3/h Amount of resin: 18 l Softening capacity (for 18°dH) 3.9m^3 Salt consumption per regeneration: 3 kg Operating pressure: 1,4 – 8 bar Operating temperature: 4-40 °C Connections 1" Power supply 220V/50Hz Dimensions l: 432 mm, w: 324mm, h: 1060 mm					

	Unit is delivered with protective pre-filter which consists of casing with 25 microns protective mesh.						
		pc	1	x	1.509,95 €	=	1.509,95 €
19	Purchase, delivery and installation of angle valve to be mounted in front of expansion vessel, following properties: Rated outlet: DN32 Overflow outlet: DN40 Rated pressure: 6 bar Maximal discharge flow 18000 kg/h Operating pressure 4 bars Operating temperature: -10 °C do +220 °C Max. operating pressure: 16 bar Coefficient: K=0,05 Overpressure calibration: 10% of set pressure Maximal back-pressure: 1,031 bar						
		pc	1	x	105,80 €	=	105,80 €
20	Purchase, delivery and fitting of feeder and receiver pipes for radiator and air convector heating circuits following dimensions: Diameter 219,1x4,5 mm Feeder length 1300 mm Return pipe length 1200 mm Connections: DN50 x 1pcs DN65 x 1pcs DN80 x 1pcs R3/4" x 2pcs R1/2" x 2pcs						
		pc	2	x	538,20 €	=	1.076,40 €
21	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN80 PN6	pc	4	x	85,33 €	=	341,32 €
	DN65 PN6	pc	5	x	68,08 €	=	340,40 €
	DN50 PN6	pc	15	x	62,45 €	=	936,68 €
22	Purchase, delivery and installation of threaded ball valves, connection size DN40 PN6	pc	5	x	39,74 €	=	198,72 €
	DN25 PN6	pc	8	x	26,91 €	=	215,28 €
23	Purchase, delivery and installation of pipes and differential pressure controller valves, connection sizes: DN65 PN6 - Kvs 51.2						

		pc	4	x	862,50 €	=	3.450,00 €
	DN50 PN6 - Kvs 41						
		pc	2	x	299,00 €	=	598,00 €
24	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets, following dimensions of connections:						
	DN65 PN6	pc	1	x	103,50 €	=	103,50 €
	DN50 PN6	pc	3	x	97,75 €	=	293,25 €
25	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets following dimensions of connections						
	DN65 PN6	pc	1	x	98,90 €	=	98,90 €
	DN50 PN6	pc	3	x	80,50 €	=	241,50 €
26	Purchase, delivery and fitting of fixed aluminium weather louver, size 300x300mm, to be fitted in the boiler room doors (to allow undisturbed air flow for fuel combustion in the boiler), type Hidria Slovenia AZR-3 500x300 or equivalent.	pc	2	x	40,25 €	=	80,50 €
27	Purchase, delivery and installation of water gauge at fresh water feeder from the water mains into the softener, with flow control scale and number disk for total flow registration, connection dimensions 1".	pc	1	x	102,01 €	=	102,01 €
28	Purchase, delivery and installation of glass thermometer in brass casing and sleeve for fitting into the pipeline, metering range 0-120°C.	pc	6	x	28,75 €	=	172,50 €
29	Purchase, delivery and installation of pressure gauge complete with manometer flow-through valve, metering range 0-6 bars.	pc	6	x	29,90 €	=	179,40 €
30	Purchase, delivery and installation of threaded backflow preventer, connection size: DN25 PN6	pc	1	x	13,23 €	=	13,23 €
31	Purchase, delivery and installation of automatic valve for water fill in the system, with block valve and ball backflow valve filter and manometer with following characteristics:						

	Connection dimensions 1"						
	Control range 0.3 – 4 bar						
	Maximal flow at inlet 16bar						
	Maximal temperature at inlet 50°C						
		pc	1	x	46,00 €	=	46,00 €
32	Purchase, delivery and assemblage of air-release vessels with overflow pipe and valve DN 15, made of black steel pipe, DN150 length 300 mm.						
		pc	4	x	54,05 €	=	216,20 €
33	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	8	x	9,60 €	=	76,82 €
34	Purchase of material and installation of piping for connecting boiler room equipment made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø 88,9x3,2						
		m	30	x	22,77 €	=	683,10 €
	Ø 76,1x2,9						
		m	35	x	18,63 €	=	652,05 €
	Ø 60,3x2,9						
		m	50	x	14,95 €	=	747,50 €
35	Joining, tightening material and brackets, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 60% of the previous item.		0,6	x	2.082,65 €	=	1.249,59 €
36	Purchase of material and production of insulation for pipes, feeders and receivers using rock wool, thickness 50 mm in AL coating thickness 0.5 mm, complete with fitting material. Fire resistance flammability class A1 in line with SIST EN 13501-1 i JUS U.J1.050. Calculated as per m^2 of insulation measured on the exterior of the pipe.						
		m^2	55	x	33,35 €	=	1.834,25 €
37	Purchase and installation of PP-R water pipes for connecting equipment for chemical water treatment, for operating pressure of 10 bars with all required fittings. Pipes need to be fixed to walls with double pipe clips at every 1.5 to 2.0 m. Pipes on branching need to be insulated with "plamafleksom" to prevent condensation. Pipes are welded with butt welded joint. Pipe diameter is rated diameter of DN25.						
		m	12	x	10,35 €	=	124,20 €

	TOTAL B.II - Installation of new boiler room equipment						125.004,89 €
C - EFFICIENCY OF THE DISTRIBUTION SYSTEM							
C.I	**Installation of thermostatic and balancing valves**						
1	Purchase, delivery and installation of thermostatic radiator valve connection size						
	1/2"	pc	73	x	12,49 €	=	911,70 €
	3/4"	pc	10	x	20,01 €	=	200,10 €
2	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without having to remove protective cap. The thermostat has liquid sensor.						
	Temperature range from 8 °C to 26 °C						
	No. of channels: four						
	Closing time 24 min.	pc	83	x	15,67 €	=	1.300,98 €
3	Purchase, delivery and installation of radiator angle valves, connection size:						
	1/2"	pc	73	x	12,49 €	=	911,70 €
	3/4"	pc	10	x	16,79 €	=	167,90 €
4	Purchase, delivery and installation of riser control valves with metering outlets in brass casing, presetting with digital reading (fitted on feeder of the manifold), size and properties:						
	DN32 PN6 - Kvs 14.2	pc	2	x	78,20 €	=	156,40 €
	DN25 PN6 - Kvs 8.7	pc	3	x	54,05 €	=	162,15 €
5	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
	DN32, Kvm 8.5	pc	2	x	149,50 €	=	299,00 €
	DN25, Kvm 5.5	pc	3	x	102,35 €	=	307,05 €

	TOTAL C.I - Installation of thermostatic and balancing valves						**4.416,98 €**
C.II	**New branch of heating system in the gym**						
1	Purchase, delivery and installation of wall-mounted hot water air convectors, properties: Manufacturer: "Hidria" Slovenia or equivalent Mark: UniKal 250-2 W tip M Thermal power at t=10°C inlet air and no, of revolutions 1350 o/min: 18.2kW Heating medium: hot water 80-60 °C Total air Flow: 3100 m^3/h Dimensions: 640x705x515mm Electricity power: 0.69 A Electrical connection: 230V, 50 Hz Calorifer weight with mixing box and filter: 29+21+14 kg Hot water connection : 1" The item includes basic filter 60% class EU2, mixing box for fresh and used air with ratio setting, as well as connection duct made of galvanized steel sheet metal thickness 0.5 mm from the roof and connecting to the calorifer, duct size 400x400mm length 1m.	pc	4	x	1.437,50 €	=	5.750,00 €
2	Purchase, delivery and installation of flow controller - damper for fitting on fresh air intake from the ventilation turret to air convector, type "Hidria" Slovenia RŽ3 400x400mm or equivalent.	pc	4	x	74,75 €	=	299,00 €
3	Purchase, delivery and installation of on/off electric actuator for closing control jealousies with a switch "Belimo Joventa" Italia B6 J6 or equivalent. The item includes cables for connecting the actuator to the switch, 150m total length.	pc	4	x	1.135,05 €	=	4.540,20 €
4	Purchase, delivery and installation of monophase transformer five-stage controller of number of revolutions for current up to 2A, power supply 220V, 50Hz, type Hidria Slovenia RMT2 or equivalent.	pc	4	x	74,75 €	=	299,00 €
5	Purchase, delivery and installation of room thermostat for switching the convector fan, type Hidria Slovenia RAA30 or equivalent.	pc	4	x	47,15 €	=	188,60 €

6	Purchase, delivery and installation of ON/OFF anti-frost thermostat, voltage 240V, load breaking current 2A, temperature control range -5 to 15 °C	pc	4	x	143,75 €	=	575,00 €
7	Purchase, delivery and installation of cables for feeding and connecting the air convector to control equipment and connecting to existing outlets for existing air convectors, 3x1.5mm² - 200m, 5x1.5mm² - 10m. Cable to be laid in OG hard PVC tube.	set	1	x	920,00 €	=	920,00 €
8	Purchase, delivery and installation of overpressure light aluminium facade jealousies type "Hidria" Slovenia AN Ž-3 500x400mm or equivalent, for releasing surplus air from the gym.	pc	2	x	74,75 €	=	149,50 €
9	Purchase, delivery and installation of fixed façade aluminium jealousies, dimensions 400x400mm, for installation in duct towards air convector, typeHidria Slovenia AZR-3 400x400 or equivalent.	pc	2	x	56,35 €	=	112,70 €
10	Purchase, delivery and installation of inclined control valves in brass cone, dimensions and properties: DN25, with drainage 1/4" Kvs=10,4	pc	4	x	55,20 €	=	220,80 €
11	Purchase, delivery and installation of threaded block-ball valves, in brass cone, dimensions 1" (DN25)	pc	12	x	13,23 €	=	158,70 €
12	Purchase, delivery and installation of bracket tray holders and bolts for mounting air convectors to the gym wall.	pc	4	x	69,00 €	=	276,00 €
13	Making opening in the wall for fresh air supply to hot water air convectors, size 40x40cm and openings for transfer grill 50x40cm.	pc	6	x	57,50 €	=	345,00 €
14	Purchase, delivery and installation of cast ribbed radiators, following properties: Manufacturer: Termik Zrenjanin or equivalent Mark: 580/4 No. of channels: four-channeled rib Height: 580mm Rib width: 160mm Axis separation: 500mm Rib length: 60mm						

	Heating surface: 0,268m2 Water capacity: 1,2lit Rib weight: 6,28kg Thermal power per rib at 90/70°C: 139,1W	pc	71	x	12,42 €	=	881,82 €
15	Purchase, delivery and installation of radiator cap, size 5/4"	pc	11	x	1,38 €	=	15,18 €
16	Elements for reduction of pipes diameter 5/4" to 1/2".	pc	13	x	1,38 €	=	17,94 €
17	Purchase, delivery and installation of brackets for heat emitters.	pc	6	x	9,20 €	=	55,20 €
18	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.	pc	1	x	4,83 €	=	4,83 €
19	Purchase of material and installation of steel seamless pipeline (distribution manifold) in line with JUS standard C.B5.221 or DIN 2448, dimensions:						
	Ø 60,3x2,9	m	75	x	14,95 €	=	1.121,25 €
	Ø 48,3x2,6	m	35	x	11,39 €	=	398,48 €
	Ø 33,7x2,6	m	52	x	8,34 €	=	433,55 €
	Ø 26,9x2,3	m	25	x	7,06 €	=	176,53 €
	Ø 21,3x2,0	m	80	x	6,44 €	=	515,20 €
20	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures. Calculated as 60% of the previous item.		0,6	x	2.645,00 €	=	1.587,00 €
21	Purchase of material and coating the pipes with insulation made of mineral wool, thickness 50 mm, with AL sheeting thickness 0.5 mm, complete with installation kit. Fire-resistance class flammability A1 in line with SIST EN 13501-1 & JUS U.J1.050. Calculated per m2 of insulation measured on the external side of the pipe.	m^2	30	x	33,35 €	=	1.000,50 €

22	Dismantling of existing gym heating equipment, set of manifolds consisting of feeder and return pipe, 35m length, 2 hot water air convectors with connection channels, 4 pipe radiators, 5 radiators, one air-release vessel and piping in the gym and ancillary premises.						
	Calculated lump-sum	set	1	x	575,00 €	=	575,00 €
	TOTAL C.II - New branch of heating system in the gym						**20.616,97 €**
C.III	**Repair of existing heating system**						
1	Purchase, delivery and installation of cast ribbed radiators instead of dismounted in lavatories, properties: Manufacturer: Termik Zrenjanin or equivalent Mark: 580/4 No. of channels: four-channeled rib Height: 580mm Rib width: 160mm Axis separation: 500mm Rib length: 60mm Heating surface: 0,268m2 Water capacity: 1,2lit Rib weight: 6,28kg Thermal power per rib at 90/70°C: 139,1W	pc	42	x	12,42 €	=	521,64 €
2	Purchase, delivery and installation of radiator cap, size 5/4“	pc	8	x	1,38 €	=	11,04 €
3	Elements for reduction of pipes diameter 5/4" to 1/2".	pc	8	x	1,38 €	=	11,04 €
4	Purchase, delivery and installation of brackets for heat emitters.	pc	4	x	9,20 €	=	36,80 €
5	Flushing entire heating system in the classrooms. Dismantling of all radiators (73 ribbed radiators with 10 to 38 ribs) and removal of residue from the bottom of ribs, cleaning air release valves and remounting with installation of new radiator brackets.						
	Calculated lump-sum	pc	1	x	2.875,00 €	=	2.875,00 €
6	Purchase of material and installation of steel seamless pipeline in line with JUS standard C.B5.221 or DIN 2448, dimensions:						
	Ø 48,3x2,6	m	10	x	11,39 €	=	113,85 €
	Ø 42,4x2,6	m	20	x	9,78 €	=	195,50 €

	Ø 33,7x2,6	m	50	x	8,34 €	=	416,88 €
	Ø 26,9x2,3	m	60	x	7,06 €	=	423,66 €
	Ø 21,3x2,0	m	20	x	6,44 €	=	128,80 €
7	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures.						
	Calculated as 60% of the previous item.		0,6	x	1.278,69 €	=	767,21 €
	TOTAL C.III - Repair of existing heating system						**5.501,42 €**
C.IV	**Preliminary and finishing works**						
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.	lump-sum	1	x	460,00 €	=	460,00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves.	lump-sum	1	x	460,00 €	=	460,00 €
3	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.	lump-sum	1	x	230,00 €	=	230,00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.	lump-sum	1	x	172,50 €	=	172,50 €
5	Issuing of certificate for entire installed material and equipment.	lump-sum	1	x	230,00 €	=	230,00 €
6	Preparation of "As-built" design.	lump-sum	1	x	575,00 €	=	575,00 €
7	Installation of framed and glazed scheme of connections on a visible place in the boiler room.	lump-sum	1	x	230,00 €	=	230,00 €
8	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with the fire protection standards.						

		lump-sum	1	x	115,00 €	=	115,00 €
9	Making holes in walls for putting pipes for the new heating system, including mending works at penetration points for bringing walls and ceilings in proper condition.(7	lump-sum	1	x	575,00 €	=	575,00 €
10	Mending walls behind: -4 radiators and 2 calorifers in the gym, -5 radiators in the auxillary rooms, which shall be removed.	lump-sum	1	x	172,50 €	=	172,50 €
	TOTAL C.IV - Preliminary and finishing works						**3.220,00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**10.921,55 €**
B	**HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS**	**133.660,02 €**
B.I	Dismantling of existing equipment and preliminary works	8.655,13 €
B.II	Installation of new boiler room equipment	125.004,89 €
C	**EFFICIENCY OF THE DISTRIBUTION SYSTEM**	33.755,36 €
C.I	Installation of thermostatic and balancing valves	4.416,98 €
C.II	New branch of heating system in the gym	20.616,97 €
C.III	Repair of existing heating system	5.501,42 €
C.IV	Preliminary and finishing works	3.220,00 €
	TOTAL PRICE, VAT EXCLUDED	**178.336,93 €**
	VAT (19 %)	**33.884,02 €**
	TOTAL PRICE, VAT INCLUDED	**212.220,94 €**

GROUP A5.2.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Primary School "Ristan Pavlovic" in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Ristan Pavlovic" Pljevlja
	Doc. origin:	Final Electrical Design
	Date:	30 April 2014

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	7,00				
	Works and material:	pc	226	x	26,57	=	6.003,69 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	14,00				
	Works and material:	pc	13,00	x	53,13	=	690,69 €
1.3.	Delivery and laying of electrical cables for lighting in bathrooms at first and second floor. The cables shall be powered from the closest distribution board in front of the bathroom. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	25,00				
	Works and material:	pc	2,00	x	94,88	=	189,75 €

1.4.	Delivery and laying of electrical cables for lighting in the gym. The cables shall be powered from the closest distribution board. Cables to be laid in walls/ceilings in PVC channels 16x16. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	13,00				
	Works and material:	pc	8,00	x	49,34	=	394,68 €
1.5.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	190	x	3,80	=	721,05 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	118	x	101,20	=	11.941,60 €
1.7.	Delivery and mounting of ceiling mounted luminaries 2/35W T16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	11	x	126,50	=	1.391,50 €
1.8.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	17	x	173,31	=	2.946,19 €
1.9.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	51	x	113,85	=	5.806,35 €
1.10.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	5	x	113,85	=	569,25 €

1.11.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	24	x	111,32	=	2.671,68 €
1.12.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit:	pc	8	x	290,95	=	2.327,60 €
1.13.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	7	x	226,44	=	1.585,05 €
1.14.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	3	x	226,44	=	679,31 €
1.15.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP65 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	3	x	232,76	=	698,28 €
1.16.	Delivery and installation of modular accessories, white PVC box Ø 60 armature 2M decorative mask 2M ordinary switch 2M - pcs 1 Total for works and material	lump sum	15	x	6,33	=	94,88 €
1.17.	Delivery and installation of modular installation accessories, white PVC box Ø 60 armature 2M decorative mask 2M ordinary switch 1M - pcs 2 Total for works and material	lump sum	5	x	7,59	=	37,95 €
1.18.	Delivery and installation of modular installation accessories, white PVC box Ø 60 armature 2M decorative mask 2M two-way switch 2M - pcs 1 Total for works and material	lump sum	4	x	6,96	=	27,83 €
1.19.	Delivery and installation of modular installation accessories, white PVC box 3M armature 3M decorative mask 3M ordinary switch 1M - pcs 3 Total for works and material	lump sum	17	x	10,12	=	172,04 €

1.20.	Delivery and installation of modular installation accessories, white						
	PVC box 4M						
	armature 4M						
	decorative mask 4M						
	ordinary switch with indication 1M - pcs 4						
	Total for works and material	lump sum	1	x	13,92	=	13,92 €
	Total for lighting installation						**38.963,27 €**
2	**ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION**						
2.1.	Marking the route, excavation and backfilling of the trench with dimensions of 0.4x0.8m for the purpose of laying cables. The excavation should be done by mechanical machines in the soil of III and IV category. This item includes: -delivery and spreading the sand at cable trench. The two layers of sand shall be laid, thickness of 10cm, before and after laying of cable. The sand is laid across the entire width of the trench, -delivery and placing PVC "gal"-protector for mechanical protection of cables at soil trench, after spreading second layer of sand. The protector should be laid to each other, lengthwise, overlapping for by 10 centimeters, completely covering the cable, -delivery and placing warning tape made of soft polyvinyl chloride, which is placed at 20cm from the surface. -delivery and laying of Zink-plated steel tape, Fe/Zn 25x4mm in the cable trench and connecting of the tape on outlet of foundation grounding unit,as shown in the drawings. The tape shall be laid at filling of the trench, after the first layer of excavation. Total for work, calculated per one meter of the	m	42	x		=	1.230,60 €
2.2.	Delivery and mounting of cabinet marked as PMO, which shall be mounted at LV post, as shown in the drawings. PMO is made of pressed polyester with IP 54 protection, IK 10, class of isolation II. Cabinet is equipped with the door which can be closed in three points, with half-cylinder lock. The following equipment shall be installed inside:						
	three-phase two-tariff counter for direct measurement of the DB2-60A	pc	1				
	ISFT NV00 100/50A	pc	1				
	V25-B/3 + NPE, producer OBO-Betterman or equivalent	pc	1				
	The price includes all material required for installation of this equipment. Total for cabinet "PMO":	pc	1	x	860,20	=	860,20 €

2.3.	Delivery and installation of switchbox "GRT", ready-made with a lock. The board is wall recessed for the installation of 72 modules (3x24M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	disconnector switch INS 1-0, 63A, 3P	pc	1				
	automatic switch iC60N 25A, 6 kA, 1P	pc	9				
	automatic switch iC60N 20A, 6 kA, 1P	pc	9				
	automatic switch iC60N 16A, 6 kA, 1P	pc	12				
	automatic switch iC60N 10A, 6 kA, 1P	pc	11				
	automatic switch iC60N 6A, 6 kA, 1P	pc	2				
	differential current protective device iID 25/0,(	pc	1				
	contactor iCT 3NO, 16A, 230V	pc	1				
	contactor iCT 1NO, 16A, 230V	pc	2				
	selector switch CM 1-0-2, 10A	pc	1				
	Programmable time switch IHP 24 hours + 7 days	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "GRT":	pc	1	x	771,65	=	771,65 €
2.4.	Delivery and installation of switchbox **"RT-PO"**, ready-made with a lock. The board is wall recessed for the installation of 18 modules (1x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	automatic switch iC60N 16A, 6 kA, 3P	pc	1				
	automatic switch iC60N 16A, 6 kA, 1P	pc	5				
	automatic switch iC60N 10A, 6 kA, 1P	pc	4				
	The price includes all material required for installation of this equipment. Total switch box "RT-PO":	pc	1	x	164,45	=	164,45 €
2.5.	Delivery and installation of switchbox **"RT-S"**, ready-made with a lock. The board is wall recessed for the installation of 18 modules (1x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	automatic switch iC60N 16A, 6 kA, 1P	pc	2				
	automatic switch iC60N 10A, 6 kA, 1P	pc	7				
	automatic switch iC60N 6A, 6 kA, 1P	pc	1				
	contactor iCT 1NO, 16A, 230V	pc	1				
	Selector switch CM 1-0-2, 10A	pc	1				
	Programmable time switch IHP 24 hours + 7 days	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-S":	pc	1	x	316,25	=	316,25 €
2.6.	Delivery and installation of switchbox **"RT-I"**, ready-made with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						

	automatic switch iC60N 16A, 6 kA, 1P	pc	9				
	automatic switch iC60N 10A, 6 kA, 1P	pc	9				
	differential current protective device iID 25/0,(	pc	2				
	contactor iCT 3NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-I":	pc	1	x	436,43	=	436,43 €
2.7.	Delivery and installation of switchbox **"RT-II"**, ready-made with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	automatic switch iC60N 16A, 6 kA, 1P	pc	9				
	automatic switch iC60N 10A, 6 kA, 1P	pc	9				
	differential current protective device iID 25/0,(	pc	2				
	contactor iCT 3NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-II":	pc	1	x	436,43	=	436,43 €
2.8.	Delivery and installation of power supply cables from PMO to GRT and from GRT to RT-S. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. The price shall include complete delivery with installation, connection and testing of conductors:						
	PP00-y 5x16 mm2	m	46	x	15,18	=	698,28 €
	PP00-y 5x6 mm2	m	70	x	6,96	=	487,03 €
2.9.	Delivery and installation of power supply cables from GRT to RT-K, RT-PO, RT-I and RT-II. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. The price shall include complete delivery with installation, connection and testing of conductors:						
	PPY 5x6 mm2	m	39	x	6,33	=	246,68 €
	PPY 5x4 mm2	m	48	x	5,06	=	242,88 €

2.10.	Delivery and mounting of three phase connection points with PPY 5x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average length of laid cable per one connection point is 12m. The price shall include complete work and material:	pc	1	x	60,72	=	60,72 €
2.11.	Delivery and mounting of single phase connection points with PPY 3x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average length of laid cable per one connection point is 14m. The price shall include complete work and material:	pc	75	x	53,13	=	3.984,75 €
2.12.	Delivery and installation of installation modular accessories, white						
	PVC box Ø 60						
	armature 2M						
	decorative mask 2M						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	73	x	7,59	=	554,07 €
2.13.	Delivery and installation of installation modular accessories, white						
	PVC box Ø 60						
	armature 2M						
	decorative and protection mask 2M IP 55						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	2	x	10,12	=	20,24 €
2.14.	Delivery and installation of three phase outlet 16A/400V, JUS N.EO.350. Total for works and material:	pc	1	x	10,12	=	10,12 €
	Total electrical installations for general consumption						**10.520,76 €**

3	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
3.1.	Delivery and mounting of prefabricated wall mounted IP 55 switchbox in boiler room "RT KO" with appropriate dimensions and completely equipped with following parts:						
	disconnector switch INS 1-0, 40A, 3P	pc	1				
	motor protection switch GV2 ME, 0,4 - 0,63 A	pc	1				
	motor protection switch GV2 ME, 1.6 - 2.5 A	pc	1				
	automatic switch 3p iC60N 16A 6 kA	pc	3				
	automatic switch 1p iC60N 16A 6 kA	pc	10				
	automatic switch 1p iC60N 10A 6 kA	pc	5				
	The price includes all material required for installation of this equipment.						
	Total switch box "RT-KO"	pc	1,00	x	569,25	=	569,25 €
3.2.	Delivery and laying of cables in wall installations with PVC rigid installation pipes and galvanized cable trays in boiler room, for construction of the electrical circuits of electrical consumers in the boiler room through cable trays and partly through rigid PVC pipes in wall installation. Works and material are calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	107,00	x	2,40	=	257,17 €
	PP-Y 3x2,5 mm2	m	216,00	x	3,04	=	655,78 €
	PP-Y 5x2,5 mm2	m	43,00	x	3,42	=	146,87 €
	Outlet three phase 3P+N+PE 16A/400V IP55	m	3,00	x	10,12	=	30,36 €
	Outlet 2P+E / 230V/ IP 55	pc	14,00	x	8,86	=	123,97 €
	Ordinary switch 10A, IP44	pc	1,00	x	6,33	=	6,33 €
	Two-way switch IP44 10A	pc	2,00	x	7,59	=	15,18 €
	Serial switch 10A IP44	pc	1,00	x	6,33	=	6,33 €
	Double two-way switch IP44 10A	pc	1,00	x	10,12	=	10,12 €
	Delivery and mounting of ceiling mounted emergency luminaries with electronic control gear, 8W,IP 65, 1h.Works and material to be included per unit:	pc	1,00	x	44,28	=	44,28 €
3.3.	Delivery and mounting of deep galvanized cable trays according to the drawing layouts. Works include delivery, mounting of all necessary materials for connection and mounting. The unit measure is m' per the cable tray 100 mm.						
	PNK 100	m	13,00	x	16,45	=	213,79 €
	Total for power supply and electrical installation for boiler room and heating equipment						**2.079,41 €**

4	**POTENTIAL EQUALIZATION INSTALLATION**						
4.1.	Delivery and mounting of deep galvanized tape Fe-Zn 25x4 mm for potential equalization in boiler room, according to the installation drawing layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	31,00	x	2,53	=	78,43 €
4.2.	Delivery and mounting of Fe-Zn 25x4mm tape for creating ring for potential equalization installation in the boiler room, with foundation grounding unit of the building. The tape should be placed partially in prepared soil trench and partially at tape holders C.L.JUS N.B4.925-P. Works and material are calculated per measure unit.	m	10,00	x	2,30	=	23,00 €
4.3.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	32,00	x	6,33	=	202,40 €
4.4.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	m	7,00	x	5,06	=	35,42 €
4.5.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	14,00	x	3,80	=	53,13 €
4.6.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	40,00	x	6,33	=	253,00 €
	Total potential equalization installation						**645,38 €**
5	**LIGHTING AND GROUNDING INSTALLATION**						
5.1.	Delivery and installation of lightning descending system, round conductors made of Al/Mg with diameter of 10 mm, for the replacement of obsolete lightning descending conductors. Lightning descending conductors shall be mounted from outlet of foundation grounding system to the position of lightning installations at the roof, according to technical recommendation and regulations. Works and material to be calculated per unit:	m	45,00	x	2,5		113,85 €

5.2.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	40,00	x	6,33	=	253,00 €
5.3.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-wire	pc	2,00	x	6,33	=	12,65 €
	linking clamp wire-wire	pc	4,00	x	6,33	=	25,30 €
	groove clamp (for crossing over horizontal gutters)	pc	8,00	x	6,33	=	50,60 €
		pc					
5.4.	Delivery and mounting of prefabricated lightning installation system with air terminal SI60 INTERCEPTOR ERITECH or equivalent. Sections of the mast are 2m and 1 x 2m. Mast is connected to the wall in accordance to the technical drawings. Works and material to be included in price:						
	AIR TERMINAL INTERCEPTOR SI 60	pc	1	x	1834,3	=	1.834,25 €
	2M section 1	pc	1	x	12,7	=	12,65 €
	2M section 2	pc	1	x	12,7	=	12,65 €
	console for air terminal	pc	3	x	63,3	=	189,75 €
	junction part for connection with grounding tape	pc	1	x	12,7	=	12,65 €
	NOTE: Before mounting lightning air terminal, examine the continuity of existing down conductors and in the case of interruption, repair and restore them to their proper condition.						
5.5.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	150,00	x	2,53	=	379,50 €
5.8.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measurement unit.	pc	12,00	x	10,12	=	121,44 €
	Total for lighting and grounding installation						**3.018,29 €**
6	**SPARE PARTS**						
6,1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	7,1	=	14,17 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	5,9	=	11,89 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	5,9	=	11,89 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	5,8	=	11,64 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	5,7	=	11,39 €

	Total for spare parts:						**60,97 €**
7	**TESTING**						
7,1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	253,00 €	=	253,00 €
7,2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	379,50 €	=	379,50 €
	Total for testing:						**632,50 €**
8	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**379,50 €**	=	**379,50 €**

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	38.963,27 €
2	ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION	10.520,76 €
3	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	2.079,41 €
4	POTENTIAL EQUALIZATION INSTALLATION	645,38 €
5	LIGHTING AND GROUNDING INSTALLATION	3.018,29 €
6	SPARE PARTS	60,97 €
7	TESTING	632,50 €
8	PREPARATION OF MAINTENANCE DESIGN	379,50 €
	TOTAL PRICE, VAT EXCLUDED	56.300,08 €
	VAT (19%)	10.697,01 €
	TOTAL PRICE, VAT INCLUDED	**66.997,09 €**

GROUP A5.3.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Secondary School "Miloje Dobrašinović" in Bijelo Polje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	Facility:	Secondary School "Miloje Dobrašinović", Bijelo Polje
	Documentation:	Final Architectural Design
	Date:	30 May 2013

Item	Description of the Item	Unit of measure	Quantity		Unit price (€)		Amount (€)
	SCHOOL AND GYM HALL						
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings and vertical gutters. Flashings have different developed widths and they are made from galvanized, coloured sheet with double interlocking, d=0,68mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and debris transportation to the town depot. Calculation is based on a m of dismantled flashing, gutters, and their supporters.						
	horizontal rain gutters, developed width up to 66 cm						
	Calculation per m	m	200,55	x	1,03 €	=	**205,56**
	-vertical gutters, dim.15x15cm, developed width up to 66 cm, including dismantling of top gutter cisterns.						
	Calculation per m	m	184,70	x	1,03 €	=	**189,32**
	-attic-wall flashings, developed width d.w.= 41-50cm.						
	Calculation per m	m	62,46	x	1,03 €	=	**64,02**
	-parapet flashing on the RC cantilever slab, developed width up to 25cm.						
	Calculation per m	m	48,50	x	1,03 €	=	**49,71**
	-roof and wall valleys, developed width up to 50cm.						
	Calculation per m	m	93,64	x	1,03 €	=	**95,98**
	-flashing sill, developed width 41-50cm.						
	Calculation per m	m	422,15	x	1,03 €	=	**432,70**

1.02.	Repair of damages in the parapet walls d=20cm and more, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheet and PVC sills. The unit price includes all works and materials, including possible skimming and painting, to bring the jambs in previous condition.						
	Calculation per m	m	422,15	x	6,66 €	=	**2.812,57**
1.03.	Repair of jamb damages d=20cm, caused by dismantling of the joinery. Surfaces shall be treated with lime cement mortar 1:2:6, previously sprinkled with low density cement mortar, to prepare the item for installation of new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheets and PVC sills. The unit price includes all works and materials, including skimming and painting, to bring the jambs in previous condition.						
	Calculation per m	m	1.071,65	x	6,66 €	=	**7.139,87**
1.04.	Dismantling and re-installation of cameras, lighting, and other facade devices and equipment. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility. NOTE: For reinstallation of AC units, consider possible mounting of new metal support brackets and small extension of electric and Freon lines due to position of external AC units.						
	Calculation as per piece.	pc	10,00	x	59,45 €	=	**594,50**
1.05.	Production and installation of the attic cornice flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 60cm. The item includes surface preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the Design and sample selected by the Employer / Employer's Representative.						
	Calculation as per m	m	156,10	x	14,97 €	=	**2.336,04**

1.06.	Production and installation of flashing on the small parapet wall on the RC cantilever slab, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 33-40 cm. The item includes surface preparation and complete binding following the regulations. The entire process shall be carried out in line with the Design and sample selected by the Employer / Employer's Representative.						
	Calculation per m.	m	48,50	x	14,97 €	=	**725,80**
1.07.	Production and installation of the drips on the façade, in the area of "Y" supporters. Drips shall be made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width of the drips is 60 cm. The item includes surface preparation and complete binding following the regulations. The entire process shall be carried out in line with the Design and sample selected by the Employer / Employer's Representative.						
	Calculation per m.	m	40,54	x	14,97 €	=	**606,68**
1.08.	Production and installation of the parapet sills, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 50cm. The item includes surface preparation and complete binding following the regulations. The entire process shall be carried out in line with the design, and sample selected by the Employer / Employer's Representative.						
	Calculation per m	m	422,15	x	14,97 €	=	**6.317,47**
1.09.	Production and installation of the vertical and horizontal gutters of 150/150mm square section, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material.						
	Calculation per m	m	397,75	x	14,97 €	=	**5.952,33**
1.10.	Purchase and installation of profiled standard flexible, vertical and horizontal expansion joints at wall-to-wall contact, for dilatation width of 5 cm, fully in line with technology of the manufacturer.						
	Calculation per m	m	75,65	x	21,53 €	=	**1.628,37**

1.11.	Setting up "Demit" thermal facade. External thermal insulation of the facade reinforced concrete (hereinafter RC) and brick walls will be conducted with expanded EPS polystyrene, having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm, produced by the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.							
	The lower part of the facade walls at the level of the ground floor (all parapets in the ground floor, pillars and parts of the full wall) will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK.							
	Thermal boards with B1 flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing) to be used. Install panels and vertical breaks of 50 cm width along the entire facade, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.							
	Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the facade opening. Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:							
	* **first layer** – refined mortar based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene boards will be filled with polyurethane foam.							
	Reinforcing mesh with adequate overlapping and extra protection at the facade openings and corners is placed in a fresh layer of this mortar. In case additional mechanical anchoring is required, impact bolt through the reinforcing mesh shall be used 24 hours after applying this layer.							

	* **reinforcing mesh,** * **second layer** of mortar, apply same procedure as with the first layer. This mortar is laid to well- dried first layer and polished afterwards, * **contact coating** made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar,						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure. painted in colour defined by Employer / Employer's Representative, while the entire procedure will be conducted according to the design details.						
	Before setting up the thermal plates, the following works will be conducted: * all works on the roofs, including sheet metal works, *reduction of windows/glazed areas, * replacement of façade joinery, * placing the entire envisaged installation in the facade, * partial / total closing of the openings described in the tender documents,						
	*covering and protection of all non-treated surfaces – glass, stone... *Control and testing of the existing facility surface, including: Use the means of impregnation- basic coating at the most critical points of the facility. When the basic coating dries out, set up the EPS cube of 5x5x5 cm by using polystyrene adhesive. Once the adhesive completely settles, minimum 3 days after the working conditions are adequate, try to separate the cube manually. If in the process of separating expanded polystyrene only the adhesive separates and not parts of the basis - the basis is sufficiently strong, solid and stable.						
	If in the process of separating expanded polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.						
	If in the process of separating expanded polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough, and shall not withstand new layer of thermal insulation.						
	Use the reinforcing mesh or angle profiles for the window corners and jambs. Facade ends along the plinth must have U-profile strip, adjusted to the thickness of thermal-plate.						

	Before setting the plates, thoroughly clean the facade surface from dust, greasy deposits and mortar. At heights over 8 meters, plates need additional anchoring with appropriate bolts.						
	During the works on the facade, surface, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortar shall not be applied in the event of heavy wind, rain or fog. The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Treatment of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be in line with the appropriate EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	EPS	m2	1.161,24	x	19,99 €	=	**23.210,28**
	XPS	m2	1.109,49	x	25,11 €	=	**27.862,07**
	Pressed mineral wool	m2	184,73	x	21,83 €	=	**4.033,12**
1.12.	Setting up "Demit" thermal facade on the "Y" supporters of the gym roof. External thermal insulation of this part of facade will be executed with EPS expanded polystyrene, thickness 10 cm in line with item 1.11.						
	Calculation per m2	m2	72,97	x	19,99 €		**1.458,49**
	NOTE: During installation of the ETICS therma façade ("Demit"), proper treatment of the main power cable at the external rear wall is required.						

1.13.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned (reinforced concrete brise-soleil, roof cantilever slabs, cornice-gutter fuse, ceiling of canopies at the entrance, chimney). Type and colour will be selected by Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, and if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	***contact coating** made of the emulsion of synthetic resins and water-glass (liquid sodium silicate) used for impregnation of the set reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This layer shall be made in fine grained and smooth structure, painted in colour determined by the Employer / Employer's Representative, fully in line with the Design details.						
	The openings shall be protected with PVC foil. The unit price includes purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.						
	Calculation per m2	m2	249,17	x	12,10 €		**3.013,71**
1.14.	Plastering of plinth with cement mortar 1:3, d=3 cm, with periodical stripping dilapidated plaster off, 20% of total plinth area. Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulir plast") as splash guard (as indicated on the drawings). Surface shall be cleaned, washed and sprinkled with acrylic base with granulate. Render shall be applied on cleaned and dried surface by manufacturer's instruction. The color shall be determined by the Employer / Employer's Representative, according to the color chart of manufacturer.						
	Calculation per m2	m2	300,39	x	23,58 €	=	**7.081,69**
1.15.	Striping off the decayed plaster from the parapet on the cantilever slab with debris removal, loading and transporting to the town landfill up to 5 km distance. This item also includes use of façade scaffold.						

	Calculation per m2	m2	29,25	x	3,59 €	=	**104,93**
1.16.	Plastering of parapet on cantilever slab with gauged mortar 1:2:6 in two layers (total thickness 2,5cm) with the previous spraying of cement slurry. Calculation is based on a m2 of the plastered area. The unit price includes all necessary materials, transportation and works.						
	Calculation per m2	m2	29,25	x	8,00 €	=	**233,85**
1.17.	Closing the window opening to the lavatory area below the stair case (indicated on the drawing MD-01-ARH-08) by gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics) with proper connection to existing wall and reinforcement. Dimension of the opening is 70 / 210 cm. Preparing the surface for installation of ETICS thermal facade from the external side. One ventilation opening with fly screen of 100 cm2 shall be inserted in the facade in mentioned area (indicated on the drawing MD-01-ARH-17). Ventilation opening shall be sturdy quality sampled and approved by Employer / Employer's Representative.						
	Calculation lump sum.	lump sum	1,00	x	87,13 €	=	**87,13**
1.18.	Existing windows which to be dismantled and their openings shall be partially or totally closed with gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics) with proper connection to existing wall and reinforcement, and vertical and horizontal beams in line with regulations. The unit price includes all required material, transport, scaffolding and work.						
	Calculation per m2	m2	20,92	x	39,565	=	**827,70**
1.19.	Plastering of newly built walls from the inner side of walls with lime-cement plaster 1:2:6 by applying two layers with previous cleaning and flush mortar joining and fitting edge galvanized strips. Sand for plaster correction is made of sifted gravel size 0-4 mm. Plastered surfaces need to be smooth, with sharp edges and without deducted openings. The unit price includes all required material with strips, transport, scaffolding and work.						
	Outer side of the new parapets shall be prepared for installation of the ETICS facade.						
	Calculation per m2	m2	20,92	x	8,00 €	=	**167,26**
	TOTAL FOR THERMAL INSULATION OF FACADE WALL						**97.231,16**
II	**THERMAL INSULATION AND WATERPROOFING OF THE ROOF**						

2.01.	Removal of the existing roof covering from the canopies made of zinc-plated metal sheets and tar-paper placed over cantilever boards (as shown on the drawings). The unit price includes all necessary works and transporting debris to the town landfill.						
	Calculation per m2	m2	170,83	x	6,46 €	=	**1.103,13**
2.02.	Installation of horizontal waterproofing and thermal insulation on the flat roof in part of the ground floor canopy. Following layers shall be applied on prepared base: a) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil, b) Vapour barrier of the post bituminized aluminium foil lined with glass fibre fleece, c) Thermal insulation made of extruded polystyrene boards XPS d = 10 cm with heat transfer coefficient of λmax = 0.033 W / mK (on top of already placed foil), d) Layer used for separating from PVC foil, e) Sloping layer made of light-weight concrete d=5-16cm, sloped by 1%, f) Layer for equalizing the pressure, made of vapour-permeable and waterproofed foil, g) Waterproofing made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is placed freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing. h) Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel. Calculation is based on a m2 of the roof basis. The unit price includes all required material following the description from a) to h), including the making of a required cove and installation of the edge perforated metal sheet drip with vertical seam (gravel supporter).						
	Calculation per m2	m2	82,87	x	57,40 €	=	**4.756,74**

2.03.	Waterproofing of the eaves above old and new school entrance with cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is put freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Waterproofing must be put up the walls at minimum 15 cm height. Pay special attention to the connections between horizontal and vertical waterproofing.						
	Calculation per m2	m2	87,96	x	19,99 €	=	**1.758,10**
2.04.	Protect waterproofing on eaves, which is not protected with gravel, with "Krovoplast" or similar coating with equal or better technical characteristics. The unit price includes complete work and material, following the description.						
	Calculation per m2	m2	87,96	x	1,54 €	=	**135,24**
2.05.	Dismantling of the part of the chimney which is going through the attic and above the roof. Chimney is made of compact brick with gauged mortar. The unit price includes all the work and debris transportation to the town landfill, as well as usage of the scaffold.						
	Calculation per m2	m2	5,53	x	38,44 €	=	**212,56**
2.06.	Removal of the existing roof covering of the main school building and the gym hall's annex made of tiles type "Mediteran" and battens 4/6 cm, up to the existing wooden roof structure. The unit price includes all the work and debris transportation to the town landfill.						
	Calculation per m2 actual area of the sloped roof.	m2	1.121,47	x	2,77 €	=	**3.103,67**
2.07.	Removal of the existing roof covering of the gym roof, made of arched trapezoid metal-sheets. The removal shall be performed up to the reinforced concrete "Y" supporters. The unit price includes all the work and debris transportation to the town landfill to 5km distance.						
	Calculation per m2	m2	715,82	x	2,77 €	=	**1.981,03**
2.08.	Dismantling of the front mask of the prefabricated "Y" supporters (0,76m2/pc) on the roof of the gym hall. The unit price includes all the work and debris transportation to the town landfill to 5km distance.						
	Calculation per m2	m2	715,82	x	2,77 €	=	**1.981,03**

2.09.	Replacement of over aged parts of wooden roof structure (roof posts, columns, rafters, struts…), which have to be of the same shapes and dimensions as the existing ones, and in total 10% of the whole roof area of the main school building and the gym hall's annex. The unit price includes all the work and materials.						
	Calculation per m2 of orthogonal projection.	m2	101,90	x	17,22 €	=	**1.754,72**
2.10.	Putting of 5/8 cm battens over wooden roof structure, at distance up to 1m. Calculation per m2 actual area of the sloped main school's building roof and the gym hall's annex. The unit price includes all the work and materials.						
	Calculation per m2	m2	1.121,47	x	3,49 €	=	**3.908,32**
2.11.	Hipped roof structure shall be covered by painted Al sheets Al.Tr.40/230/0.7mm. The next operation, after covering, is installation of the flashing of all roof and wall valleys, ridges, hips and gutters with mounting of snow shields, using all necessary joining materials. Calculation per m2 of the of the sloped main school building's roof and the gym hall's annex roof. The unit price includes all the work and materials.						
	Calculation per m2.	m2	1.121,47	x	27,47 €	=	**30.806,78**
2.12.	Thermal insulation of the walls of the school attic and gym hall's annex, using expanded polystyrene EPS d=10cm, 20kg/m3 and d=3cm in line with details 5 and 6, laid down over reinforced concrete slab and vapour barrier, with PVC foil protection and overlaps of 10-15cm. The unit price includes all the work and materials. Calculation per m2.						
	EPS, d=10cm	m2	1.019,17	x	9,12 €	=	**9.297,38**
	EPS, d=3cm	m2	128,78	x	3,90 €	=	**501,60**
2.13.	Installation of a thermal insulation boards 10cm thick and vapour barrier on the attic's wall to the gym's annex. Thermal insulation shall be protected by PVC foil with overlaps 10-15 cm. Thermal plates are attached to the wall with appropriate enriched mineral adhesive and anchoring with appropriate bolts. The unit price includes all the work and material.						
	Calculation per m2.	m2	38,48	x	9,12 €	=	**351,03**

2.14.	Covering the roof with the roof of the gym with polyurethane composite panels, d=10cm thickness, heat transfer coefficient λmax = 0.025 W/mK, of standard modular width 1000mm. The panels are fastened to the steel "U" profiles 60/40/3mm, placed at 60-150cm distance, over reinforced concrete "Y" supporters. The upper metal-sheet of panel is of unique trapezoid shape d = 0.5mm, and the lower one is standard SNV d = 0.5mm.						
	After covering the roof with the roof polyurethane composite panels, install flashing of all wall valleys, gable edges and gutters, using all necessary bonding material (stainless steel screws, washers and EPDM sealings). The unit price includes all works and material in line with description.						
	Calculation per m2	m2	715,82	x	69,29 €	=	**49.599,17**
2.15.	Installation of the EPS thermal insulation boards, 10cm thick, on the slopes and front of the eaves of the gym's roof. EPS boards shall be installed on the base made of plasterboards 1.25 cm thick on metal sub-construction (galvanized steel profiles). Thermal plates are attached to the wall with appropriate enriched mineral adhesive and anchoring with appropriate bolts.The unit price includes all the work and materials.						
	Calculation per m2	m2	138,38	x	32,19 €	=	**4.453,76**
	NOTE: An alternative technology for flat roof covering can be offered as a deviation.						
	TOTAL FOR THERMAL INSULATION AND WATERPROOFING OF THE ROOF						**115.704,26**
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery.						
	255/200	pc	93,00	x	11,50	=	**1.069,50**
	255/180	pc	12,00	x	11,50	=	**138,00**
	260/180	pc	3,00	x	11,50	=	**34,50**
	350/200	pc	3,00	x	11,50	=	**34,50**
	230/180	pc	2,00	x	11,50	=	**23,00**
	245/200	pc	8,00	x	11,50	=	**92,00**
	245/175	pc	3,00	x	11,50	=	**34,50**
	240/175	pc	1,00	x	11,50	=	**11,50**
	245/75	pc	6,00	x	11,50	=	**69,00**
	245/135	pc	2,00	x	11,50	=	**23,00**
	220/55	pc	2,00	x	11,50	=	**23,00**

	200/150	pc	2,00	x	11,50	=	**23,00**
	200/120	pc	8,00	x	11,50	=	**92,00**
	75/50	pc	2,00	x	11,50	=	**23,00**
	80/75	pc	4,00	x	11,50	=	**46,00**
	130/130	pc	1,00	x	11,50	=	**11,50**
	290/100	pc	2,00	x	11,50	=	**23,00**
	595/220	pc	5,00	x	11,50	=	**57,50**
	205/125	pc	1,00	x	11,50	=	**11,50**
	215/205	pc	2,00	x	11,50	=	**23,00**
	250/205+70	pc	2,00	x	11,50	=	**23,00**
	195/190+40	pc	1,00	x	11,50	=	**11,50**
	420/220+50	pc	1,00	x	11,50	=	**11,50**
	275/180	pc	1,00	x	11,50	=	**11,50**
	210/180	pc	1,00	x	11,50	=	**11,50**
	275/320	pc	2,00	x	11,50	=	**23,00**
	210/320	pc	2,00	x	11,50	=	**23,00**
3.02.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4 +16 +4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes.							
	- include internal PVC sill of required width in the item, - PVC profile colour - white.							
	1. 255/200	pc	45,00	x	552,00 €	=	**24.840,00**
	2. 255/180	pc	12,00	x	514,05 €	=	**6.168,60**
	3. 260/180	pc	3,00	x	519,80 €	=	**1.559,40**
	4. 322/200	pc	3,00	x	587,65 €	=	**1.762,95**
	5. 230/180	pc	2,00	x	508,30 €	=	**1.016,60**
	6. 245/200	pc	4,00	x	538,20 €	=	**2.152,80**
	9. 245/75	pc	6,00	x	318,55 €	=	**1.911,30**
	10. 245/135	pc	2,00	x	339,25 €	=	**678,50**
	11&11' 220/55	pc	2,00	x	254,15 €	=	**508,30**
	12. 200/50	pc	2,00	x	250,70 €	=	**501,40**
	13. 200/120	pc	8,00	x	372,60 €	=	**2.980,80**
	14. 75/50	pc	2,00	x	165,60 €	=	**331,20**
	15. 80/75	pc	4,00	x	188,60 €	=	**754,40**
	16. 130/130	pc	1,00	x	273,70 €	=	**273,70**
	17. 290/100	pc	2,00	x	541,65 €	=	**1.083,30**

	18. 595/220	pc	5,00	x	1.197,2 €	=	**5.985,75**
	19. 205/125	pc	1,00	x	307,05 €	=	**307,05**
	20. 215/205	pc	2,00	x	428,95 €	=	**857,90**
3.03.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4 +16 +4 mm, **NOTE:** External glass has to be coated with low-emission coating as a protection from sunlight, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes, - include internal PVC sill of required width in the item, - PVC profile colour - white.						
	1'. 255/200	pc	48,00	x	552,00 €	=	**26.496,00**
	6'. 245/200	pc	4,00	x	535,90 €	=	**2.143,60**
	7. 245/175	pc	3,00	x	508,30 €	=	**1.524,90**
	8. 240/175	pc	1,00	x	494,50 €	=	**494,50**
3.04.	Production and installation of the facade aluminium joinery. The unit price includes everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Measures shall be taken on site. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2,8 W/m2K, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium.						
	A1 i A1'. 250/205+70	pc	2,00	x	1.522,6 €	=	**3.045,20**
	A2. 195/190+40	pc	1,00	x	1.009,70 €	=	**1.009,70**

	A3. 420/220+50	pc	1,00	x	1.044,2 €	=	**1.044,20**
	A4. 275/180	pc	1,00	x	737,15 €	=	**737,15**
	A5. 210/180	pc	1,00	x	578,45 €	=	**578,45**
	A6. 275/200	pc	2,00	x	1.616,9 €	=	**3.233,80**
	A7. 210/200	pc	2,00	x	1.296,1 €	=	**2.592,10**
3.05.	Production and installation of the aluminium windshield joinery. The unit price includes everything from the description: the purchase of material, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break, - glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	- building A						
	dim. 245/205+70cm	pc	1	x	2.214,90 €	=	**2.214,90**
	dim. 245/205+70cm	pc	1	x	2.214,90 €	=	**2.214,90**
	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper. **NOTE:** Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.						
	TOTAL FOR REPLACEMENT OF FACADE JOINERY						**102.981,35**
IV	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						

4.01.	Partial repair of pavement (court corner of old building, back side of the gym). Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. Pavement has to be strained into the fields cca1,5m2. Expansion joints shall be filled up with joint filler. The unit price includes all works and materials, including demolition of old concrete slabs, transportation to a landfill up to 5 km distance and finishing works.						
	Calculation per m2	m2	50,00	x	17,8 €	=	**891,75**
4.02.	Cleaning the whole surface water drainage system around school building in order to get an overflow to the old entrance area. The unit price shall also include cleaning of canals for the rainwater from leaves and dirt.						
	Calculated as per m	m	150,00	x	**5,125**	=	**768,75**
4.03.	Supply and installation of smooth wooden boards for covering the expansion joints inside the building, along the walls and ceilings. Boards shall be 2,5 cm thick and 15cm width. After installing, boards shall be varnished (process: filling and grinding, primer, two layers of synthetic resin paint).						
	Calculated as per m.	m	24,20	x	**13,735**	=	**332,39**
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						**1.992,89**
V	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
	RECONSTRUCTION OF SANITARY FACILITIES						
5.01.	Removal of the existing floor tiles from the toilets, including all sub-layers to the existing waterproofing, removal and loading of debris onto a truck and transportation to landfill up to 5 km distance.						
	Calculation per m2	m2	39,62	x	4,92 €	=	**194,93**
5.02.	Removal of the existing ceramic wall tiles jointly with base layer from the walls in sanitary facilities. Removal and loading of debris onto a truck and transportation to landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of the floor area.	m2	155,27	x	4,92 €	=	**763,93**

5.03.	Removal of existing rotten plaster from the walls, removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m2	m2	37,03	x	3,59 €	=	**132,85**
5.04.	Scraping of the old paint from the internal ceiling and walls, removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2	m2	43,26	x	0,51 €	=	**22,17**
5.05.	Dismantling of the existing joinery - doors in sanitary facilities, including transportation to the town landfill or handing over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery. 70/205 pc 12 80/205 pc 3 120/100 pc1						
	Calculation per m2	m2	23,34	x	6,15 €	=	**143,54**
5.06.	Making of the scrimmed cement screed for a sloping layer in the toilets. The unit price includes installation of the mesh (1kg/m2) with and overlap 5cm (1,08 m2/m2). Floated coat is used as finishing layer. Screed thickness is d = 4 cm.						
	Calculation per m2	m2	39,62	x	10,05 €	=	**397,98**
5.07.	Setting up of horizontal waterproofing in the toilets, on different floors, in the following layers (from the bottom up): - bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos. Put the waterproofing at least 10 cm up the wall. Calculation is based on a m2 of the basis (section pulled up the walls is included in the unit price). The unit price includes all works and materials, in line with the description, including the cleaning and surface preparation for a quality installation of a new waterproofing.						
	Calculation per m2	m2	39,62	x	19,99 €	=	**791,90**
5.08.	Plastering of internal toilet walls with cement mortar 1:3 in two layers with the previous spraying of cement slurry to prepare the wall for ceramic tiles. Calculation is based on a m2 of the plastered wall, without the openings. The unit price includes all necessary works, materials with battens, transportation and scaffolding.						
	Calculation per m2	m2	192,30	x	8,00 €	=	**1.537,44**

5.09.	Tiling the toilet walls with the class I ceramic tiles, while the size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster. Ceramics will be placed up to the ceiling height, h=3,60m. Coating of the jambs and niches is included in the item unit price and it won't be calculated separately.						
	Calculation per m2	m2	239,10	x	23,06 €	=	**5.514,24**
5.10.	Floor tiling in the toilets and other premises with the class I anti-slip tiles. The size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in the waterproof adhesive layer joint bonding manner, by using pointing plaster. In the toilets, where there is a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2	m2	39,62	x	28,19 €	=	**1.116,79**
5.11.	Polishing and painting of the ceilings in sanitary facilities and dressing rooms. The Employer / Employer's Representative will select the tone of semi dispersed distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer.						
	Calculation per m2, including all necessary work, materials and scaffolding.	m2	39,62	x	2,87 €	=	**113,71**
5.12.	Production and installation of internal single leaf PVC compact doors. The unit price includes: the purchase of materials, manufacturing, transport and installation of fitting and blind frame. Measures must be taken on site. Calculation is based per piece of the installed joinery.						
	70/205	pc	12,00	x	364,90 €	=	**4.378,80**
	80/205	pc	3,00	x	386,43 €	=	**1.159,28**
	120/100	pc	1,00	x	262,40 €	=	**262,40**
	RENEWAL / COMPLETION OF THE FLOORS						

5.13.	Repairing of the existing parquet floor. Apply machine sanding and varnishing of the parquet. Conduct these procedures 3 times by using color free lacquer. Before varnishing, thoroughly clean the surface from dust. Conduct varnishing with a brush, to avoid bubbles. The item includes installation and processing of the angular parquet batten.						
	Calculation per m2	m2	100,00	x	18,66 €	=	**1.865,50**
	PAINTING OF WALLS AND CEILINGS						
5.14.	Stripping off the damaged gauged plaster (2.5cm thick) off the walls and ceilings (5% of total area), removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance. Scaffold to be included in price.						
	Calculation per m2 5442.21x5%	m2	272,11	x	3,59 €	=	**976,19**
5.15.	Plastering of walls and ceilings in the areas of previosly stripped plaster (5% of total area) with cement-lime plaster 1:2:6 in two layers in total 2.5cm thick. Previously treat the walls with cement milk. The first layer shall be applied roughly and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges. The unit price includes all works, necessary material, transportation and scaffolding.						
	Calculation per m2	m2	272,11	x	8,00 €		**2.175,52**
5.16.	Scraping and skimming of old walls and ceilings with emulsion putty. All surfaces need to be scraped and washed and then smoothened, cleaned and impregnated. Inspect and remedy minor damages and cracks using putty. Flatten with putty and skim with emulsion putty for the first time. All surfaces need to be smoothen, then flatten with putty and skimmed with emulsion putty for the second time. Perform all the works using required scaffold.						
	Calculation per m2						
	- hall, comunications						
	ground floor						
	walls	m2	627,93	x	2,36 €	=	**1.480,34**
	ceilings	m2	385,92	x	2,36 €	=	**909,81**
	first floor						
	walls	m2	536,31	x	2,36 €	=	**1.264,35**
	ceilings	m2	230,40	x	2,36 €	=	**543,17**
	second floor						
	walls	m2	543,70	x	2,36 €	=	**1.281,77**
	ceilings	m2	245,90	x	2,36 €	=	**579,71**
	-classrooms and other premices						
	ground floor						
	walls	m2	494,14	x	2,36 €	=	**1.164,94**
	ceilings	m2	289,82	x	2,36 €	=	**683,25**

	first floor						
	walls	m2	567,19	x	2,36 €	=	**1.337,15**
	ceilings	m2	314,70	x	2,36 €	=	**741,91**
	second floor						
	walls	m2	774,20	x	2,36 €	=	**1.825,18**
	ceilings	m2	431,80	x	2,36 €	=	**1.017,97**
5.17.	Painting the walls with oil-based paint up to the height h=1.40m in two layers in colour selected by the Employer / Employers Representative. Calculation per m2						
	- hall, comunications						
	ground floor	m2	273,30	x	3,33 €	=	**910,43**
	first floor	m2	236,19	x	3,33 €	=	**786,81**
	second floor	m2	240,06	x	3,33 €	=	**799,70**
	-classrooms and other premices						
	ground floor	m2	213,75	x	3,33 €	=	**712,05**
	first floor	m2	245,16	x	3,33 €	=	**816,69**
	second floor	m2	335,25	x	3,33 €	=	**1.116,80**
	- painting the areas behind the radiators, which will be dismantled, rinsed and re-installed (in the rooms which are not planed to be painted).	m2	19,60	x	3,33 €	=	**65,30**
5.18.	Painting internal walls and ceilings with semi-dispersed distemper, by applying two layers of the paint, in colour selected by the Employer / Employers Representative, using scaffold. Calculation per m2						
	- h all, comunications						
	ground floor						
	walls	m2	354,61	x	1,64 €	=	**581,56**
	ceilings	m2	385,92	x	1,64 €	=	**632,91**
	first floor						
	walls	m2	300,11	x	1,64 €	=	**492,18**
	ceilings	m2	230,40	x	1,64 €	=	**377,86**
	second floor						
	walls	m2	303,62	x	1,64 €	=	**497,94**
	ceilings	m2	245,90	x	1,64 €	=	**403,28**
	-classrooms and other premices						
	ground floor						
	walls	m2	280,39	x	1,64 €	=	**459,84**
	ceilings	m2	289,82	x	1,64 €	=	**475,30**
	first floor						
	walls	m2	322,02	x	1,64 €	=	**528,11**
	ceilings	m2	314,70	x	1,64 €	=	**516,11**
	second floor						
	walls	m2	438,95	x	1,64 €	=	**719,88**
	ceilings	m2	431,80	x	1,64 €	=	**708,15**
5.19.	Painting of hydrant and switch boxes, painting of steel handrails of staircases in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculated as per lump sum.	lump sum	1,00	x	128,13 €	=	**128,13**

5.20.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative. Trees shall be planted on min 5 m distance and min. 4 m distance from the buildings and 3m high. Dig a pit for planting throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of with 3 kg of peat enriched fertilizer per tree. Having completed the planting of the seedlings, trees shall be well watered.						
	Calculation per piece	pc	4,00	x	51,25 €	=	**205,00**
5.21.	Removal and loading of debris from the ground floor, 1st and 2 nd floor onto a truck and transportation to landfill up to 5 km distance.						
	Calculation per m2	m2	1.898,54	x	1,03 €	=	**1.946,00**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**48.256,74**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3,00	x	11,50 €	=	**34,50**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1,00	x	11,50 €	=	**11,50**
6.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece	pc	2,00	x	11,50 €	=	**23,00**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2,00	x	28,75 €	=	**57,50**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5,00	x	28,75 €	=	**143,75**
6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5,00	x	28,75 €	=	**143,75**

6.07.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						
	wall	m2	1,00	x	11,50 €	=	**11,50**
	floor	m2	1,00	x	11,50 €	=	**11,50**
	TOTAL FOR SPARE PARTS						**437,00**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

SUMMARY OF COSTS

SCHOOL AND GYM		
I	THERMAL INSULATION OF FACADE WALLS	97.231,16
II	THERMAL INSULATION AND WATERPROOFING OF THE ROOF	115.704,26
III	REPLACEMENT OF FAÇADE JOINERY	102.981,35
IV	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURI	1.992,89
V	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	48.256,74
VI	SPARE PARTS	437,00
	TOTAL PRICE, VAT EXCLUDED	366.603,40
	VAT (19 %):	69.654,65
	TOTAL PRICE, VAT INCLUDED	**436.258,05**

GROUP A5.3.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Secondary School "Miloje Dobrasinovic" in Bijelo Polje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Miloje Dobrasinovic" Bijelo Polje
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 shall be delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions. Manufacturer: "Siemens" or equivalent Type: "UH50 Ultraheat" Nominal flow: 10 m^3/h Connection size DN40	pc	1	x	1.127,00 €	=	1.127,00 €
2	Purchase, supply and installation of electronic flow gauge for light distillated oil . Manufacturer: "Aqua metro" or equivalent Type: "VZO 4 RE" Nominal flow: 25 l/h Minimum flow: 0.5 l/h	pc	1	x	511,75 €	=	511,75 €
3	Purchase, supply and installation of control unit with M-Bus communication and display. Manufacturer: "Siemens" or equivalent Type: "Climatix POL638"	pc	1	x	2.472,50 €	=	2.472,50 €
4	Software development and staff training.	pc	1	x	690,00 €	=	690,00 €
	TOTAL A - Energy management						**4.801,25 €**

B - INSTALLATION OF THERMOSTATIC AND BALANCING VALVES

1	Purchase, delivery and installation of thermostatic radiator valves, connection size 1/2".	pc	116	x	13,94 €	=	1.616,81 €
2	Purchase, delivery and installation of thermostatic radiator valves, connection size 3/4".	pc	16	x	20,01 €	=	320,16 €
3	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without need to remove the protective cap. Thermostat has the liquid sensor. Setting range from 8 °C to 26 °C Closing time 24 min.	pc	132	x	15,67 €	=	2.069,03 €
4	Purchase, delivery and installation of the radiator angular valves, size 1/2"	pc	116	x	12,49 €	=	1.448,72 €
5	Purchase, delivery and installation of the radiator angular valves, size 3/4"	pc	16	x	16,79 €	=	268,64 €
6	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
a)	DN50, KVm=24,4	pc	1	x	299,00 €	=	299,00 €
a)	DN25, KVm=5,5	pc	4	x	102,35 €	=	409,40 €
b)	DN20, KVm=3,1	pc	1	x	79,35 €	=	79,35 €
7	Purchase, delivery and installation valves for riser pipes with meter gauges in brass casing, pre-setting with digital reading (fitted on the feed pipe of the manifold), size and properties:						
	DN50 PN6 - Kvs 33	pc	1	x	109,25 €	=	109,25 €
	DN25 PN6 - Kvs 8.7	pc	4	x	54,05 €	=	216,20 €
	DN20 PN6 - Kvs 5.7	pc	1	x	43,70 €	=	43,70 €
	TOTAL B - Installation of thermostatic and balancing valves						**6.880,27 €**

C - MEASURES FOR IMPROVEMENT OF COMFORT AND BETTER FUNCTIONALITY							
C.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of boiler room equipment that is out of function (solid-fuel boiler capacity 500 kW and open expansion vessel capacity 1000l with connecting pipes).						
	Item to be calculated as lump-sum.	set	1	x	575,00 €	=	575,00 €
2	Repair of openings in walls and damages, plastering of walls, tiling floors with ceramic tiles (25 m^2). Fitting of concrete base of the boiler, dimensions 165 x 90 x 10 cm. Base will be coated with ceramic tiles.						
	Item to be calculated as lump-sum.	set	1	x	1.150,00 €	=	1.150,00 €
3	Adaptation of existing flue for installation of new prefabricated flue through the old chimney, chimney cleaning, waste removal and fitting of terminal on top of the old chimney inside which new chimney will be installed, including repair of plaster on the external side at the top of the chimney.						
	Item to be calculated as lump-sum.	set	1	x	402,50 €	=	402,50 €
4	Fitting of single-leaf metal doors, size 90x205cm, in the opening behind the existing coal-fired boiler. The doors will be made of steel box profiles infilled with sheet metal thickness 0.7 mm. Doors are delivered with double coating of protective primary colour and one layer of protective lacquer.						
		kg	80	x	2,53 €	=	202,40 €
5	Flushing the entire heating system in the school with gym. Dismounting of functional radiators (132 pieces), flushing deposits from the bottom of the ribs, cleaning air-extraction network in the second floor of the old section of the school and cleaning air-release radiator valves (42) pieces, remounting with installation of new radiator brackets.						
	Item to be calculated as lump-sum.	set	1	x	6.900,00 €	=	6.900,00 €
6	Dismounting of existing radiator (19 ribs 680/160) in the upstairs office and its re-mounting into the ground floor hallway of the old section of the school on existing connection points.						
	Item to be calculated as lump-sum.	set	1	x	862,50 €	=	862,50 €
	TOTAL C.I - Dismantling of existing equipment and preliminary works						**10.092,40 €**
C.II	**Boiler room elements and fittings**						

1	Purchase, delivery and installation of condensing light distilled oil-fired boiler VIESSMANN Vitoradial 300-T VR3 or equivalent, rated thermal output 263kW for 50/30°C and 245kW for 80/60°C, efficiency 103% (Hi) when working on light distilled oil. For heating systems with flow temperatures (= ultimate temperatures) up to 110°C. Boiler for economical operating with variable boiler water temperature. The compact condensing three-pass boiler with Therm-Control for operating without additional function for return water temperature increase. Boiler body fully insulated with stiff insulation. Dimensions: Length 2900 mm Width 905mm Height 1460 mm Weight with insulation 870 kg Boiler water capacity 490 lit Flue gas connection 200 mm Permissible operating pressure: 4bar Combustion chamber temperature resistance: 2,4mbar Digital control Vitotronic 300 typeGW2B included, for up to 2 heating circuits with mixers. Weather-compensated boiler and heating circuit control unit. with digital built in watch, daily and weekly operating mode, for power with two-stage or modulated burners. with iluminated pushbuttons, simplified putting into operation via sockets, flexible DHW temperature control, integrated diagnosis system and switching to summer, economic modes. Vitotronic 300 contains: heating system on/off switch, test button, electronic maximal temperature limiter, temperature controller and safety temperature limiter, operating status and fault indicator, Optolink laptop connection, boiler water temperature button, domestic hot water temperature button, mixing circuits, pump shunt protection and switching onto economy mode. with water temperature sensor in boiler. External unit connected to Rast 5 - system socket. Boiler complete with two-stage burner for light distilled oil Vitoflame 100. burner is fabric preset to nominal boiler capacity. Delivery scope: Boiler body with fitted boiler door and cleaning cover, virbulators, mating flanges with screws and gasket, thermal insulation, inspection glass for combustion chamber, virbulator extraction tool, control and light distilled oil burner Vitoflame 100 with burner cover.	set	1	x	22.154,75 €	=	22.154,75 €

2	Purchase, delivery and installation of device for neutralisation of condensed water from gas flues GENO-Neutra V NO-24 or equivalent, for light distilled oil condensing boilers capacity 545kW, activated carbon and neutralisation granulate filling. Neutralisation granulate filling 16kg is included.						
		pc	1	x	876,30 €	=	876,30 €
3	Purchase, delivery and installation of "Vitoset" membrane safety valve or equivalent, type MS 1 1/4 with activation pressure of 3 bar. For closed heating installations thermal capacity up to 350 kW. Brass casing. Connection: G 1 1/4, Outlet: G 1 1/2.						
		pc	1	x	78,20 €	=	78,20 €
4	Purchase, delivery and installation of System temperature sensor (NTC 10 kOhm) for metering temperature on pipe, with connection pipe (5,8 m long) and plug.						
		pc	2	x	86,25 €	=	172,50 €
5	Purchase, delivery and installation of gases temperature sensor (NTC 20 kOhm, 100 mm long). For reading and monitoring safety temperatures with connection pipe (3,5 m long) and a plug.						
		pc	1	x	149,50 €	=	149,50 €
6	Purchase, delivery and installation of remote control unit for setting one to three heating circuits, Vitotrol 300A or equivalent: - for setting defined room temperature and lowered defined room temperature, and also hot water temperature, - with operating programs, holiday programs, and function for party operating and economy operating - with switching time for one of three heating circuits, DW water heater and circulating pump - with illuminated graphic display for reading outdoor temperature and indoor temperature, operating states and support in form of text - with room temperature sensor in premises for starting via room temperature (solely for one mixer circuit)						
		pc	1	x	385,25 €	=	385,25 €

7	SCHIEDEL chimney system ICS 25 or equivalent, made of twin-wall stainless steel W.Nr. 1.4404 wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature stable insulation material - Superwool. ICS chimney system includes all required elements: inspection port and boiler connection, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals. ICS system is fully in line with EN 1856.					
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS or equivalent, is made of stainless steel W.Nr. 1.4404 wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus. PRIMA PLUS system is fully in line with EN 1856.					
	All chimney elements are industrially produced in every detail as set out in technical documents for particular building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. The system passed GASTEC corrosion test. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.					
	Chimney "Prima Plus", internal diameter Ø200mm, total height 16.5 m					
	Furnace flue ICS25 Ø200 mm, developed length 3.4m	set	1	x	2.558,75 € =	2.558,75 €
8	Purchase, delivery and installation of the duplex circulation pump with electronic frequency controller used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:					
	Manufacturer: "Grundfos" or equivalent					
	Type: Magna 3 D 40-80 F					
	1st pump flow 7, 2nd pump flow 6 m^3/h					
	1st pump thrust 4.5, 2nd pump 4 m					
	Type of connection: Flanged DN40					
	Power supply: V=1x230V~					
	Maximum current: I=0,19 - 1.21A					
	Transferred power: P=17 - 269W					
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.	pc	2	x	1.688,20 € =	3.376,40 €

9	Purchase, delivery and installation of membrane expansion vessel. Maximum permitted pressure is 6 bars, pre-set pressure is 3.5 bars, maximum permitted temperature is 120 °C.					
	Manufacturer: "Pneumatex", Switzerland or equivalent					
	Type: Statico SU 800.6					
	Volume: 800 lit					
	Dimensions: diameter 740mm, height 2044mm, weight 105kg, connection 3/4"					
		pc	1	x	2.409,25 € =	2.409,25 €
10	Purchase, delivery and installation of service valve, brass for maintenance and dismounting of expansion vessel, ball valve with DN 15 outlet for fast discharge hose.					
	Outlet size: 3/4"					
	Operating temperature: -10 °C do +120 °C					
	Max. operating pressure: 16 bar					
		pc	1	x	17,25 € =	17,25 €
11	Purchase, delivery and installation of three-way mixing and diverting valve for constant control of cooling and heating water, with drive power motor as drive unit, connection size:					
	DN40 PN6, Kvs-28,5					
		pc	2	x	80,50 € =	161,00 €
12	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:					
	DN80 PN6					
		pc	2	x	85,33 € =	170,66 €
	DN65 PN6					
		pc	8	x	68,08 € =	544,64 €
13	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets PN6, with following dimensions of connections:					
	DN65 PN6					
		pc	2	x	103,50 € =	207,00 €
14	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets, with following dimensions of connections:					
	DN80 PN6					
		pc	1	x	127,65 € =	127,65 €
	DN65 PN6					
		pc	1	x	98,90 € =	98,90 €
15	Purchase of material and fitting of piping (corrections on connecting pipes in boiler room) made of seamless steel pipes in accordance with JUS C.B5.221 or DIN 2448, dimensions:					

	Ø114,3x3,6	m	5	x	29,67 €	=	148,35 €
	Ø88,9x3,2	m	5	x	22,77 €	=	113,85 €
	Ø76,1x2,9	m	15	x	18,63 €	=	279,45 €
	Ø48,3x2,6	m	10	x	11,39 €	=	113,85 €
	Ø42,4x2,6	m	5	x	9,78 €	=	48,88 €
16	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures. Calculated as 60% of the previous item.		0,6	x	704,38 €	=	422,63 €
17	Purchase and delivery of copper pipes Ø12x0.8mm 15m long for light distilled oil. These are connected to the existing pipes. The item includes installation of ball valves on both pipes, back-flow preventers and oil filters on feeder.	set	1	x	230,00 €	=	230,00 €
18	Purchase of material and pipework insulation with plate prefabricated insulation on the base of expanded rubber with closed cell structure. insulation is 25cm thick for temperature range up to 105°C. To be used for insulation of part of the existing piping and new pipes installed in the boiler room. Item is calculated as per m^2 of insulation measured on the external side of the pipe.	m^2	15	x	23,00 €	=	345,00 €
19	Installation of steel cast ribbed radiator in the hallway on the second floor, axial distance from ribs h=600mm, depth d=160mm, rib width s=60mm thermal effectiveness at branching of 90/70°C 157W (the item includes fitting of new sets for brackets mounting with spacers). Item to be calculated per number of ribs.	pc	20	x	4,60 €	=	92,00 €
20	Purchase, delivery and installation of radiator cap, dimensions 5/4" .	pc	6	x	1,38 €	=	8,28 €
21	Purchase, delivery and installation of reduction elements connection diameter 5/4" to 1/2".	pc	8	x	1,38 €	=	11,04 €
	TOTAL C.II - Boiler room elements and fittings						**35.301,32 €**
C.III	**Preliminary and finishing works**						

1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.	lump-sum	1	x	460,00 €	=	460,00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves.	lump-sum	1	x	460,00 €	=	460,00 €
3	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.	lump-sum	1	x	230,00 €	=	230,00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.	lump-sum	1	x	172,50 €	=	172,50 €
5	Issuing of certificate for entire installed material and equipment.	lump-sum	1	x	230,00 €	=	230,00 €
6	Preparation of "As-built" design.	lump-sum	1	x	575,00 €	=	575,00 €
7	Installation of framed and glazed scheme of connections on a visible place in the boiler room.	lump-sum	1	x	230,00 €	=	230,00 €
8	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with the fire protection standards.	lump-sum	1	x	115,00 €	=	115,00 €
9	Mending wall behind the radiator in the office on the first floor which shall be dismantled and installed on the diferent position.	lump-sum	1	x	34,50 €	=	34,50 €
	TOTAL C.III - Preliminary and finishing works						**2.507,00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**4.801,25 €**
B	**INSTALLATION OF THERMOSTATIC AND BALANCING VALVES**	**6.880,27 €**
C	**EFFICIENCY OF THE DISTRIBUTION SYSTEM**	47.900,72 €
C.I	Dismantling of existing equipment and preliminary works	10.092,40 €

C.II	Boiler room elements and fittings	35.301,32 €
C.III	Preliminary and finishing works	2.507,00 €
	TOTAL PRICE, VAT EXCLUDED	**59.582,24 €**
	VAT (19 %)	**11.320,62 €**
	TOTAL PRICE, VAT INCLUDED	**70.902,86 €**

GROUP A5.3.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Secondary School "Miloje Dobrasinovic" in Bijelo Polje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Miloje Dobrasinovic" Bijelo Polje
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures above blackboards in classrooms and for light fixtures in toilets for handicapped persons. Connect cables for light fittings in classrooms to existing junction box in classrooms. Connect cables for light fittings in toilets for handicapped persons to junction box in adjacent toilet. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Control for light fixture above blackboard shall be done from existing control point. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	4,00				
	Works and material:	pc	34	x	15,18	=	516,12 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	12,00				
	Works and material:	pc	20,00	x	45,54	=	910,80 €
1.3.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	309	x	3,80	=	1.172,66 €

1.4.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	130	x	101,20	=	13.156,00 €
1.5.	Delivery and mounting of ceiling mounted luminaries 2/35W T16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	11	x	126,50	=	1.391,50 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	34	x	173,31	=	5.892,37 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	4	x	113,85	=	455,40 €
1.8.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	66	x	144,21	=	9.517,86 €
1.9.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	15	x	94,88	=	1.423,13 €
1.10.	Delivery and mounting of ceiling mounted light fitting 2/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	3	x	107,53	=	322,58 €
1.11.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	21	x	113,85	=	2.390,85 €

1.12.	Delivery and mounting of ceiling mounted luminaries 1/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	8	x	96,14	=	769,12 €
1.13.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	13	x	111,32	=	1.447,16 €
1.14.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof, completely equipped with mounting gear and light source, certified by DIN 18032. Works and material to be calculated per unit:	pc	16	x	290,95	=	4.655,20 €
1.15.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	15	x	226,4	=	3396,5
1.16.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	3	x	226,4	=	679,3
1.17.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	2	x	232,8	=	465,5
	Total for lighting installation						**48.562,09 €**
2	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
2.1.	Delivery and laying of cables in wall installations with PVC rigid installation pipes and galvanized cable trays in boiler room, for power supply of electrical consumers in the boiler room. Works and material are calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	45,00	x	2,40	=	108,16 €
	PP-Y 3x2,5 mm2	m	60,00	x	3,04	=	182,16 €
	PP-Y 5x2,5 mm2	m	15,00	x	3,42	=	51,23 €
	Outlet three phase 3P+N+PE 16A/400V IP55	pc	1,00	x	10,12	=	10,12 €
	Outlet 2P+E / 230V/ IP 55	pc	2,00	x	8,86	=	17,71 €
	Switch IP44 10A	pc	1,00	x	6,33	=	6,33 €
2.2.	Delivery and mounting electrical parts in existing switchbox in boiler room , "RT KO", completely equipped with following parts:						
	disconnector switch INS 1-0, 40A, 3P	pc	1,00				
	automatic switch 1p,iC60N-C/16A, 6kA	pc	7,00				
	automatic switch 1p,iC60N-C/10A, 6kA	pc	3,00				

	The price includes all material required for installation of this equipment.						
	Total "RT KO"	pc	1,00	x	120,18	=	120,18 €
	Total for power supply and electrical installation for boiler room and heating equipment						**495,88 €**
3	**POTENTIAL EQUALIZATION INSTALLATION**						
3.1.	Delivery and mounting of deep galvanized tape Fe-Zn 25x4 mm for potential equalization in boiler room, according to the drawing layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	20,00	x	2,53	=	50,60 €
3.2.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	pc	18,00	x	6,33	=	113,85 €
3.3.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	pc	1,00	x	5,06	=	5,06 €
3.4.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room, for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	12,00	x	3,80	=	45,54 €
3.5.	Perform galvanic connecting of all metal parts in school with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...), which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded.	m	50,00	x	6,33	=	316,25 €
3.6.	Delivery and mounting box for discharge of static electricity. The box is mounted at facade wall of boiler room. Installed equipment within the box:						
	disconnector switch 16A,250V SKX 12/21 0-1, Ex ed II CT6 Tep-EX	pc	1,00				
	P/F 25 mm2 with pliers for connection at end of the wire	m	10,00				
		pc	1,00	x	480,70	=	480,70 €
	Total potential equalization installation						**1.012,00 €**
4	**LIGHTING AND GROUNDING INSTALLATION**						
4.1.	Dismantling of existing lightning protection system.	lump sum	1,00	x	253,0	=	253,00 €
4.2.	Delivery and installation of lightning descending system and lightning reception system, made of round conductor which is made of Al/Mg with diameter of 8mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	560,00	x	2,53	=	1.416,80 €

4.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	445,00	x	6,33	=	2.814,63 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	72,00	x	6,33	=	455,40 €
	Lightning conductor holder for wall installation:	pc	12,00	x	6,33	=	75,90 €
	Holders for vertical mechanical protection of lightning conductors:	pc	18,00	x	6,33	=	113,85 €
4.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	14,00	x	6,33	=	88,55 €
	linking clamp strip-wire	pc	15,00	x	6,33	=	94,88 €
	linking clamp wire-wire	pc	54,00	x	6,33	=	341,55 €
	groove clamp (for crossing over horizontal gutters)	pc	37,00	x	6,33	=	234,03 €
4.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	9,00	x	31,63	=	284,63 €
4.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	18,00	x	12,65	=	227,70 €
4.7.	Delivery and mounting of wet-preventing clamp. Works and material to be calculated per unit:	pc	19,00	x	12,65	=	240,35 €
4.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	lump sum	1,00	x	822,25	=	822,25 €

4.9.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measure unit.	pc	16,00	x	10,12	=	161,92 €
4.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	120,00	x	2,53	=	303,60 €
	Total for lighting and grounding installation						**7.929,02 €**
5	**SPARE PARTS**						
5,1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2,00	x	7,1	=	14,17 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2,00	x	5,9	=	11,89 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2,00	x	5,9	=	11,89 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2,00	x	5,8	=	11,64 €
	compact fluorescent light bulb TC-L 18W	pc	2,00	x	5,7	=	11,39 €
	Total for spare parts:						**60,97 €**
6	**TESTING**						
6,1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1,00	x	253,00 €	=	253,00 €
6,2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1,00	x	379,50 €	=	379,50 €
	Total for testing:						632,50 €
7	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1,00	x	**379,50 €**	=	379,50 €

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	48.562,09 €
2	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	495,88 €
3	POTENTIAL EQUALIZATION INSTALLATION	1.012,00 €
4	LIGHTING AND GROUNDING INSTALLATION	7.929,02 €
5	SPARE PARTS	60,97 €
6	TESTING	632,50 €
7	PREPARATION OF MAINTENANCE DESIGN	379,50 €
	TOTAL PRICE, VAT EXCLUDED	59.071,96 €
	VAT (19%)	11.223,67 €
	TOTAL PRICE, VAT INCLUDED	**70.295,63 €**

GROUP A5.3.4 **BILL OF QUANTITIES** *on Indoor Water Supply and Sewerage Services in Secondary School "Miloje Dobrašinović" in Bijelo Polje*	*Client:*	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Secondary School "Miloje Dobrašinović", Bijelo Polje, Montenegro
	Documentation:	Final Design of Interior Water Supply and Sewerage Services
	Date:	30 May 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1,01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	2,00	x	10,25 €	=	20,50
1,02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	10,00	x	10,25 €	=	102,50
1,03	Removal of existing faucets above concrete lavatories, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	4,00	x	10,25 €	=	41,00
1,04	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per m'	m'	25,23	x	7,18 €	=	181,03
1.05.	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2,00	x	15,38 €	=	30,75
	TOTAL REMOVAL WORKS						**375,78**

II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
2,01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints should be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes should be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, should be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dØ20mm(DN15)	piece	8,70	x	3,59 €	=	31,21
	dØ25mm(DN20)	piece	9,79	x	4,61 €	=	45,16
	dØ32mm(DN25)	piece	6,74	x	5,74 €	=	38,69
2,02	Purchase and installation of straight stop valves. The valves should be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dØ20mm(DN15)	piece	6,00	x	14,35 €	=	86,10
	dØ25mm(DN20)	piece	4,00	x	14,35 €	=	57,40
	dØ32mm(DN25)	piece	1,00	x	20,50 €	=	20,50
2,03	Purchase and installation of "EK" angle valves DN 20mm. The valves should be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	10,00	x	12,30 €	=	123,00
2,04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report should be made. The Report should be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	25,23	x	2,05 €	=	51,72
2,05	Disinfection of complete water supply installations. The following actions should be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works should be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	25,23	x	3,59 €	=	90,51
2,06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1,00	x	358,75 €	=	358,75
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**903,04**

III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
3,01	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1,00	x	410,00 €	=	410,00
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece. Floor drain, type: "HL310NPr"	pc	2,00	x	30,75 €	=	61,50
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**471,50**
IV	**SANITARY EQUIPMENT**						
4,01	Purchase and installation of faucet above concrete lavatory, for cold water only, together with gaskets and all other bits and pieces necessary for assembling. Calculation as per piece.	piece	4,00	x	246,00 €	=	984,00
4,02	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network should be connected by siphon trap of Ø100. Water tank should be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette should be ordered as per Employer / Employer's Representative decision. Calculation as per piece.	piece	10,00	x	123,00 €	=	1230,00
4,03	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation. Calculation as per piece.	piece	2,00	x	138,38 €	=	276,75
	TOTAL SANITARY EQUIPMENT						**2490,75**

SUMMARY OF COSTS

I	REMOVAL WORKS	375,78
II	WATER-SUPPLY INDOOR INSTALLATIONS	903,04
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	471,50
IV	SANITARY EQUIPMENT	2490,75
	TOTAL PRICE, VAT EXCLUDED	4241,06
	VAT (19 %)	805,80
	TOTAL PRICE, VAT INCLUDED	**5046,87**

GROUP A5.4.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Primary School "Mustafa Pećanin" in Rožaje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	Facility:	Primary school "Mustafa Pećanin", Rožaje
	Documentation:	Final Architectural Design
	Date:	30 May 2013

Item	Description of the Item	Unit of measure	Quantity		unit price (€)		Amount (€)
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Stripping of old plaster from the facade, along with base preparation. Removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m2 of stripped and prepared facade area.						
	Note/see enclosure 1						
	school building	m2	2.400,00	x	2,87 €	=	**6888,00**
	administrative building	m2	493,00	x	2,87 €	=	**1414,91**
1.02.	Setting up of "Demit" thermal facade.						
	Thermal insulation of the facade will be made of expanded EPS polystyrene having heat transfer coefficient of λmax = 0,037 W/mK, thickness δmin=10cm, produced in line with the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade wails reaching up to the height of h=1,6m from ground floor will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with heat transfer coefficient of λ=0,035-0,04 W/mK. Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the openings.						
	Thermal plates are folding, attached to facade wall by using the relevant enriched mineral adhesive, anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:						
	***the first layer** enriched plaster based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene plates will be filled with polyurethane foam.						

| | | |

	If in the process of separating polystyrene, only the adhesive separates and not parts of the basis- the basis is sufficiently strong, solid and stable. If in the process of separating polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong. If in the process of separating polystyrene, part of the adhesive and cradling is separated - it means that the basis is not strong enough and it will withstand a new layer of thermal insulation.						
	Use the reinforcing mesh or corner profiles for the window corners and jambs. To complete the facade along the plinth, use reinforced layer or install U profile of the batten adjusted to thickness of a thermal boards.						
	At heights exceeding 8 meters, plates need additional anchoring with appropriate bolts.						
	During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortars must not be applied in case of strong wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE:						
	Processing of jambs is included in the unit price, it won't be calculated separately.						
	The planned facade systems shall be aligned with the appropriate EN standards. **External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate. ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.**						
	school and gym						
	EPS 10cm	m2	1.596,85	x	19,99 €	=	**31916,99**
	XPS 10cm	m2	449,87	x	25,11 €	=	**11297,42**
	pressed mineral wool A1 d=10cm	m2	351,99	x	21,83 €	=	**7684,71**

	administrative building						
	EPS 10cm	m2	209,10	x	19,99 €	=	**4179,39**
	XPS 10cm	m2	60,48	x	25,11 €	=	**1518,68**
	pressed mineral wool A1 d=10cm	m2	73,80	x	23,06 €	=	**1702,01**
1.03.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, 'Bavalit' type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned.						
	Type and colour will be selected by the by Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	***contact coating** made of the emulsion of synthetic resins and water-glass used for impregnation of the set reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, in colour determined by the by Employer / Employer's Representative, while the entire procedure will be conducted under the design details.						
	The openings shall be protected with PVC foil.						
	Use angle profiles to treat corners and window jambs.						
	The unit price includes the purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding. Calculation is per m2 of the installed façade.						
	Main school building- columns and walls of outdoor staircases.	m2	22,00	x	12,10 €	=	**266,09**
	Administrative building-funnel, walls of fuel store room.	m2	168,00	x	12,10 €	=	**2031,96**

1.04.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulir plast") as splash guard (as indicated on the drawings). Surface shall be cleaned, washed and sprinkled with acrylic base with granulate. Render shall be applied on cleaned and dried surface by manufacturer's instruction. The color shall be determined by the Employer / Employer's Representative, according to the color chart of manufacturer. Calculation per m2.						
	School and the gym	m2	227,15	x	15,58 €	=	**3539,00**
	Administrative building	m2	57,97	x	15,58 €	=	**903,17**
1.05.	Installation of drip batten at the plinth, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative, with anchoring. Anchor bolts can be direct or indirect. On the front side, overhang of the drip shall be 3cm.						
	Calculation per m						
	Main school building	m	279,00	x	12,92 €	=	**3603,29**
	Administrative building	m	54,00	x	12,92 €	=	**697,41**
1.06.	Repair of damages in the facade by using repairing mortar, along with preparations for setting up of "Demit" thermal facade. Surface shall be smooth, without bumps and wraps and with no sharp edges. Calculation per m2. The quantity is given approximately.						
	Note: See enclosure 1						
	Main school building-30%	m2	720,00	x	9,94 €	=	**7158,60**
	Administrative building-30%	m2	144,00	x	9,94 €	=	**1431,72**
1.07.	Making of the facade frame (sembrana) around the windows of the main school building (on the main and two lateral facades). The width of the frame is 15cm, and it is made of EPS board 3cm thick. Processing with "Bavalit" is already included in item "installation of thermal insulation facade "Demit".						
	Calculation per m of installed sambrano.	m	514,00	x	5,54 €	=	**2844,99**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**89078,34**
II	**REPLACEMENT OF FACADE JOINERY**						
2.01.	Dismantling of façade joinery and all its elements and mechanisms. Transportation to the town landfill or hand-over to the Employer / Employer's Representative (according to the agreement) for storing. Calculation as per piece of dismantled joinery.						
	Main school building and gym:						

	dim.140/335cm -door	pc	2,00	x	11,50 €	=	**23,00**
	dim.165/245cm -window	pc	22,00	x	11,50 €	=	**253,00**
	dim.125/245cm -window	pc	10,00	x	11,50 €	=	**115,00**
	dim.105/125cm -window	pc	2,00	x	11,50 €	=	**23,00**
	dim.50/245cm -window	pc	4,00	x	11,50 €	=	**46,00**
	dim.150/220cm -window	pc	8,00	x	11,50 €	=	**92,00**
	dim40/40cm -window	pc	8,00	x	11,50 €	=	**92,00**
	dim.290/135cm -window	pc	2,00	x	11,50 €	=	**23,00**
	dim.260/275cm -glass panel	pc	2,00	x	11,50 €	=	**23,00**
	dim.265/135cm -window	pc	5,00	x	11,50 €	=	**57,50**
	dim.135/145cm -window	pc	4,00	x	11,50 €	=	**46,00**
	dim.85/145cm -window	pc	2,00	x	11,50 €	=	**23,00**
	dim.130/210cm -door	pc	1,00	x	11,50 €	=	**11,50**
	dim.380/150cm -window	pc	9,00	x	11,50 €	=	**103,50**
	dim.460/150cm -window	pc	3,00	x	11,50 €	=	**34,50**
	dim.110/205cm -door	pc	1,00	x	11,50 €	=	**11,50**
	dim.171/135cm -window	pc	2,00	x	11,50 €	=	**23,00**
	dim.275/145cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.280/135cm -window	pc	4,00	x	11,50 €	=	**46,00**
	dim.266/135cm -window	pc	2,00	x	11,50 €	=	**23,00**
	dim.211/135cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.290/135cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.215/135cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.245/135cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.75/65cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.195/145cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.180/135cm -window	pc	4,00	x	11,50 €	=	**46,00**
	dim.170/205cm -window	pc	24,00	x	11,50 €	=	**276,00**
	dim.125/205cm -window	pc	8,00	x	11,50 €	=	**92,00**
	dim.110/115cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.150/130cm -window	pc	12,00	x	11,50 €	=	**138,00**
	dim.180/130cm -window	pc	2,00	x	11,50 €	=	**23,00**
	dim.265/135cm-protective net	pc	3,00	x	11,50 €	=	**34,50**
	dim.275/145cm-protective net	pc	1,00	x	11,50 €	=	**11,50**
	dim.600*400cm-protective net with door	pc	1,00	x	11,50 €	=	**11,50**
	Total length of the window drips which shall be dismantled from the façade (within the windows which shall not be changed).	m	7,95	x	5,75 €	=	**45,71**
	Administrative building:						
	dim.100/205cm-door	pc	1,00	x	11,50 €	=	**11,50**
	dim.154/240cm-door	pc	1,00	x	11,50 €	=	**11,50**
	dim.70/60cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.122/122cm -window	pc	2,00	x	11,50 €	=	**23,00**
	dim.300/300cm-door	pc	1,00	x	11,50 €	=	**11,50**
	dim.185/155cm -window	pc	10,00	x	11,50 €	=	**115,00**
	dim.119/125cm -window	pc	1,00	x	11,50 €	=	**11,50**
	dim.90/90cm -window	pc	1,00	x	11,50 €	=	**11,50**
	Total length of the window drips which shall be dismantled from the façade (within the windows which shall not be changed).	pc	2,80	x	11,50 €	=	**32,20**
2.02.	Production and installation of the facade PVC joinery. The unit price includes everything from description:						

	- Production and assembling, - 6-chamber PVC profiles reinforced on the inside with galvanized steel U profiles, no thermal bridge, - Non-recycled PVC to be used, - Heat transfer coefficient Umax = 1,5 W/m,K, - Minimal required solar energy transmittance factor for glazed surfaces is g≤65%, - Glass - double-glazed 4+16+4 mm low emission with argon or some other inert gas between glass panels, - Fittings: required set for hanging and closing, - Opening - as shown on the annexed joinery schemes. -The unit price also includes: blind frames, decorative stripes, external Al drip with lateral plugs. -Colour of the profile shall be light brown (wood), sampled and aproved by Employer / Employer's Representative. NOTE:The items marked with ' include glass coated with low emission coating as the protection against sunshine.						
	Measures to be taken onsite. Calculation per piece of installed joinery fully in line with the description. note- see detail D10						
	Main school building and gym:						
	POS2 - glass panel 170/252cm-unit price includes window frames	pc	6,00	x	748,65 €	=	**4491,90**
	POS2' - glass panel 170/252cm-unit price includes window frames	pc	16,00	x	748,65 €	=	**11978,40**
	POS3 - glass panel 130/252cm-unit price includes window frames	pc	10,00	x	495,65 €	=	**4956,50**
	POS4 - glass panel 105/125cm-unit price includes window frames	pc	2,00	x	257,60 €	=	**515,20**
	POS5 - glass panel 150/195cm-unit price includes window frames	pc	8,00	x	485,30 €	=	**3882,40**
	POS24 -glass panel 170/205cm- unit price includes window frames	pc	6,00	x	533,60 €	=	**3201,60**
	POS24' -glass panel 170/205cm- unit price includes window frames	pc	18,00	x	533,60 €	=	**9604,80**
	POS25 - glass panel 125/205cm- unit price includes window frames	pc	10,00	x	445,05 €	=	**4450,50**
	POS26 - glass panel 110/120cm- unit price includes window frames	pc	1,00	x	221,95 €	=	**221,95**
	POS27 - glass panel 150/130cm- unit price includes window frames	pc	10,00	x	387,55 €	=	**3875,50**
	POS29 - glass panel 110/120cm- unit price includes window frames	pc	1,00	x	247,25 €	=	**247,25**
2.03.	Production and installation of the facade PVC joinery. The unit price includes everything from description:						

	- Production and assembling, - 6-chamber PVC profiles reinforced on the inside with galvanized steel U profiles, no thermal bridge, - Non-recycled PVC to be used, - Heat transfer coefficient Umax = 1,5 W/m¸K, - Minimal required solar energy, transmittance factor for glazed surfaces is g≤65%, - Glass - double-glazed 4+16+4 mm low emission with argon or some other inert gas between glass panels, - Fittings: required set for hanging and closing, - Opening - as shown in the annexed joinery schemes, - To be included within the item: blind frames, decorative stripes, external Al drip with lateral plugs, - Profile colour: white. **NOTE:** The items marked with ' include glass coated with low emission coating as the protection against sunshine.							
	Calculation per piece.							
	Main school building and gym:							
	POS 6 -window 80/60cm	pc	5,00	x	174,80 €	=		**874,00**
	POS 7 -glass panel 291/135cm	pc	4,00	x	761,30 €	=		**3045,20**
	POS -9- glass panel 265/135cm	pc	1,00	x	652,05 €	=		**652,05**
	POS 10- window 160/145cm	pc	3,00	x	294,40 €	=		**883,20**
	POS 11- window 145/145m	pc	3,00	x	381,80 €	=		**1145,40**
	POS 13- glass panel 380/150cm	pc	4,00	x	549,70 €	=		**2198,80**
	POS 13* -glass panel 330/150cm	pc	2,00	x	549,70 €	=		**1099,40**
	POS 13' -glass panel 330/150cm	pc	3,00	x	748,65 €	=		**2245,95**
	POS 14 -glass panel 460/150cm	pc	3,00	x	1.036,15 €	=		**3108,45**
	POS 16- glass panel 171/135cm	pc	2,00	x	415,15 €	=		**830,30**
	POS 17- glass panel 275/145m	pc	2,00	x	685,40 €	=		**1370,80**
	POS 18- glass panel 280/140cm	pc	2,00	x	745,20 €	=		**1490,40**
	POS 18*- - glass panel 280/145cm	pc	1,00	x	772,80 €	=		**772,80**
	POS 19 - glass panel 190/140cm	pc	1,00	x	473,80 €	=		**473,80**
	POS 20 - glass panel 260/140cm	pc	2,00	x	645,15 €	=		**1290,30**
	POS 21 - glass panel 228/135cm	pc	1,00	x	584,20 €	=		**584,20**
	POS 22 - glass panel 180/135cm	pc	1,00	x	427,80 €	=		**427,80**
	POS 22* - glass panel 180/125cm	pc	1,00	x	410,55 €	=		**410,55**
	POS 23 -glass panel 175/125cm	pc	1,00	x	392,15 €	=		**392,15**
	POS 28 -glass panel 180/130cm	pc	4,00	x	417,45 €	=		**1669,80**
	Administrative building:							
	POS 34 - glass panel 122/122cm	pc	2,00	x	335,80 €	=		**671,60**
	POS 35* - window 185/155cm	pc	1,00	x	501,40 €	=		**501,40**
	POS 35 - window 185/155cm	pc	9,00	x	588,80 €	=		**5299,20**
	POS 36 - window 90/90cm	pc	1,00	x	289,80 €	=		**289,80**
	POS 37 - widow 120/125	pc	1,00	x	325,45 €	=		**325,45**
2.04.	Production and installation of main entrance doors at the main school building. Doors shall have skylights and shall be made of Al profiles with thermal break. Calculation, fully in line with the description:							

	* production and assembling, * self-closing mechanism, * profiles- aluminium, with thermal break * infill- combination of the glass and Al thermal-panels with polyurethane infill. * glass- double- glazed 4+16+4 mm, with argon or some other inert gas between the panels (one glass panel shall be low emission), * heat transfer coefficient Umax = 2.8 W/m¸K, * solar energy transmittance factor g≤65% * fittings: required set for hanging and closing, * knob - chrome plated - mate, * fit rubber door stoppers on the floor, * Opening as shown in the joinery schemes annexed, * Profile colour shall light brown (wood), sampled and aproved by Employer / Employer's Representative.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	POS 1 - glass panel 141/335cm	pc	1,00	x	1.198,30 €	=	**1198,30**
	POS 1* - glass panel 141/335cm	pc	1,00	x	1.198,30 €	=	**1198,30**
2.05.	Production and installation of the aluminium windshield. The unit price includes everything from the description: the purchase of material, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break, -glass system: single glazing 4 mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation per piece.						
	POS 1a - glass panel 141/335cm	pc	1,00	x	875,15 €	=	**875,15**
	POS 1a* - glass panel 141/335cm	pc	1,00	x	875,15 €	=	**875,15**

2.06.	Production and installation of entrance door made of Al profiles with thermal break. The unit price includes everything from the description:						
	* production and assembling, * self-closing mechanism, * profiles- aluminium, with thermal break * infill- combination of the glass and Al thermal-panels with polyurethane infill. * glass- double- glazed 4+16+4 mm, with argon or some other inert gas between the panels (one glass panel shall be low emission), * heat transfer coefficient Umax = 2.8 W/m¸K, * solar energy transmittance factor g≤65%, *fittings: required set for hanging and closing, * knob - chrome plated - mate, * fit rubber door stoppers on the floor, * opening as shown in the joinery schemes annexed, *profile colour - natural aluminium.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	The unit price also includes: blind frames, decorative stripes, external Al drip with lateral plugs. In the given dimensions blind frames are already included.						
	Main school building and gym:						
	POS 8 - glass panel 268/213cm (double leaf door 140/213 with lateral skylights)	pc	2,00	x	1.260,40 €	=	**2520,80**
	POS 12 - door 131/210cm	pc	1,00	x	737,15 €	=	**737,15**
	POS 15 - door 110/205cm	pc	1,00	x	618,70 €	=	**618,70**
	Administrative building:						
	POS 30 - door 110/210cm	pc	1,00	x	611,80 €	=	**611,80**
2.07.	Production and installation of facade aluminium joinery, made of aluminium profiles coated in plastic layer, without thermal break, with panel infill and wing fitted with jalousie. Colour of the profiles: white.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	Administrative building:						
	POS 31 - door 150/240cm	pc	1,00	x	652,05 €	=	**652,05**
2.08.	Production and installation of weather louvers made of Al white profiles. Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	POS 32-weather louvers 70/60cm	pc	1,00	x	140,30 €	=	**140,30**

2.09.	Purchase of material and installation of double-leaf, metal, garage door, made of rectangular tube profiles covered with sheet metal d=3 mm. Door shall be equipped with all necessary shackles and mechanism for manual opening. Door shall be properly painted, firstly with anti-corrosive paint, then with paint in the same colour as the door of the nearby administrative building - grey color.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	Administrative building:						
	POS 33 - door 300/300cm	pc	1,00	x	971,75 €	=	**971,75**
	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.						
	NOTE: Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.						
2.10.	Purchase and installation of external flashing sills, made of ready-made plastic-laminated galvanized steel metal sheets, within side sills which shall be preserved. Carefully dismantle existing flashing sills, prior to installation of new ones. Replacement is needed due to the thickness change of facade covering.						
	Measures to be taken on site. Flashing sills shall be 26 cm width, i.e. maximum 3 cm beyond facade surface. Calculation is per piece of installed flashing sill, fully in line with the description.						
	Main school building:						
	l=265	pc	3,00	x	51,98 €	=	**155,94**
	Administrative building:						
	l=80cm	pc	2,00	x	18,17 €	=	**36,34**
	l=60cm	pc	2,00	x	18,17 €	=	**36,34**
2.11.	Production and installation of protective mesh for windows in the basement and ground floor. The mesh is made of steel rectangular tube profiles 60*60 mm, which form external frame. Inner bars are made of rectangular steel tube profiles 40*40 mm and it's position is in line with the window leafs. Mesh is used as infill (stretched metal of approximate dimensions of a rhomb cca 85*35mm). The mesh is welded to angle profiles L30*30 and then fitted into the frame so that L profile is visible on the external side. The entire structure is anchored, appropriately protected and painted in white.						

	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	POS m- 125/245cm	pc	3,00	x	442,75 €	=	**1328,25**
	POS m2 - 165/245cm	pc	3,00	x	563,50 €	=	**1690,50**
2.12.	Installation of safety meshes, previously dismantled from the object. There is a possibility of reduction of mesh dimensions, so they could fit into the new windows. Meshes shall be painted in white. Upon approval of the Employer / Employer's Representative mounted on the building.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	mesh, dim. 265/135	pc	3,00	x	97,75 €	=	**293,25**
	mesh and door 600/400	pc	1,00	x	241,50 €	=	**241,50**
	mesh, dim. 275/145	pc	3,00	x	120,75 €	=	**362,25**
2.13.	Production and installation of new internal wooden sills on new windows in main school building. New wooden sills shall have the same or similar colour as the colour of profile used for new windows and they shall be placed over battens and layer of tar paper, as described in detail D10.						
	Measures to be taken onsite. Calculation per piece, all complete.						
	165/43cm	pc	22,00	x	66,70 €	=	**1467,40**
	125/43cm	pc	6,00	x	52,90 €	=	**317,40**
2.14.	Production and installation of meshes made of ropes. Meshes shall be attached on ceilings / walls over the windows in the gym, as a glass protection. Before the installation, meshes shall be sampled and approved by Employer / Employer's Representative.						
	opening dim. 380/150cm POS 13 & 13*	pc	9,00	x	396,75 €	=	**3570,75**
	opening dim. 460/150cm POS 14	pc	3,00	x	419,75 €	=	**1259,25**
	TOTAL FOR FACADE JOINERY REPLACEMENT						**102716,33**
III	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
3.01.	Dismantling of vertical gutters round cross-section Ø10cm made of galvanized sheet metal with its dumping at landfill. The unit price shall include all the work, material and transport.						
	Calculation per m.	m	193,20	x	1,03 €	=	**198,03**
3.02.	Dismantling of facade installations (cables, lightning, lightning rod etc.), their storing away to a place set by the Employer / Employer's Representative and their re-installation upon facade installation.						
	Calculation per lump sum.	lump sum	1,00	x	348,50 €	=	**348,50**

3.03.	Dismantling of roof coverings from canopies over ancillary entrances, together with horizontal rain gutters and vertical rain downpipes, flashings, plasterboards and battens which form suspended ceilings (both sides: front and lateral). Dismantling of existing structure shall be foreseen too, since it was not possible to determin it' s exact condition.						
	Calculation per m2 of real roof area.						
	East side canopy	m2	9,60	x	9,74 €	=	**93,48**
	West side canopy	m2	8,50	x	9,74 €	=	**82,77**
	Canopy of the gym main entrance	m2	4,86	x	9,74 €	=	**47,32**
	Canopy of the gym ancillary entrance	m2	2,00	x	9,74 €	=	**19,48**
3.04.	Openings, as specified in the Drawings, shall be walled-up using perforated bricks d=20 cm , laid in gauged mortar 1:2:6.						
	Calculation per m2, all complete.	m2	6,00	x	24,19 €	=	**145,14**
3.05.	Production and installation of the vertical gutters of 120/120 mm square section, made of ready made galvanized plastic-laminated steel metal sheets d=0,70 mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material.						
	Calculation per m.						
	Main school building	m	228,00	x	14,97 €	=	**3412,02**
	Administrative building	m	49,00	x	14,97 €	=	**733,29**
3.06.	Renovation / construction of the pavement around school and administrative building and construction of the new pavement of the rear school yards. The works include, where necessary, preparation works such as: cleaning off the overgrowth, stripping of the humus layer, preparation of the terrain for the construction of the pavement. The works include purchase and transportation of materials for gravel filling and concrete works. Layer of gravel to be 10 cm of thickness. Gravel shall be rammed manually and by machine if necessary to achieve complete compactness. Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. Expansion joints shall be filled up with joint filler. The unit price includes all works and materials. Calculation is per m2.						
	Renewal of the pavement around school building	m2	110,00	x	14,56 €	=	**1601,05**

	Renewal of the pavement around ancillary building	m2	15,00	x	14,56 €	=	**218,33**
	New pavement in the rear school yards	m2	80,00	x	17,84 €	=	**1426,80**
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						**8326,20**
IV	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
4.01.	Removal of the existing floor tiles from the toilets, including all sub-layers to the slab, removal and loading of debris onto a truck and transportation to landfill up to 5 km distance.	m2	132,72	x	4,92 €	=	**652,98**
4.02.	Removal of the existing ceramic wall tiles with undercoat layer from the walls in sanitary facilities. Removal and loading of debris onto a truck and transportation to landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of the floor area.	m2	654,48	x	4,92 €	=	**3220,04**
4.03.	Removal of existing rotten plaster from the walls, removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of removed plaster.	m2	145,70	x	3,59 €	=	**522,70**
4.04.	Scraping of the old paint from the internal ceilings in sanitary facilities, removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation as per m2 of scraped area.	m2	142,40	x	0,51 €	=	**72,98**
4.05.	Removal of internal single leaf, double layer plywood door. The unit price includes transportation to a landfill up to 5 km distance. Calculation is per piece.						
	- dim. 66/200cm	pc	22,00	x	138,38 €	=	**3044,25**
	- dim. 88/200cm	pc	9,00	x	158,88 €	=	**1429,88**
4.06.	Demolition of partition walls d=24cm in line with drawing detail D10. The unit price includes transportation to a landfill up to 5 km distance.						
	Calculation m3	m3	1,00	x	69,70 €	=	**69,70**
4.07.	Dismantling existing barriers beetwen the showers in the sanitary facilities of the gym. Barriers are made of metal profiles. The unit price includes transportation to the landfill up to 5 km distance.						
	Calculation as per piece.						
	- dim. 70/200cm	pc	8,00	x	15,38 €	=	**123,00**

4.08.	Dismantling of existing plinths around showers in the sanitary facilities of the gym. Plinths are 15 cm high and thick. The unit price includes transportation to the landfill up to 5 km distance.						
	Calculation per m	m	12,24	x	14,35 €	=	**175,64**
4.09.	Purchase and delivery of the materials for construction of partition walls beetwen the showers and plinth wall on the front side of the shower in the sanitary facilities of the gym. Walls, 6.5 cm thick shall be made of the bricks laid in the gauged mortar 1:2:6 with proper connection to existing wall and reinforcement, and vertical and horizontal beams in line with regulations. The unit price includes RC beams and collumns with reinforcement. Height of the partition walls is 220 cm, and height of the front parapets is 12 cm.						
	Calculation as per m2 .	m2	7,31	x	26,24 €	=	**191,81**
4.10.	Purchase of the materials and building the partition wall in the area of reconstruction of toilets for disabled persons. The walls shall be built by bricks / "giter" blocks in gauged mortar 1:2:6 in line with Design. During construction, connection shall be achieved by "working on a half-element" and the connection to the existing wall shall be done in line with regulations. The unit price includes necessary reinforcement beams above doors and usage of the scaffold. Calculated per m2.						
	wall 12 cm	m2	8,40	x	24,19 €	=	**203,20**
	wall 24 cm	m2	8,00	x	25,22 €	=	**201,72**
4.11.	Making of the scrimmed cement screed for a sloping layer in the toilets. The unit price includes installation of the mesh (1kg/m2) with and overlap 5cm (1,08 m2/m2). Floated coat is used as finishing layer. Screed thickness is d = 4 cm. Calculation per m2 of finished surface, including all works and material.	m2	138,12	x	10,05 €	=	**1387,42**
4.12.	Setting up of horizontal waterproofing in the toilets, in the following layers (from the bottom up): - bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos . Put the waterproofing at least 10 cm up the wall. Calculation is based on a m2 of the basis (section pulled up the walls is included in the unit price). The unit price includes all works and materials, in line with the description, including the cleaning and surface preparation for a quality installation of a new waterproofing.						

	NOTE: Entire waterproofing overlapping and putting the waterproofing up the walls shall be included in the unit price of works.						
	floor	m2	138,22	x	19,99 €	=	**2762,67**
4.13.	Setting up the vertical waterproofing on the walls in shower cubicles (including the newly built partition and plinth walls), from floor level up to the height of 2,2 m, using "Texaspenetrat" or equivalent material. Calculation is per m2.						
	wall	m2	80,48	x	14,15 €	=	**1138,39**
4.14.	Plastering interior walls of sanitary facilities (including the newly built partition and plinth walls) with cement mortar 1:3, in two layers, with previous spraying of cement slurry to prepare the item for tiling to walls with ceramic tiles. The unit price includes all works, material with strips, transportation and use of scaffold.						
	Calculation is per m2 of plastered wall, with deduction of total openings areas.	m2	772,08	x	8,00 €	=	**6172,78**
4.15.	Tilling to walls of sanitary facilities with ceramic tiles class I. The size, colour and tone of the tiles will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster.						
	Ceramics will be placed up to the ceiling.						
	Coating of the jambs and niches is included in the item unit price and it won't be calculated separately.						
	Calculation per m2 fully completed item.	m2	772,08	x	23,06 €	=	**17806,10**
4.16.	Tiling to floor in the toilets and other premises with the class I anti-slip tiles. The size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in the waterproof adhesive layer joint bonding manner, by using pointing plaster.						
	In the toilets, consisting a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2 fully completed item.	m2	142,40	x	28,19 €	=	**4013,90**
4.17.	Polishing and painting of the ceilings in sanitary facilities and dressing rooms. The Employer / Employer's Representative will select the tone of semi dispersed distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer.						

	Calculation per m2, including all necessary work, materials and scaffolding.	m2	142,40	x	4,82 €	=	**686,01**
4.18.	Production and installation of internal joinery. The unit price includes everything from the description:						
	Purchase of material and mounting of indoor joinery, produced of hard and high resistant PVC profiles, reinforced by zinc plated steel „U" profiles, strictly according to joinery drawings and details, including high quality of accessories, hinges, opening / closing handles etc. PVC panels shall be used for doors and float glass for fan lights above the doors. This item implicates all needed cleanings and transportation of waste materials to the waste depot, as well as all necessary works for joinery mounting (proper fitting, needed wall chase cutting, plastering, painting and use of jamb sills). Stick the plate dim.13 * 4cm on the door, with written purpose of the room, and fix in the floor the rubber stoppers. Calculation is per completely finished item. The profiles are white. Prior to manufacture of joinery, the Contractor is obliged to take „on site" measures.						
	Measures must be taken onsite. Calculation per piece of installed joinery, in line with the description.						
1u	- dim. 66/180cm	pc	22,00	x	436,65 €	=	**9606,30**
2u	- dim. 88/200cm	pc	9,00	x	493,03 €	=	**4437,23**
2u	- dim. 90/205cm	pc	1,00	x	496,10 €	=	**496,10**
4u	- dim. 105/205cm	pc	1,00	x	523,78 €	=	**523,78**
4.19.	Purchase and installation of the shower curtains in the shower cubicles of the gym. Curtains will be hanged on the metal bars wich are included in the unit price. Before the installation samples shall be approved by the Employer / Employer's Representative.						
	Calculation as per piece	pc	8,00	x	87,13 €	=	**697,00**
4.20.	Removal of the existing gypsum board cover of horizontal installations within the sanitary facilities. There are two sides of cascades, lateral side and bottom side, average developed width 80 cm. Calculation per m, including transportation of debris to a landfill.						
	Removal of the existing gypsum cover.	m	24,00	x	4,31 €	=	**103,32**

4.21.	Installation of the new gypsum board cover of horizontal installations within the sanitary facilities. There are two sides of cascades, lateral side and bottom side, average developed width 80 cm. Calculation per m, including all the materials, substructure, bandaging, tools, scaffold etc.						
	Calculation is per m.	m	24,00	x	18,04 €	=	**432,96**
4.22.	Skimming and painting of the plaster cascades in sanitary facilities. Use semi-dispersed water-based paint. Colour of the paint will be selected by the Employer / Employer's Representative. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer. Calculation per m2, including all necessary work, materials and scaffolding.	m2	24,60	x	4,00 €	=	**98,34**
4.23.	Installation of new canopy as per enclosed drawing detail D6. The item includes everything from described detail D6, up to the final completion, together with all necessary material, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1,00	x	486,88 €	=	**486,88**
4.24.	Installation of new canopy as per enclosed details D7. The item includes all other items from described details D7, up to the final completion, along with all necessary materials, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1,00	x	486,88 €	=	**486,88**
4.25.	Installation of new canopy as per enclosed detail D8. The item includes all other items from described detail D8, up to the final completion, along with all necessary materials, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1,00	x	589,38 €	=	**589,38**
4.26.	Installation of new canopy as per enclosed detail D9. The item includes all other items from described detail D9, up to the final completion, along with all necessary materials, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1,00	x	589,38 €	=	**589,38**

4.27.	Replacement of the suspended ceiling panels with new ones, finally painted in white using water-based paint. The panels shall be hooked up to the wooden ceiling joists using profiles. Prior this work, the existing ceiling needs to be removed and put off to the landfill. Calculation per m2, including all the materials, works and scaffolding.						
	Dismantling and storage	m2	1.200,00	x	1,90 €	=	**2275,50**
	Procurement and installation	m2	1.200,00	x	13,94 €	=	**16728,00**
	Painting	m2	1.200,00	x	4,36 €	=	**5227,50**
4.28.	Scraping and skimming with emulsion putty of complete old walls within the main school building (the gym is excluded), on which the joinery shall be replaced and walls with cracks and dammages (20% of total area). All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Flattening and skimming with putty minor damages and cracks. Flattening and skimming with emulsion putty first time. All the surfaces must be finally glassed, then flattened and skimmed with putty for the second time, using required scaffold.						
	Calculation per m2						
	ground floor						
	walls	m2	495,09	x	2,36 €	=	**1167,16**
	ceilings	m2	220,06	x	2,36 €	=	**518,79**
	level +2,40						
	walls	m2	120,42	x	2,36 €	=	**283,89**
	ceilings	m2	50,18	x	2,36 €	=	**118,29**
	first floor						
	walls	m2	598,88	x	2,36 €	=	**1411,86**
	ceilings	m2	219,46	x	2,36 €	=	**517,38**
4.29.	Painting walls and ceilings with double layer of semi-dispersed paint. Colour of the paint will be selected by the Employer / Employer's Representative. The unit price includes usage of scaffold.						
	Calculation per m2						
	ground floor						
	walls	m2	1.371,18	x	1,64 €	=	**2248,73**
	ceilings	m2	1.100,29	x	1,64 €	=	**1804,48**
	level dig +2,40						
	walls	m2	213,25	x	1,64 €	=	**349,73**
	ceilings	m2	250,88	x	1,64 €	=	**411,44**
	first floor						
	walls	m2	1.977,84	x	1,64 €	=	**3243,66**
	ceilings	m2	1.097,31	x	1,64 €	=	**1799,59**
4.30.	Painting walls with double layer of oil based paint up to the height of 1,55 m. Colour of the paint will be selected by the Employer / Employer's Representative.						
	Calculation per m2						
	ground floor	m2	1.104,25	x	3,33 €	=	**3678,53**
	level dig +2,40	m2	388,86	x	3,33 €	=	**1295,39**
	floor	m2	1.016,57	x	3,33 €	=	**3386,44**

	painting the areas behind the radiators, which will be dismantled, rinsed and re-installed (in the rooms which are not planed to be painted).	m2	30,00	x	3,33 €	=	**99,94**
4.31.	Repaire of the existing parquet floor. Machine sanding and varnishing of the parquet is included. Conduct these procedures 3 times by using color free lacquer. Before varnishing, thoroughly clean the surface from dust. Conduct varnishing with a brush, to avoid bubbles. The item includes installation and processing of the angular parquet batten.						
	Calculation per m2	m2	20,00	x	18,66 €	=	**373,10**
4.32.	Purchase of materials and installation of new vinyl floor in the storage room next to the toilets for disabled persons. Works shall include: *Demolition of the existing floor in the storage room next to the toilets for disabled persons up to the slab level. The unit price shall include loading of debris onto a truck and transportation to a landfill up to 5 km distance, *Applying self leveling mass. Before applying the mass thoroughly clean the surface from dust. *Purchase and applying of vinyl floor. Adhesive shall be adequate for this type of floor. Before applying the adhesive thoroughly clean the surface from dust. *The stripes for vinyl floor on the room edges shall be installed.						
	Calculation per m2	m2	8,00	x	35,06 €	=	**280,44**
4.33.	Purchase and installation of self-supporting network cable, category 5E outdoor, and accessories for hanging on both sides, 100m long.						
	Calculated as per piece	pc	4,00	x	240,88 €	=	**963,50**
4.34.	Delivery and installation of the RJ45 socket, category 5E. Usage of installation tools shall be included in calculation.						
	Calculated as per piece	pc	8,00	x	66,63 €	=	**533,00**
4.35.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers. The item also includes painting of metal hydrant and switch boxes, painting of steel handrails of staircases in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculated as per lump sum.	lump sum	1,00	x	230,63 €	=	**230,63**

4.36.	Purchase and installation of wall pad coating for concrete columns in the gym. Wall padding features an 18 mm thick wafer boards base onto which the padding foam is bonded. Pads to be upholstered with closed cell expanded polyethylene and coated with vinyl fabric. The finishing material needs to be flexible, highly resistant against moisture and bacteria, and easy to maintain. Installation with appropriate connection to the wall.						
	Calculated as per piece	pc	12,00	x	59,45 €	=	**713,40**
4.37.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative. Trees shall be planted on min 5 m distance and min. 4 m distance from the buildings and 3m high. Dig a pit for planting throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of 3 kg of peat enriched fertilizer per tree. Having completed the planting of the seedlings, trees shall be well watered.						
	Calculation per piece	pc	10,00	x	51,25 €	=	**512,50**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**112595,56**
V	**RECONSTRUCTION OF THE ROOF ABOVE MAIN SCHOOL BUILDING**						
5.01.	Dismantling- removal of existing roof cover made of: plastic coated metal sheet, tar-paper (roof paper), wooden boards, together with the belonging horizontal rain gutters, flashings and snow hurdles. Calculation is per m2 of inclinated roof area. Classification and storage to be done in line with the instruction of the Employer / Employer's Representative. Transportation of debris to a landfill up to 5 km distance to be included in price.						
	Main school building	m2	1.500,00	x	5,95 €	=	**8917,50**
5.02.	Removal of existing, damaged wooden roof substructure and storage in place determined by the Employer / Employer's Representative. Transportation of debris to a landfill up to 5 km distance to be included in price.						
	Calculation per m2 of horizontal roof projection.						
	main school building	m2	1.305,00	x	3,28 €	=	**4280,40**

5.03.	Removal of existing, damaged attic substructure and storage in place determinate by the Employer / Employer's Representative. Transportation of debris to a landfill up to 5 km distance to be included in price.						
	Calculation per m2 of horizontal roof projection.						
	main school building	m2	1.305,00	x	2,56 €	=	**3344,06**
5.04.	Purchase of material and installation of wooden attic and roof substructure made of dry white wood, everything in accordance with standards for roof cover made of galvanized and plastic coated metal sheet. Calculation includes setting up of connections between bearing elements in accordance with the code of practice, with use of nails, bolts and other strengthening steel elements.						
	Protect the anchors with two layers of antirust paint. Wooden elements shall be treated with different coats against decay, wormholes and fire. Fireproof coating shall consist of expanding water-soluble coating designed for fire protection of interior wood. It is necessary that the coating protects the wooden structure from fire for a time interval of at least 45 minutes. Obtain necessary test certificate.						
	Calculation per m2 of horizontal projection.						
	After the structure is removed, the precise measuring shall be done, as well as the check of the technical solution given in the Design.						
	Expected wood grain volume is cca 120m3.						
	Main school building	m2	1.305,00	x	38,54 €	=	**50294,70**
5.05.	Purchase of material and setting up thermal insulation in the school attic, above the classrooms and over the gypsum boards.						
	Calculation per m2.						
	Main school building	m2	1.044,00	x	9,84 €	=	**10272,96**
5.06.	Purchase of material and setting up wooden boards over the ceiling joists with proper connection.						
	Calculation per m2.						
	Main school building	m2	1.044,00	x	9,64 €	=	**10058,94**
5.07.	Purchase of material and setting up of roof cover, made of the following layers: wooden boards d=24 mm, placed over rafters and roofing paper, battens 3/3 cm, and plastic coated galvanized steel metal sheet. The item includes installation of all necessary flashings and snow hurdles.						
	Calculation per m2 of actual inclined roof area.						

	Main school building	m2	1.500,00	x	24,81 €	=	**37207,50**
5.08.	Purchase of material and installation of suspended horizontal gutters, R=15 cm, made of ready made galvanized plastic-laminated steel metal sheets d=0,70 mm. This item includes all necessary connection elements, gutter hooks, at max. distance of 80 cm, with inclination of 0,5 % to the drain. Calculation is per m, all together.						
	Main school building	m2	183,00	x	14,97 €	=	**2738,60**
5.09.	Partial reconstruction of the roof cover in places where replacement of the roof substructure is not foreseen. Item includes removal and transportation of debris to a landfill as well as the purchase and installation of new galvanized and plastic coated metal sheet panels. Calcu						
	Calculation is per m2 of actual inclined roof area. Quantity of works is calculated as lump sum.						
	Main school building	m2	70,00	x	19,68 €	=	**1377,60**
	RECONSTRUCTION OF THE ROOF ABOVE MAIN SCHOOL BUILDING						**128492,26**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3,00	x	11,50 €	=	**34,50**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1,00	x	11,50 €	=	**11,50**
6.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece	pc	2,00	x	11,50 €	=	**23,00**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2,00	x	28,75 €	=	**57,50**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5,00	x	28,75 €	=	**143,75**

6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5,00	x	28,75 €	=	**143,75**
6.07.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						
	wall	m2	1,00	x	11,50 €	=	**11,50**
	floor	m2	1,00	x	11,50 €	=	**11,50**
	TOTAL FOR SPARE PARTS						**437,00**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

SUMMARY OF COSTS

I	THERMAL INSULATION OF FACADE WALLS	89078,34
II	REPLACEMENT OF FAÇADE JOINERY	102716,33
III	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	8326,20
IV	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	112595,56
V	RECONSTRUCTION OF THE ROOF ABOVE MAIN SCHOOL BUILDING	128492,26
VI	SPARE PARTS	437,00
	TOTAL PRICE, VAT EXCLUDED:	441645,69
	VAT (19%):	83912,68
	TOTAL PRICE, VAT INCLUDED:	**525558,37**

GROUP A5.4.2 *TABLE OF QUANTITIES of thermal-technical (heating) services for energy efficiency improvement in Primary School "Mustafa Pecanin" Rozaje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Mustafa Pecanin" Rozaje
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions. Manufacturer: Siemens or equivalent Type: "UH50 Ultraheat" Nominal flow: 25 m^3/h Connector: DN65	pc	1	x	1.658,30 €	=	1.658,30 €
2	Purchase, supply and installation of electronic flow gauge for light fuel oil. Manufacturer: Aqua metro or equivalent Type VZO 4 RE Nominal flow 50 l/h Minimum flow 1 l/h	pc	2	x	517,50 €	=	1.035,00 €
3	Purchase, supply and installation of control unit with M-Bus communication and display. Manufacturer: Siemens or equivalent Type: "Climatix POL638"	pc	1	x	2.472,50 €	=	2.472,50 €
4	Software development and staff training.	pc	1	x	690,00 €	=	690,00 €
	TOTAL A - Energy management						**5.855,80 €**

B - HEATING SYSTEM OPTIMISATION

B.I Installation of new equipment and repair of existing equipment

1	Flushing of the entire heating system in the school with the gym. Dismantling of all radiators (153 steel ribbed radiators with 10 to 38 ribs), flushing of the deposits from the bottom of radiators, cleaning air-release valves, remounting of radiators with installation of new radiator brackets.						
	Calculated as lump-sum.	pc	1	x	5.577,50 €	=	5.577,50 €
2	Purchase, delivery and installation of thermostatic radiator valves connection size 1/2" (angle or flat).						
		pc	155	x	13,94 €	=	2.160,39 €
3	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without need to remove the protective cap. Thermostat has the liquid sensor.						
	Setting range from 8 °C to 26 °C Closing time 24 min.	pc	155	x	15,67 €	=	2.429,55 €
4	Purchase, delivery and installation of the radiator angular valves, size 1/2"						
		pc	155	x	12,49 €	=	1.935,80 €
5	Purchase, delivery and installation of the circulation pump with electronic frequency-driven controller used to supply the radiator heating, with integrated cooler and ability to control pressure at the feeder, proportionally and constantly, having the following characteristics: Manufacturer: "Grundfos" or equivalent Type: Magna3 65-120 F Flow: 24,5 m^3/h Thrust: 6.0 m Type of connection: Flanged DN65 Power supply: V=1x230V~ Maximum current: I=0.18 - 3.38A Transferred power: P=16-769W Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material. The item includes dismounting of existing pumps, main and back-up, manufacturer WILO Germany, model type top - S100/10						
		pc	2	x	2.766,90 €	=	5.533,80 €

6	Repair of water softener manufactured by MIP TIMO Serbia, model MOV-2. Adding 25 kg of salt for softening into the softener, provision of same amount of salt reserves.						
		pc	1	x	287,50 €	=	287,50 €
7	Purchase of material and insulation of entire boiler room equipment, pipes, valves, feed and return pipes, as well as front and rear side of boilers using mineral wool, 50 mm thickness in AL sheet metal formwork thickness 0,5mm, with mounting material. Flammability fire resistance class A1 according to SIST EN 13501-1 and JUS U.J1.050. Item is calculated per m^2 of insulation measured on the external side of the pipe.						
		m^2	35	x	33,35 €	=	1.167,25 €
8	Purchase, delivery and installation of preinsulated seamless steel pipe, spirally welded (weld V=1, tested to 40 bars permanently with surges of 80 bar at 10 sec) material St 37.0 i.e. Č0361 in accordance with DIN 1626, dimensions and mass according to DIN 2458, pipe terminals ready for welding in accordance with DIN 2559. Thermal insulation made of polyurethane foam average density 80 kg/m3. Waterproofing made of corona charged high-density polyethylene. Fully in accordance with EN 253 for preinsulated pipes.						
	Ø114,3x3,6mm, external Ø 250mm						
	L=6m	pc	2	x	408,25 €	=	816,50 €
9	Purchase, delivery and fitting of steel preinsulated steel bend (non-segmented) made of seamless pipe material St 35.8, i.e. Č1212 in accordance with valid European standard EN 448, insulated with polyurethane foam in HDPE coating. Ø114,3x3,6mm, external Ø 250mm α=135°; R=1,5D						
		pc	2	x	109,25 €	=	218,50 €
10	Purchase, delivery and installation of HDPE connecting coupler for preinsulated pipes made of cross-link polyethylene, minimum length 700mm, with supporting equipment (strips, connectors, spacers, caps, HDPE foam), in accordance with EN489.						
	Ø114.3mm, external Ø 250mm						
		pc	2	x	48,30 €	=	96,60 €

11	Purchase, delivery and installation of sealant at penetrations through the wall to prevent water leakage at wall penetrations. It consists of special profiled neoprene rink in accordance with DIN 18337.						
	For pipe DN100:	pc	2	x	17,25 €	=	34,50 €
12	Purchase of material and installation of pipework made of steel seamless pipes, in accordance with JUS C.B5.221 or DIN 2448, (the item includes dismantling of existing pipes from the boiler room to the school, 6.7m long) dimensions:						
	Ø114,3x3,6	m	6	x	35,88 €	=	215,28 €
13	Purchase, delivery and fitting of air release vessel, with overflow pipe and tap DN 15, made of black seamless pipe DN150 length 250 mm, together with 3 m long pipe, diameter 3/8".						
		pcs	2	x	40,25 €	=	80,50 €
14	Purchase, delivery and installation valves for riser pipes with meter gauges in brass casing, pre-setting with digital reading (fitted on the feed pipe of the manifold), size and properties:						
	DN40 PN6 - Kvs 19.2	pc	1	x	89,70 €	=	89,70 €
	DN32 PN6 - Kvs 14.2	pc	1	x	78,20 €	=	78,20 €
	DN25 PN6 - Kvs 8.7	pc	4	x	54,05 €	=	216,20 €
	DN20 PN6 - Kvs 5.7	pc	2	x	43,70 €	=	87,40 €
15	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
a)	DN40, Kvm 12.8						

		pc	1	x	166,75 €	=	166,75 €
b)	DN32, Kvm 8.5						
		pc	1	x	149,50 €	=	149,50 €
a)	DN25, Kvm 5.5						
		pc	4	x	102,35 €	=	409,40 €
b)	DN20, Kvm 3.1						
		pc	2	x	79,35 €	=	158,70 €
16	Purchase, delivery and installation of radiator cap, dimensions 5/4" . Item includes dismantling of existing air-release valves on radiators at the ground floor and mezzanine.						
		pc	25	x	1,73 €	=	43,13 €
17	Reduction elements for connection of 5/4" to 1/2" pipe diameter.						
		pc	10	x	1,38 €	=	13,80 €
18	Purchase, delivery and installation of valve locks with automatic air-release valves connection size 1", maximum operating temperature 100°C, max operating pressure 10bar, max gas release pressure 6 bars, EPDM rubber tightness, with hygroscopic safety air vent cap and protective casing.						
		pc	10	x	19,55 €	=	195,50 €
19	Purchase, delivery and fitting of threaded ball valves (valves are fitted instead of existing stop valves, which need to be removed), connection size:						
	DN50 PN6						
		pc	4	x	40,25 €	=	161,00 €
	DN32 PN6						
		pc	6	x	25,30 €	=	151,80 €
20	Installation of steel cast ribbed radiators, total 2 radiators, from rib axial distance of outlets, h=500mm, depth d=160mm, ribs width s=60mm thermal effectiveness at 90/70°C water manifold 139.1W (item includes installation of new sets of radiator brackets with spacers, caps and reducing tees). Item calculated as per number of ribs.						
		pc	30	x	4,60 €	=	138,00 €
	TOTAL B.I - Installation of new equipment and repair of existing equipment						**22.612,74 €**
B.II	**Preliminary and finishing works**						
1	Preparation of the construction site for construction works on thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
		lump-sum	1	x	460,00 €	=	460,00 €

2	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency. Issuing of certificate for entire installed material and equipment.						
		lump-sum	1	x	460,00 €	=	460,00 €
3	Drilling holes in wall and slabs for fitting pipes DN100 from boiler room through the office above and in ancillary building. The item includes mending works at penetration points for bringing walls and ceilings in proper condition.						
		lump-sum	1	x	230,00 €	=	230,00 €
4	Cleaning of the existing burners (2pcs), chimneys (2pcs) and boilers (2pcs).						
		lump-sum	1	x	920,00 €	=	920,00 €
	TOTAL B.II - Preliminary and finishing works						**2.070,00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**5.855,80 €**
B	**HEATING SYSTEM OPTIMISATION**	**24.682,74 €**
B.I	Installation of new equipment and repair of existing equipment	22.612,74 €
B.II	Preliminary and finishing works	2.070,00 €
	TOTAL PRICE, VAT EXCLUDED	**30.538,54 €**
	VAT (19 %)	**5.802,32 €**
	TOTAL PRICE, VAT INCLUDED	**36.340,86 €**

GROUP A5.4.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Primary School "Mustafa Pećanin" in Rožaje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Mustafa Pecanin" Rozaje
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures above blackboards in classrooms and for light fixtures in toilets for handicapped persons. Connect cables for light fittings in classrooms to existing junction box in classrooms. Connect cables for light fittings in toilets for handicapped persons to junction box in adjacent toilet. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Control for light fixture above blackboard shall be done from existing control point. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	4,00				
	Works and material:	pc	28	x	15,18	=	425,04 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	6,00				
	Works and material:	pc	12,00	x	22,77	=	273,24 €
1.3.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	248	x	3,80	=	941,16 €

1.4.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	29	x	101,20	=	2.934,80 €
1.5.	Delivery and mounting of ceiling mounted luminaries 2/49W T16 F840 [STD] T16 x 2/49W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	114	x	145,48	=	16.584,15 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	27	x	173,31	=	4.679,24 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16, with IP50 protection, with electronic high frequency ballast, completely equipped with mounting gear and light sources. Works and material to be calculated per unit:	pc	25	x	113,85	=	2.846,25 €
1.8.	Delivery and mounting of ceiling mounted luminaries with electronic control gear 2/35 W, T16, IP50, completely equipped with mounting gear and light source. Works and material to be calculated per unit:	pc	31	x	154,33	=	4.784,23 €
1.9.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16, IP50, with electronic high frequency ballast, completely equipped with fluo tubes, and mounting gear. Works and material to be calculated per unit:	pc	2	x	88,55	=	177,10 €
1.10.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16, IP54, with opaline protector and electronic high frequency ballast, completely equipped with fluo tubes and mounting gear. Works and material to be calculated per unit:	pc	25	x	94,88	=	2.371,88 €

1.11.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L , IP50 with opaline protector and electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	7	x	103,73	=	726,11 €
1.12.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L, IP54 with opaline protector and electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	6	x	113,85	=	683,10 €
1.13.	Delivery and mounting of ceiling mounted luminaries with electronic control gear 2/35 W T16, IP65, completely equipped with mounting gear and light source. Works and material to be calculated per unit:	pc	16	x	111,32	=	1.781,12 €
1.14.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG, impact resistant for lighting source T16, surface mounted, direct distribution of light, certificate by DIN 18032. Works and material to be calculated per unit:	pc	10	x	290,95	=	2.909,50 €
1.15.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with 1lux. Works and material to be calculated per unit:	pc	3	x	226,4	=	679,31 €
1.16.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with 1lux. Works and material to be calculated per unit:	pc	21	x	232,8	=	4.887,96 €
	Total for lighting installation						**47.684,18 €**
2	**LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION**						
2.1.	Dismantling of existing lightning protection system.	lump sum	1	x	253,0	=	253,00 €
2.2.	Delivery and installation of lightning descending system and lightning reception system, made of round conductor which is made of Al/Mg with diameter of 8mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	920,00	x	2,53	=	2.327,60 €
2.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						

	Lightning conductor holder for roof installation:	pc	680,00	x	6,33	=	4.301,00 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	240,00	x	6,33	=	1.518,00 €
	Lightning conductor holder for wall installation:	pc	45,00	x	5,75	=	258,75 €
	Holders for vertical mechanical protection of lightning conductors:	pc	52,00	x	6,33	=	328,90 €
2.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	16,00	x	6,33	=	101,20 €
	linking clamp strip-wire	pc	26,00	x	6,33	=	164,45 €
	linking clamp wire-wire	pc	56,00	x	6,33	=	354,20 €
	groove clamp (for crossing over horizontal gutters)	pc	40,00	x	6,33	=	253,00 €
2.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	26,00	x	31,63	=	822,25 €
2.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	25,00	x	12,65	=	316,25 €
2.7.	Delivery and mounting of wet-preventing clamp. Works and material to be calculated per unit:	pc	26,00	x	12,65	=	328,90 €
2.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	lump sum	1,00	x	822,25	=	822,25 €
2.9.	Delivery and mounting of prefabricated tape junction elements for gutters with radius of 120mm according to JUS and IEC standards and technical report. Works and material to be calculated per unit:	pc	18,00	x	10,12	=	182,16 €
2.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	160,00	x	2,53	=	404,80 €
2.11.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	55,00	x	6,33	=	347,88 €
	Total for lighting, grounding installation and potential equalization installation						**13.084,59 €**

3	**SPARE PARTS**						
3,1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	7,1	=	14,17 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	5,9	=	11,89 €
	fluorescent light bulb T16 x 1/49W, 840	pc	2	x	5,9	=	11,89 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	5,9	=	11,89 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	5,8	=	11,64 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	5,7	=	11,39 €
	Total for spare parts:						**72,86 €**
4	**TESTING**						
4,1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	253,00 €	=	253,00 €
4,2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	379,50 €	=	379,50 €
	Total for testing:						**632,50 €**
5	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**379,50 €**	=	**379,50 €**

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	47.684,18 €
2	LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION	13.084,59 €
3	SPARE PARTS	72,86 €
4	TESTING	632,50 €
5	PREPARATION OF MAINTENANCE DESIGN	379,50 €
	TOTAL PRICE, VAT EXCLUDED	61.853,62 €
	VAT (19%)	11.752,19 €
	TOTAL PRICE, VAT INCLUDED	**73.605,81 €**

GROUP A5.4.4 **BILL OF QUANTITIES** *on Indoor Water Supply and Sewerage Services in Primary School "Mustafa Pećanin" in Rožaje*	*Client:*	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Primary School "Mustafa Pećanin", Rožaje
	Documentation:	Final Design of Interior Water Supply and Sewerage Services
	Date:	30 May 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1,01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	31,00	x	10,25 €	=	317,75
1,02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	20,00	x	10,25 €	=	205,00
1,03	Removal of existing toilet bowels with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	2,00	x	10,25 €	=	20,50
1,04	Removal of existing shower faucets, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	8,00	x	15,38 €	=	123,00
1,05	Removal of existing urinals, with siphon trap and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	10,00	x	10,25 €	=	102,50
1.06.	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	19,00	x	15,38 €	=	292,13
1.07.	Removal of existing water heating cylinders, and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	4,00	x	10,25 €	=	41,00

1.08.	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per m'	m'	134,24	x	7,18 €	=	963,17
	TOTAL REMOVAL WORKS						**2065,05**
II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
2,01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dø20mm(DN15)	piece	84,13	x	3,59 €	=	301,82
	dø25mm(DN20)	piece	56,31	x	4,61 €	=	259,73
2,02	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dø20mm(DN15)	piece	62,00	x	12,30 €	=	762,60
	dø25mm(DN20)	piece	11,00	x	14,35 €	=	157,85
2,03	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	33,00	x	12,30 €	=	405,90
2,04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						

	Calculation as per m of tested pipeline	m	140,44	x	2,05 €	=	287,90
2,05	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works shall be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	140,44	x	3,59 €	=	503,83
2,06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1,00	x	512,50 €	=	512,50
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**3192,13**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
	Toilets 1-11:						
3.01.	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1,00	x	512,50 €	=	512,50
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	19,00	x	30,75 €	=	584,25
	Toilet 12 (for disabled persons):						
3.03.	Breaking concrete slabs in a width of 50cm, excavation, removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance. Backfill the floor installations trench (width 50cm) and make concrete slabs. The unit price includes the full set of drilling the wall. Calculated per m	m	5,00	x	71,75 €	=	358,75
3.04.	Purchase and installation of PP sewage pipes for interior installations, together with all required sealing equipment for proper network operation. Pipe connecting shall performed by rubbers. Upon finished pipes assembling to rinse pipelines and performed distribution lines has to be waterproof tested. All chase cuttings and hole perforations within walls and structures, as well as bringing the walls back into original state shall be incalculated within the unit price. Calculation as per m' of installed pipes.						
	DN50mm	m	2,20	x	6,15 €	=	13,53
	DN110mm	m	3,80	x	9,02 €	=	34,28

3.05.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pieces	1,00	x	30,75 €	=	30,75
3.06.	Conducting water pressure test of all newly installed sewage pipes, as per appicable regulation (refer to chapter "Technical conditions for works execution" of this tender document). Pump the water into the respective foul drainage network. If the network is defective, all deficiencies must be repaired.						
	Calculation per m'.	m	6,00	x	153,75 €	=	922,50
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**2456,56**
IV	**SANITARY EQUIPMENT**						
4,01	Purchase and installation of toilet bowl completely made of ceramics, type "simplon", with plastic low mounted water tank, connection pipes, sealing and gaskets, including all other bits and pieces necessary for proper installation of the toilet bowl. Calculation as per piece.						
	Type: "Simplon"	piece	3,00	x	170,15 €	=	510,45
4.02.	Purchase and delivery of first class ceramic wall toilette urinal. The toilette urinal shall be fixed by means of rubber spacers, suitable wall plugs and brass screws. To install chrome plated stop valve and siphon trap. The siphon trap shall be ordered as per Employer / Employer's Representative decision. Calculation as per piece.						
	toilette urinal	piece	10,00	x	138,38 €	=	1383,75

4.03.	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network shall be connected by siphon trap of Ø100. Water tank shall be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette shall be ordered as per Employer / Employer's Representative decision.						
	Calculation as per piece.	piece	20,00	x	123,00 €	=	2460,00
4,05	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation.						
	Calculation as per piece.	piece	32,00	x	138,38 €	=	4428,00
4,06	Purchase and installation of vertical water heater cylinder of 80 l capacity, a wall mounting type, connectors and other accessories for proper operation.						
	Calculation as per piece.	piece	4,00	x	148,63 €	=	594,50
	TOTAL SANITARY EQUIPMENT						**9376,70**

SUMMARY OF COSTS

I	REMOVAL WORKS	2065,05
II	WATER-SUPPLY INDOOR INSTALLATIONS	3192,13
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	2456,56
IV	SANITARY EQUIPMENT	9376,70
	TOTAL PRICE, VAT EXCLUDED	17090,43
	VAT (19 %)	3247,18
	TOTAL PRICE, VAT INCLUDED	**20337,61**

GROUP A5.5.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Secondary School "Bećo Bašić" in Plav*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	Facility:	Secondary School "Bećo Bašić", Plav
	Documentation:	Final Architectural Design
	Date:	30 May 2013

Item	Description of the Item	Unit of measure	Quantity		Unit price (€)		Amount (€)
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Demolition of the RC facade bays (erker) up to the facade level, including appurtenant mortar layers, wood battens and ribbed metal sheet. The unit price includes all works and transportation of debris to the town landfill. Special attention shall be paid not to damage RC floor slabs.						
	Calculation per m2 of the roof base.	m2	50,00	x	18,66 €	=	**932,75**
1.02.	Dismantling of the existing PVC flashing sills off the windows. The unit price includes all works and transportation of debris to the town landfill.						
	Calculation per m.	m	80,10	x	1,03 €	=	**82,10**
1.03.	Repair of damaged parts of facade using repairing mortar, with previous chasing of damaged parts and base preparation.						
	Calculation per m2 of plastered item. The unit price includes usage of scaffold.	m2	40,00	x	10,05 €	=	**401,80**
1.04.	Repair of jamb damages 30 cm wide, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing ETICS façade. The unit price includes all works and materials.						
	Calculation per m2 of treated damaged area.	m	350,00	x	10,05 €	=	**3515,75**

1.05.	Clean the facade surface from dirt, moss and dust. Undertake the cleaning mechanically or chemically. During cleaning, be careful not to damage the surface. Surface strength and absorption shall be provided. Prior to this, dirty, wet and non-bearing surface shall be remedied. The interior mortar and coating shall set prior to commencing the works. Works to be conducted depending on the surface: *smooth surfaces furrowed, *bubbling brushed with dry brush, *wet surfaces dried and protected, *mildew and algae cleaned by using algae remover, *binding mortar cleaned and coated with flexible and cement free adhesive, *dusty surface brushed, cleaned under high pressure, washed with water and dried, *lime mortar removed and covered with equalization coating, *mortar remains mechanically removed, *joints between bricks filled with cement mortar, filled joints cleaned with foam, paint cleaned with water and dried. Calculation as per m2 of the cleaned surface. The unit price includes usage of scaffolding.						
	Calculation per m2	m2	2174,88	x	2,26 €	=	**4904,35**
1.06.	Setting up of "Demit" thermal facade. On the external side, thermal insulation of reinforced concrete (hereinafter RC) and brick facade walls will be made of expanded EPS polystyrene having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm, produced in line with the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate. Thermal panels with flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing) shall be used. The lower part of the facade walls reaching up to the height of h=1,6 m from ground floor will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with heat transfer coefficient of λ=0,035-0,04 W/mK. Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the openings. In zones above the opening, width of 50 cm, facade walls shall be insulated with HP mineral wool 10cm flammability class A1.						
	Thermal plates are lap-joint, attached to facade wall with corresponding enriched mineral adhesive, anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which consists of the following elements:						

	*first layer – enriched plaster based on cement binder, mineral aggregate and additives to improve elasticity and water repellence. Surface for this layer of mortar shall be flat and smooth. Any unevenness at joints of the installed polystyrene plates will be filled with polyurethane foam.						
	Reinforcing mesh with adequate overlapping and extra protection at the openings and corners is laid in a fresh layer of this mortar. In case of need for the additional mechanical anchoring, use impact bolt through the reinforcing mesh 24 hours after applying this layer.						
	* reinforcing mesh,						
	* second layer of mortar, apply same procedure as with the first layer. This mortar is laid to well-settled first layer and polished afterwards,						
	* contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar,						
	*top coat is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour selected by the Employer / Employer's Representative, while the entire procedure will be conducted in line with the design details.						
	Before setting up the thermal plates, the following works will be conducted:						
	* all works on the roofs, including the covering and sheet metal works,						
	* windows and doors replacement,						
	* plastering of inside wall and ceiling surfaces,						
	*concrete pavement,						
	*setting up of all installations on the façade,						
	*covering and protection of all non-treated surfaces – glass, wood, aluminium...						
	*removal of eight brick chimneys.						
	*control and testing of the existing facility surface:						
	Use of impregnation- basic coating at the most critical points of the facility. When the basic coating sets, place the EPS cube of 5x5x5 cm using polystyrene adhesive. Once the adhesive has completely settled, minimum 3 days if working conditions are adequate, try to separate the cube manually.						

	If in the process of separating polystyrene only the adhesive separates and not parts of the basis- the basis is sufficiently strong, solid and stable. If in the process of separating polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong. If in the process of separating polystyrene, part of the adhesive and cradling is separated - it means that the basis is not strong enough and it will withstand a new layer of thermal insulation.						
	Use the reinforcing mesh or corner profiles for the window corners and jambs. To complete the facade along the plinth, use reinforced layer or install U profile of the batten adjusted to thickness of a thermal plate.						
	At heights exceeding 8 meters, plates need additional anchoring with appropriate bolts.						
	During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortars must not be applied in case of strong wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Processing of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be aligned with the appropriate EN standards.						
	External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate. ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	EPS	m2	1653,35	x	19,99 €	=	**33046,33**
	XPS	m2	232,82	x	25,11 €	=	**5846,69**
	Pressed mineral wool	m2	127,00	x	23,06 €	=	**2928,94**

	NOTE: As the existing windows have been installed without considering a sufficient width of the window frame for receiving ETICS "Demit" thermal açade, proper solutions approved by Employer / Employer's Representative shall be found on the site on case to case basis during the construction period.					
1.07.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with equivalent or better technical characteristics, where the installation of thermal plates has not been planned (reinforced concrete brise-soleil, eaves, ceilings and similar).					
	The facade surface will be sound and dry. Surface will be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:					
	*contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the set reinforced mortar.					
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, in colour determined by the Employer / Employer's Representative, while the entire procedure will be conducted under the design details.					
	The openings shall be protected with PVC foil.					
	Use angle profiles to treat corners and window jambs.					
	The unit price includes purchasing, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.					
	Calculation is per m2 of the installed façade.	m2	60,00	x	12,10 €	= 725,70

1.08.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulie") as splash guard (as indicated on the drawings). Partial removal of the existing mortar plinth on the workshop (aprox. 10m2) that is peeling from the substructure shall be done. Surface shall be cleaned, washed and sprinkled with acrylic base with granulate. Render shall be applied on cleaned and dried surface by manufacturer's instruction. The color shall be determined by the Employer / Employer's Representative, according to the color chart of manufacturer. Size of the granulate grain-1.5mm.						
	Calculation per m2	m2	161,70	x	15,58 €	=	**2519,29**
1.09.	Purchase and installation of OSB boards, 10 mm thick. Boards are placed over substructure of the façade gable wall and circular pillars on the building's entrance, in accordance with the Design and enclosed drawing **detail no. 14**. The unit price includes all works and materials.						
	Calculation per m2.	m2	16,00	x	10,66 €	=	**170,56**
1.10.	Supply and installation of typical profiled flexible expansion joints in wall-wall contact. The joint width is 5 cm as per manufacturer's technology. Price to be calculated per m of installed expansion joint. The unit price includes all works and materials usage of the scaffolding, purchase and transport, everything in accordance to the enclosed drawing **detail no. 14** and description.						
	Calculation per m.	m	14,00	x	22,14 €	=	**309,96**
1.11.	Purchase and installation of steel box profiles 40x40x3 mm, as preparation of circular column. The works shall be executed in line with the Design and enclosed drawing **detail D5**. The unit price includes all works and materials according to description.						
	Calculation per m.	m	24,80	x	12,71 €	=	**315,21**
1.12.	Construction of the RC walls, d=20 cm, over the existing gable walls in the ground floor of the workshop. The RC walls shall be constructed in the required concrete form, in line with the structural analysis and enclosed Design details. The unit price includes preparation, construction, vibration and maintenance of the concrete MB 30 type. Concrete works to be done using smooth concrete form and scaffold as per structural analysis and enclosed Design details. The unit price also includes all tools, materials, maintenance etc. Works to be done in line with the general description for this kind of work.						
	Calculation per m3.	m3	1,00	x	230,63 €	=	**230,63**

1.13.	Purchase and installation of new, adapted, external shutters for fans of the kitchen / restaurant area, after installation of ETICS thermal façade. External shutters shall be of sturdy quality, sampled and approved by Employer / Employer's Representative.						
	Calculation as per piece.	pc	2,00	x	43,05 €	=	**86,10**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**56016,16**
II	**RECONSTRUCTION OF PITCHED ROOFS**						
2.01.	Removal of the existing layers of pitched roofs marked as **R1, R3, R4, up** to the existing wooden or concrete slab. This item includes removal of the following layers: ribbed metal sheet cover, roof paper, battens. The unit price includes all works and transportation of debris to a landfill. Special attention shall be paid not to damage RC floor/ceiling slabs.						
	Calculation per m2 of roof base.	m2	814,10	x	3,59 €	=	**2920,58**
2.02.	Removal of existing trapezoid metal sheet and flat metal sheet from the pitched roof marked as **R2** and from the gable wall. The unit price includes all works and transportation of debris to a landfill. Pay attention not to damage sub construction-transverse battens, which shall be kept.						
	Calculation per m2 of roof base.	m2	584,41	x	2,46 €	=	**1437,65**
2.03.	Removal of existing trapezoid metal sheet and flat metal sheet from the pitched roof marked as **R**. The unit price includes all works and transportation of debris to a landfill.						
	Calculation per m2 of roof base.	m2	584,41	x	2,46 €	=	**1437,65**
2.04.	Removal of existing roofs from the canopies marked as **T** together with trapezoid metal sheet and substructure. The unit price includes all works and transportation of debris to a landfill.						
	Calculation per m2 of roof base.	m2	45,50	x	3,08 €	=	**139,91**
2.05.	Purchase and covering the roofs **R2, R3, R4 and R5** with the roof polyurethane composite panels, d=10 cm thickness, heat transfer coefficient λmax=0,025 W/mK, of standard modular width 1000 mm. The unit price includes installation of substructure panels, made of cold profiled steel,with cross-section in the shape of the letter C, 60x30x3 mm, together with all related works and materials.						
	Calculation per m2 of roof base.	m2	807,31	x	69,29 €	=	**55938,51**

2.06.	Purchase and setting of the Al trapezoid metal sheet 40/230/0.7 mm over the existing sub construction of the roof **R1**, in line with the Design and enclosed drawing details. The unit price includes snow guards and all related works and material.						
	Calculation per m2 of roof base.	m2	584,41	x	28,50 €	=	**16652,76**
2.07.	Purchase of the waterproof membrane as final layer for covering the roof R1a in line with the Design and enclosed drawing detail D7. The unit price includes setting up thermal insulation with inclination of 10-12 cm as well as the PVC foil, placed between thermal insulation and concrete slab. Before installation, waterproof membrane shall be sampled and approved by Employer / Employer's Representative. The unit price also includes all works and materials as described.						
	Calculation per m2.	m2	87,00	x	54,94 €	=	**4779,78**
2.08.	Purchase and installation of the vapour barrier on the roof marked as **L**, on the floor slab of the attic, as defined in the Design, made of post bituminized aluminium foil lined with glass fibre fleece. The unit price includes all works and material as per description.						
	Calculation per m2.	m2	96,00	x	10,66 €	=	**1023,36**
2.09.	Purchase and installation of wooden rafters and strutted frame (post), made of 1st class dry fir timber, cross section of 10x14 cm, everything in line with the Design and enclosed drawing **detail 15.** The unit price includes all works and materials as per description.						
	Calculation per m2 of horizontal roof projection.	m2	95,50	x	16,61 €	=	**1585,78**
	TOTAL FOR RECONSTRUCTION OF PITCHED ROOF						**85915,98**
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of façade joinery and all its elements and mechanisms. Transportation to the town landfill or hand-over to the Employer / Employer's Representative (according to the agreement) for storing. Calculation as per piece of dismantled joinery.						
	windows						
	dim.245/75cm	pc	1,00	x	11,50 €	=	**11,50**
	dim.80/170cm	pc	1,00	x	11,50 €	=	**11,50**
	dim.130/135cm	pc	1,00	x	11,50 €	=	**11,50**
	basement window	pc	1,00	x	11,50 €	=	**11,50**
	glass panel with single-leaf door dim.260/270cm	pc	2,00	x	11,50 €	=	**23,00**

3.02.	Production and installation of the façade PVC joinery. The unit price includes everything from the description:						
	* production and assembling, * 6-chamber PVC profiles, adequate thickness (3,5 mm) reinforced on the inside with galvanized steel U profiles, no thermal bridge, * non-recycled PVC to be used, *heat transfer coefficient Umax = 1,5 W/m ˛K, * minimal required solar energy transmittance factor for glazed surfaces is g≤65% , * glass double-glazed 4+16+4 mm low emission with argon or some other inert gas between glass panes, * fittings: required set for hanging and closing, *opening - as shown in the annexed joinery schemes. * internal PVC sill (window bench) of required width, * profile colour: white.						
	Measures to be taken onsite. Calculation per piece of installed joinery fully in line with the description.						
A	Clear opening 245/75cm-window	pc	1,00	x	299,81 €	=	**299,81**
B	Clear opening 80/170cm-window	pc	1,00	x	185,15 €	=	**185,15**
C	Clear opening 130/135cm-window	pc	1,00	x	224,25 €	=	**224,25**
D	Clear opening 235/50cm-window	pc	1,00	x	201,25 €	=	**201,25**
3.03.	Production and installation of the aluminium windshield joinery. The unit price includes everything from the description: purchase of material, manufacturing, transport and installation of fittings and blind frame, together with aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break, - glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown in the annexed joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						

	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	- building A						
	Clear opening 260/330cm-window	pc	1,00	x	1.299,50 €	=	**1299,50**
3.04.	Production and installation of the façade aluminium joinery. The unit price includes everything from the description:						
	*production and assembling, *self-closing mechanism, *profiles - aluminium, with thermal break, *infill: double-glass panel 4+16+4 mm, with argon or some other inert gas between the panes, with one glass as low-emission, * heat transfer coefficient Umax = 2.8 W/m^{2}K, * solar energy transmittance factor g≤65%, * fittings: required set for hanging and closing, * knob - chrome plated - mate, * fit rubber door stoppers on the floor , * opening as shown in the annexed joinery schemes, *profile colour - natural aluminium.						
	Measures to be taken on site. Calculation is per piece of installed joinery, fully in line with the description.						
	Glass panel with single-leaf door						
	Clear opening 260/270cm	pc	2,00	x	1.236,25 €	=	**2472,50**
	NOTE: Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles. NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.						
	TOTAL FOR REPLACEMENT OF FACADE JOINERY						**4751,46**
IV	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
4.01.	Dismantling of the canopy made of steel box profiles 10 x 10 cm on the terraces. The unit price includes works and transportation of the debris to the town landfill.						
	Calculation as per lump sum.	pc	2,00	x	46,13 €	=	**92,25**

4.02.	Dismantling of metal plates, various signs, commercial signs, steel structures, metal stairs, spars, luminaries, cameras, mechanical elements and electrical installations, protective bars, aggregate, canopy above entrance of the technical room and all other equipment which is not included in the list and which is necessary to be dismantled from the facade due installation of the ETICS thermal facade and renovation of the roofs. Dismantled equipment shall be handed over to the Client for storing (with proper handing-over procedure). After completion of the works on installation of the ETICS thermal facade and renovation of the roof, all items shall be re-installed. The unit price includes work and materials, all necessary works for adjustment of these elements to the new conditions. Calculation is per lump sum.						
	Calculated as per lump sum	pc	1,00	x	358,75 €	=	**358,75**
4.03.	Dismantling and re-installing of the existing roof windows. The unit price includes works and material.						
	Calculated as per piece.	pc	8,00	x	15,00 €	=	**120,00**
4.04.	Dismantling of metal sheet flashings, drips, horizontal and vertical gutters. Flashings have different developed widths and they are made of galvanized, coloured sheet metal with double interlocking system, d=0,68 mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and debris transportation to the town landfill. Calculation as per m of dismantled flashing and its supporters.						
	-attic-wall flashing, **d.w.=65 cm.**	m	152,20	x	1,03 €	=	**156,01**
	-joints flashings between vertical walls and roofs covered with metal sheet, d.w.=65 cm.	m	206,27	x	1,03 €	=	**211,43**
	-horizontal gutters, developed width **d.w.=65cm.** **NOTE:** The unit price includes dismantling of the connections between horizontal and vertical gutters.	m	130,00	x	1,03 €	=	**133,25**
	-vertical gutters, **dim.12x12cm**	m	151,33	x	1,03 €	=	**155,11**
	-vertical gutters, **dim.8x8cm**	m	15,00	x	1,03 €	=	**15,38**
	-vertical gutters, **dim.Ø12cm**	m	10,00	x	1,03 €	=	**10,25**
	-vertical gutters, **dim.Ø10cm**	m	14,00	x	1,03 €	=	**14,35**

4.05.	Production and installation of the roof cornice flashings- attic, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealings. Works to be executed as per Design and enclosed drawing details D6 and D8. The unit price includes all works and material, fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. Developed width is up to d=0,80 m.						
	Calculation per m' of treated flashing including entire binding and joining material.	m	152,20	x	14,97 €	=	**2277,67**
4.06.	Production and installation of the roof eaves flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealings, as per Design and enclosed drawing details D6 and D8. The unit price includes all works and materials fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. Developed width is up to d=0,80 m.						
	Calculation is per m' of treated flashing and entire binding and joining material.	m	127,00	x	14,97 €	=	**1900,56**
4.07.	Production and installation of the roof ridges flashings, roof hip flashings and valley flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, together with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealings. The unit price includes all works and materials fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. Developed width is up to d=50 cm.						
	Calculation per m of treated flashing and entire binding and joining material.	m	80,60	x	14,97 €	=	**1206,18**

4.08.	Purchase and installation of OSB boards as roof eave flashing, 10 mm thick, beneath the metal sheet drips, as per enclosed drawing details **D6 and D8**. OSB panels shall be fixed to the roof wooden rafters.						
	Calculation per m2 of treated flashing, including entire binding and joining materials	m2	88,50	x	12,71 €	=	**1124,84**
4.09.	Production and installation of flashings at the connection point of vertical wall and pitched roof covered with made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealing, d.w.=40 cm. The unit price includes all works and materials fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative.						
	Calculation per m of treated drip and entire bonding and joining materials, as well as sealing with elastic joint filler.	m	245,00	x	14,97 €	=	**3666,43**
4.10.	Purchase and installation of drips, made of made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, d.w.= 30 cm. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative.						
	Calculation per m' of treated drip together with entire bonding,joining materials and sealing with elastic joint filler.	m	245,00	x	14,97 €	=	**3666,43**
4.11.	Installation of horizontal hanging gutters, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, d.w.= 70 cm. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. The item includes surface preparation and binding carried out in line with standards.						
	Calculation per m of installed gutters and entire binding and joining material.	m	121,00	x	14,97 €	=	**1810,77**

4.12.	Production and installation of vertical gutters, with square cross-section 120/120 mm and 100/100mm, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour to be selected by the Employer / Employer's Representative. Gutter pipes to be installed with all required anchors, holding clips and also bonding and joining material. Calculation per m of installed gutters, including top-gutter cisterns at the connection points of horizontal and vertical rain water pipes (bonding and joining materials shall be included too). Calculation per m of installed gutters and entire binding and joining material.	m	218,27	x	14,97 €	=	**3266,41**
4.13.	Production and installation of flashing sills made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative, developed width 60 cm. Calculation per m of installed flashing sill.	m	220,00	x	14,97 €	=	**3292,30**
4.14.	Production and installation of the canopy made of steel box profiles dimensions 12x12 on the terraces. The unit price includes all necessary work, material, protection and painting. Calculated as per piece.	pc	2,00	x	435,63	=	**871,25**
4.15.	Installation of the sloped 2% concrete pavement in the area of the basement window. The unit price includes following works: -gravel filling 8-12cm thick, -lean concrete 2% slope, 8cm thick, -installation of waterproofing layer in the window / pavement connection area. Calculated per m2	m2	3,80	x	22,55	=	**85,69**
4.16.	Partial repair of the external concrete pavement around school building. Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. Pavement has to be strained into the fields cca. 1,5m2. Expansion joints shall be filled up with joint filler. The unit price includes all works and materials and demolition of old concrete slabs, transportation to a landfill up to 5 km distance and finishing works. Calculation per m2.	m2	100,00	x	15,79 €	=	**1578,50**

4.17.	Removal of brick chimneys on the roof and the attic of the building up to the roof slab level. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance. Preparing of surfaces for installation of ETICS thermal facade and construction of the new roof. Special attention shall be paid not to damage the RC slab and walls.						
	Calculation as per piece.	pc	8,00	x	87,13 €	=	**697,00**
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						**26710,78**
V	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
5.01.	Removal of existing ceramic floor tiles with screed, up to structure in sanitary facilities. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance.						
	Calculation per m2 of the floor area.	m2	28,73	x	4,92 €	=	**141,35**
5.02.	Removal of the existing ceramic wall tiles with undercoat layer up to the wall in sanitary facilities. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of the floor area.	m2	105,75	x	4,92 €	=	**520,29**
5.03.	Scraping of the old paint from the ceilings in sanitary facilities on the ground floor. Removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2 of the scraped painted area.	m2	33,22	x	1,23 €	=	**40,86**
5.04.	Scraping of oil-based paint off the walls in sanitary facilities (technique "spanski" zid), removal and loading of the debris onto a truck and its transportation to a landfill up to 5 km distance. This item include all pre-work for installation of wall ceramic tiles, and usage of scaffold.						
	Calculation per m2 of scraped painted area.	m2	110,00	x	1,85 €	=	**202,95**
5.05.	Dismantling of the internal, single wing, double layer plywood door. The unit price includes transportation to a landfill up to 5 km distance. Undamaged door shall be registered and given to the Employer / Employer's Representative. Calculation per piece.						
	- dim. 70/205cm	pc	5,00	x	10,25 €	=	**51,25**
	- dim. 80/205cm	pc	4,00	x	10,25 €	=	**41,00**
	- dim. 140/205cm	pc	1,00	x	10,25 €	=	**10,25**

5.06.	Production and installation of internal joinery. The unit price includes everything from the description:						
	Purchase of material and mounting of indoor joinery, produced of hard and high resistant PVC profiles, reinforced by zinc plated steel „U" profiles, strictly according to joinery schemes and details, including high quality of accessories, hinges, opening / closing handles etc. PVC panels shall be used for doors. This item implicates all needed cleanings and transportation of waste materials to the waste depot, as well as all necessary works for joinery mounting (proper fitting, needed wall chase cutting, plastering, painting and use of jamb sills). Calculation is per completely finished item. The profiles are white. Prior to manufacture of joinery , the Contractor is obliged to take „on site" measures.						
	1- dim. 140/205cm	pc	1,00	x	538,13 €	=	**538,13**
	2- dim. 80/205cm	pc	4,00	x	395,65 €	=	**1582,60**
	3- dim. 70/205cm	pc	5,00	x	362,85 €	=	**1814,25**
5.06.	Making of the scrimmed cement screed for a sloping layer in the toilets. The unit price includes installation of the mesh (1kg/m2) with and overlap 5cm (1,08 m2/m2). Floated coat is used as finishing layer. Screed thickness is d = 4 cm.						
	Calculation per m2 of the treated surface, including all work and material.	m2	28,73	x	10,05 €	=	**288,59**
5.07.	Setting up of horizontal waterproofing in the toilets, on ground floor, in the following layers (from the bottom up):						
	- bitulith + polyasbestos + glass mesh,						
	- polyasbestos + glass mesh,						
	- polyasbestos, Put the waterproofing at least 10 cm up the wall. Calculation is based on a m2 of the basis (section pulled up the walls is included in the unit price). The unit price includes all works and materials, in line with the description, including the cleaning and surface preparation for a quality installation of a new waterproofing.						
	NOTE: Entire waterproofing overlapping and putting the waterproofing up the walls to be included in the price of works.	m2	28,73	x	19,99 €	=	**574,24**
5.08.	Plastering of internal toilet walls with cement mortar 1:3 in two layers with the previous spraying of cement slurry to prepare the wall for ceramic tiles. The unit price includes all necessary works, materials with battens, transportation and scaffolding.						
	Calculation is based on a m2 of the plastered wall, without the openings.	m2	105,75	x	8,00 €	=	**845,47**

5.09.	Tiling the toilet walls with the class I ceramic tiles, while the size and color and tone of the tiles will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in layer of adhesive, placing them in joint bonding manner, by pointing the joints using pointing plaster.						
	Ceramic tiles to be placed up to the height of 190 cm.						
	Coating of the jambs and niches is included in the item price and it won't be calculated separately.						
	Calculation per m2 of the treated surface.	m2	105,75	x	23,06 €	=	**2438,86**
5.10.	Tiling floor in the toilet with the class I anti-slip tiles. The size, colour and tone of the tiles will be will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in the waterproof adhesive layer in joint bonding manner, by using pointing plaster.						
	In the toilets where there is a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2 of the treated surface.	m2	28,73	x	23,06 €	=	**662,59**
5.11.	Polishing and painting of the internal walls in toilet. The Employer / Employer's Representative will select the tone of semi dispersed distemper. Repeat the polishing until a completely flat surface is achieved, and apply layers of paint until reaching an even tone. This item includes scraping, plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done twice.						
	Calculation per m2, including all material, work and required scaffolding.	m2	110,00	x	4,00 €	=	**439,73**
5.12.	Polishing and painting of the ceilings in sanitary facilities. The tone of semi dispersed distemper will be selected by the Employer / Employer's Representative. This item includes scraping, plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer.						
	Calculation as per m2, including all material, work and required scaffolding.	m2	33,22	x	4,00 €	=	**132,80**

5.13.	Works on the sanation of the moisture from the toilet which is visible on the façade wall. Works include breaking and removal of the existing wall tiles in order to reach water tube and determine the position of crack which makes leakages and all necessary works for bringing wall in the previous condition.The unit price includes all necessary works to perform these leakage repair in the full professional manner.						
	Calculation as per lump sum	lump sum	1,00	x	189,63 €	=	**189,63**
5.14.	Painting the walls with oil-based paint in the areas of the radiators which will be replaced. Unit price shall include loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation as per m2	m2	15,00	x	3,33 €	=	**49,97**
5.15.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers and painting of hydrant and switch boxes in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculated per lump sum.	lump sum	1,00	x	189,63 €	=	**189,63**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**10754,42**
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3,00	x	11,50 €	=	**34,50**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1,00	x	11,50 €	=	**11,50**
6.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece	pc	2,00	x	11,50 €	=	**23,00**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2,00	x	28,75 €	=	**57,50**
6.05.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						

	wall	m^2	1,00	x	11,50 €	=	**11,50**
	floor	m^2	1,00	x	11,50 €	=	**11,50**
	TOTAL FOR SPARE PARTS						**149,50**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

SUMMARY OF COSTS

I	THERMAL INSULATION OF FACADE WALLS	56016,16
II	RECONSTRUCTION OF PITCHED ROOF	85915,98
III	REPLACEMENT OF FAÇADE JOINERY	4751,46
IV	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	26710,78
V	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	10754,42
VI	SPARE PARTS	149,50
	TOTAL PRICE, VAT EXCLUDED:	184298,29
	VAT (19 %):	35016,68
	TOTAL PRICE, VAT INCLUDED:	**219314,97**

GROUP A5.5.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Secondary School "Beco Basic" in Plav*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Beco Basic" Plav
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions. Manufacturer: "Siemens" or equivalent Type: "UH50 Ultraheat" Nominal flow: 15 m^3/h Connection size DN50	pc	1	x	1.319,05 €	=	1.319,05 €
2	Purchase, supply and installation of electronic flow gauge for light fuel oil. Manufacturer: "Aqua metro" or equivalent Type: "VZO 4 RE" Nominal flow: 50 l/h Minimum flow: 1 l/h	pc	2	x	511,75 €	=	1.023,50 €
3	Purchase, supply and installation of control unit with M-Bus communication and display. Manufacturer: "Siemens" or equivalent Type: "Climatix POL638"	pc	1	x	2.472,50 €	=	2.472,50 €
4	Software development and staff training.	pc	1	x	690,00 €	=	690,00 €
	TOTAL A - Energy management						**5.505,05 €**

B - INSTALLATION OF NEW HEATING EQUIPMENT

1	Purchase, delivery and fitting of cast steel ribbed radiators, total 13 units, axial connection distance h=500mm, depth d=110mm, rib width s=60mm thermal effectiveness at branching 90/70°C 99W (the item includes fitting of new sets for brackets mounting with spacers). Item as per number of ribs.	pc	188	x	11,33 €	=	2.129,57 €
2	Purchase, delivery and fitting of cast steel ribbed radiators, total 5 units, axial connection distance h=500mm, depth d=160mm, rib width s=60mm thermal effectiveness at branching 90/70°C 139.1W (the item includes fitting of new sets for brackets mounting with spacers). Item as per number of ribs.	pc	80	x	13,23 €	=	1.058,00 €
3	Purchase, delivery and fitting of cast steel ribbed radiators, total 2 units, axial connection distance h=800mm, depth d=160mm, rib width s=60mm thermal effectiveness at branching 90/70°C 191.9W (the item includes fitting of new sets for brackets mounting with spacers). Item as per number of ribs.	pc	36	x	19,90 €	=	716,22 €
4	Purchase, delivery and installation of thermostatic radiator valve 1/2" (angle and flat).	pc	20	x	13,94 €	=	278,76 €
5	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many users, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without having to remove protective cap. The thermostat has liquid sensor. Temperature range from 8 °C to 26 °C Closing time 24 min.	pc	20	x	15,67 €	=	313,49 €
6	Purchase, delivery and installation of radiator angle bolts, connection size 1/2"	pc	20	x	12,49 €	=	249,78 €
7	Purchase, delivery and assemblage of air-release vessels complete with overflow pipe DN 15, made of black seamless pipe DN100 length 200 mm.	pc	2	x	32,20 €	=	64,40 €

8	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.	pc	4	x	4,83 €	=	19,32 €
9	Purchase, delivery and fitting of radiator cap, size 5/4" .	pc	32	x	1,38 €	=	44,16 €
10	Purchase, delivery and fitting of connection elements for reduction from 5/4" to 1/2" pipe diameter .	pc	10	x	1,38 €	=	13,80 €
11	Purchase, delivery and fitting of manual air release whisker for radiator, size 1/2".	pc	6	x	1,73 €	=	10,35 €
12	Purchase of material and installation of pipeline made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø33,7x2,6	m	90	x	8,34 €	=	750,38 €
	Ø26,9x2,3	m	130	x	7,06 €	=	917,93 €
	Ø21,3x2,0	m	280	x	6,44 €	=	1.803,20 €
	Ø17,2x1,8	m	40	x	5,52 €	=	220,80 €
13	Joining, tightening material and brackets, elbows, branches and such are calculated as 50% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 50% of the previous item.		0,5	x	3.692,31 €	=	1.846,15 €
14	Purchase, delivery and installation of oblique flow control valves, for flow reduction, threaded, dimensions and properties:						
	DN25 PN6	pc	2	x	20,70 €	=	41,40 €
15	Purchase, delivery and installation of threaded ball valves, connection size:						
	DN25 PN6	pc	2	x	13,23 €	=	26,45 €
16	Purchase of material and fitting of pipe insulation consisting of plate prefabricated insulation on the base of expanded rubber with closed cell structure. Insulation to be 25 mm thick for temperatures up to 105°C, for insulation of part of the pipeline to be added in the boiler room. Calculated as per m^2 of insulation measured from the external side of the pipe.						

		m^2	3	x	23,00 €	=	69,00 €
17	Preparation of the construction site for execution of works on heating and cooling installations. On-site state analysis. Erection of containers. Transportation of man power, goods and material.						
		lump sum	1	x	460,00 €	=	460,00 €
18	Putting into operation and trial testing of the entire heating system, as well as testing of proper operating of all fitted radiator valves. Balancing and setting heating system network.						
		lump sum	1	x	460,00 €	=	460,00 €
19	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operating newly installed equipment and introduction with drill for hazardous and emergency situations. Issuance of certificates for entire installed material and equipment. Preparation of as-built design.						
		lump sum	1	x	460,00 €	=	460,00 €
20	Drilling holes in walls for installations of the new heating system. The item includes mending works at penetration points for bringing walls and ceilings in proper condition.(10 penetration points on the walls and 4 on the ceilings)						
		lump sum	1	x	575,00 €	=	575,00 €
21	Cleaning of the existing burners (2pcs), chimneys (2pcs) and boilers (2pcs).						
		lump-sum	1	x	920,00 €	=	920,00 €
	TOTAL B - Installation of new heating equipment						**13.448,16 €**

SUMMARY OF COSTS:

A	ENERGY MANAGEMENT	5.505,05 €
B	INSTALLATION OF NEW HEATING EQUIPMENT	13.448,16 €
	TOTAL PRICE, VAT EXCLUDED	18.953,21 €
	VAT (19 %)	3.601,11 €
	TOTAL PRICE, VAT INCLUDED	22.554,32 €

GROUP A5.5.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Secondary School "Beco Basic" in Plav*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Beco Basic" Plav
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION**						
1.1.	Dismantling of existing lightning protection system.	lump sum	1	x	230,0	=	230,00 €
1.2.	Delivery and installation of lightning descending system and lightning reception system, made of round conductor which is made of Al/Mg with diameter of 8mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	680,00	x	2,30	=	1.564,00 €
1.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	475,00	x	5,75	=	2.731,25 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	150,00	x	5,75	=	862,50 €
	Lightning conductor holder for wall installation:	pc	38,00	x	5,75	=	218,50 €
	Holders for vertical mechanical protection of lightning conductors:	pc	30,00	x	5,75	=	172,50 €
1.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	15,00	x	5,75	=	86,25 €
	linking clamp strip-wire	pc	15,00	x	5,75	=	86,25 €
	linking clamp wire-wire	pc	56,00	x	5,75	=	322,00 €
	groove clamp (for crossing over horizontal gutters)	pc	29,00	x	5,75	=	166,75 €
1.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	15,00	x	28,75	=	431,25 €
1.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	19,00	x	11,50	=	218,50 €
1.7.	Delivery and mounting of wet-preventing clamp. Works and material to be calculated per unit:	pc	15,00	x	11,50	=	172,50 €

1.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	lump sum	1,00	x	747,50	=	747,50 €
1.9.	Delivery and mounting of prefabricated tape junction elements for gutters with radius of 120mm according to JUS and IEC standards and technical report. Works and material to be calculated per unit:	pc	17,00	x	9,20	=	156,40 €
1.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	160,00	x	2,30	=	368,00 €
1.11.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	70,00	x	5,75	=	402,50 €
	Total for lighting, grounding installation and potential equalization installation						**8.936,65 €**
2	**TESTING**						
2,1	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1,00	x	345,00 €	=	345,00 €
	Total for testing:						**345,00 €**
3	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1,00	x	**115,00 €**	=	**115,00 €**

SUMMARY OF COSTS:

1	LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION	8.936,65 €
2	TESTING	345,00 €
3	PREPARATION OF MAINTENANCE DESIGN	115,00 €
	TOTAL PRICE, VAT EXCLUDED	9.396,65 €
	VAT (19%)	1.785,36 €
	TOTAL PRICE, VAT INCLUDED	**11.182,01 €**

GROUP A5.5.4 **BILL OF QUANTITIES** *on Indoor Water Supply and Sewerage Services in Secondary School "Bećo Bašić" in Plav*	*Client:*	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Secondary School "Bećo Bašić", Plav
	Documentation:	Final Design of Interior Water Supply and Sewerage Services
	Date:	May, 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1,01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	4,00	x	10,25 €	=	41,00
1,02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	5,00	x	10,25 €	=	51,25
1,03	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per m'	m'	23,88	x	7,18 €	=	171,34
1.04.	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2,00	x	15,38 €	=	30,75
	TOTAL REMOVAL WORKS						**294,34**

II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
2,01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dØ20mm(DN15)	piece	9,59	x	3,59 €	=	34,40
	dØ25mm(DN20)	piece	14,29	x	4,61 €	=	65,91
2,02	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dØ20mm(DN15)	piece	5,00	x	12,30 €	=	61,50
	dØ25mm(DN20)	piece	4,00	x	14,35 €	=	57,40
2,03	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	5,00	x	12,30 €	=	61,50
2,04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	23,88	x	2,05 €	=	48,95
2,05	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the price. Disinfection works shall be done by certified organization.						

	Calculation as per m of disinfected pipeline	m	23,88	x	3,59 €	=	85,67
2,06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1,00	x	256,25 €	=	256,25
2,07	Repair of failure on water-supply installations on the first floor, which causes external damages on the façade.	lump sum	1,00	x	666,25 €	=	666,25
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**1337,84**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
3,01	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1,00	x	512,50 €	=	512,50
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	2,00	x	30,75 €	=	61,50
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**574,00**
IV	**SANITARY EQUIPMENT**						
4,01	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network shall be connected by siphon trap of Ø100. Water tank shall be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette shall be ordered as per Employer / Employer's Representative decision.						
	Calculation as per piece.	piece	5,00	x	123,00 €	=	615,00
4,02	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation. Calculation as per piece.						
		piece	6,00	x	138,38 €	=	830,25

4,03	Purchase and delivery of first class ceramic wall toilette urinal. The toilette urinal shall be fixed by means of rubber spacers, suitable wall plugs and brass screws. To install chrome plated stop valve and siphon trap. The siphon trap shall be ordered as per Employer / Employer's Representative decision. Calculation as per piece.						
	toilette urinal	piece	1,00	x	138,38 €	=	138,38
	TOTAL SANITARY EQUIPMENT						**1583,63**

SUMMARY OF COSTS

I	REMOVAL WORKS	294,34
II	WATER-SUPPLY INDOOR INSTALLATIONS	1337,84
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	574,00
IV	SANITARY EQUIPMENT	1583,63
	TOTAL PRICE, VAT EXCLUDED	3789,80
	VAT (19 %)	720,06
	TOTAL PRICE, VAT INCLUDED	**4509,87**

2.2 Price Schedule - Grand Summary

No.	Description	Total Price per Building [EUR]
	Educational Building 1	
A.5.1	"Secondary Vocational School", Pljevlja	1.107.303,85
	Educational Building 2	
A.5.2	Primary School "Ristan Pavlović", Pljevlja	608.831,06
	Educational Building 3	
A.5.3	Secondary School "Miloje Dobrašinović", Bijelo polje	582.503,40
A.5.4	**Educational Building 4**	
	Primary School "Mustafa Pećanin", Rožaje	655.842,65
A.5.5	**Educational Building 5**	
	Secondary School "Bećo Bašić", Plav	257.561,17
	Grand Total for All Schools (Total Contract Price)	**3.212.042,13**

2.3 Price Schedule - Group Prices

No.	Description	Total Price per Works [EUR]
A.5.1	**Educational Building 1: "Secondary Vocational School", Pljevlja**	**1.107.303,85**
A.5.1.1	Building and trade works	732.785,07
A.5.1.2	Thermo-technical (heating) services	247.861,89
A.5.1.3	Electrical services	110.774,05
A.5.1.4	Sanitary (Water Supply and Sewage) services	15.882,84
A.5.2	**Educational Building 2: Primary School "Ristan Pavlović", Pljevlja**	**608.831,06**
A.5.2.1	Building and trade works	329.613,03
A.5.2.2	Thermo-technical (heating) services	212.220,94
A.5.2.3	Electrical services	66.997,09
A.5.3	**Educational Building 3: Secondary School "Miloje Dobrašinović", Bijelo polje**	**582.503,40**
A.5.3.1	Building and trade works	436.258,05
A.5.3.2	Thermo-technical (heating) services	70.902,86
A.5.3.3	Electrical services	70.295,63
A.5.3.4	Sanitary (Water Supply and Sewage) services	5.046,87
A.5.4	**Educational Building 4: Primary School "Mustafa Pećanin", Rožaje**	**655.842,65**
A.5.3.1	Building and trade works	525.558,37
A.5.3.2	Thermo-technical (heating) services	36.340,86
A.5.3.3	Electrical services	73.605,81
A.5.3.4	Sanitary (Water Supply and Sewage) services	20.337,61
A.5.5	**Educational Building 5:Secondary School "Beco Bašić", Plav**	**257.561,17**
A.5.4.1	Building and trade works	219.314,97
A.5.4.2	Thermo-technical (heating) services	22.554,32
A.5.4.3	Electrical services	11.182,01
A.5.4.4	Sanitary (Water Supply and Sewage) services	4.509,87

2.4 Options

No.	Description	Unit	Qty	Total Cost [EUR]
		1	2	3=1 x 2
	Total Alternative Items			

2.4 Options

No.	Description	Unit	Qty	Total Cost [EUR]
		1	2	3=1 x 2
	Total Alternative Items			

2.5 Price Schedule - Extra Works

No.	Description	Unit	Quantity	Rate [EUR]
			1	2
I	**Labor**			
1.	**Supervisor unit rates**			
1.01	Leading Contractor Engineer	hour	1	6,5
1.02	Site engineer (architectural works, civil works, thermal-technical (heating), electrical, water supply and sewage services)	hour	1	4,5
1.03	Design engineer	hour	1	4,5
1.04	Foreman	hour	1	6,7
2.	**Labor unit rates**			
2.01	Unskilled laborer	hour	1	
2.02	Sheet metal worker	hour	1	3,8
2.03	Bricklaying worker	hour	1	3,5
2.04	Bar bender	hour	1	4
2.05	Plastering worker	hour	1	4,2
2.06	Waterproofing worker	hour	1	3,8
2.07	Carpenter	hour	1	4
2.08	Ironmongery worker	hour	1	4,2
2.09	Joinery assembler	hour	1	3,8
2.10	Floor (parquet) worker	hour	1	4
2.11	Ceramic worker	hour	1	3,8
2.12	Painter	hour	1	3
2.13	Electrician	hour	1	4
2.14	Heating services assembler	hour	1	4,5
2.15	Plumber	hour	1	4,2

II Material

The Bidder shall state the percentage on cost which would be added to the net cost of any sub-contracted extra supply or works not covered by the Contract/unit rates.
This percentage must include handling charges and all other costs involved in providing extra equipment or work at site in accordance with the General Conditions of Contract and the requirements of the Technical Requirements

5%

III Plant and equipment

The Bidder shall add to the list all other items of plant which he expects to have on site

C1. Minutes of the pre-bid meeting

EEPPB:Tender for Cluster III and IV
Minutes of the Pre-Bid meeting

Country:	**Montenegro**
Employer:	**Ministry of Economy**
Project Name:	**Energy Efficiency Program in Public Buildings**
Closing Date:	**01/09/2014**
Ref. No.:	**BMZ Nr. 202080554**
Funding Source:	**German Financial Cooperation Funds via KfW-Development Bank**
Date:	**Thursday, 10/07/2014.**
Place:	**Ministry of Economy, Podgorica, Montenegro**

Present:

Ministry of Economy:
Dragica Sekulić
Sandra Šipčić
Toma Siništaj

Program Consultant:
Udo Becker
Viktor Marković
NebojšaŽižić
Igor Strugar
Slobodan Marković

Bidders:
JV Bitemo MNG Podgorica
JV Roaming Nikšić
JV Fidija, Podgorica
JV Kroling, Podgorica,
JV Normal, Podgorica

Recipients: present at the meeting

Item	Subject	Responsible/ Remarks
1.	**Brief presentation of the project**	D. Sekulić
	The Bidders have been briefly informed about the tender documents, bidding procedures and the deadline.	
	The requests for clarification of the tender documents shall be submitted to the Client before 08/08/2014, answers will be provided by 15/08/2014.	
2.	**Questions of the Bidders - General**	
	Question 1: When will be the start of the works?	Bitermo
	Answer 1: The time schedule shall be prepared with the starting date of 1st April 2015, both for cluster III and IV.	

	Q2: Please clarify the meaning of "handing over",clause 1.1.3/A1-Instructions to Bidders?	Bitermo
	A 2:A1 Instructions to Bidders/1.1.3*: If the necessity is given, parts of the above works, might be handed over separately, on a school for school bases...* –meaning that if the works on one school are finished before the deadline or before finishing of the works on other schools from the same cluster, the handing over of the works can be organized separately.	
	Q 3: Is it possible to visit one of the schools which is reconstructed within the same project?	Bitermo
	A 3: The visit to the school "Njegos" Spuz will be organized for all interested Bidders after the pre-bid meeting.	
	Q 4: In the BoQ it was mentioned that the colours shall be chosen by the Client, please clarify.	Bitermo
	A 4: Colours of the finishing layer for external walls and of the painting for internal walls and visible pipes will be chosen from the standard catalogue of colours, provided by the Contractor at the site, before the start of the certain phase of works.	
	Q 5: In the BoQ some works are described as a percentage (for example 20% of the roof tiles to be replaced etc.). Who will define exact amount of the works to be done and how?	Bitermo
	A 5: When certain works are foreseen to be done partially, the Employer´s Representative will determine exact quantity and location of works at the site.	
	Q 6: If in the school "Vuko Jovović" in Danilovgrad, it is foreseen to reconstruct electrical installation (power), why the reconstruction of telecommunication installation, fire detection, public address and other similar systems is not included?	Bitermo
	A 6: Funds from this program are supposed to be used only for application of EE measures, besides that certain part of the funds can be used for comfort measures. In some schools it was necessary to perform certain works such as reconstruction of the roof construction, replacement of electrical installations and similar issues, in order to enable the application of EE measures. There are not sufficient funds available to finance any other sort of works.	
	Q 7: Are reports on periodical testing of electrical installations available for all schools? Has the quality of the existing grounding conductors been checked prior preparation of the designs?	Bitermo
	A 7: The reports on testing of electrical installations in all buildings of Clusters III and IV will be submitted to the Contractor at the kick-off meeting.	
	Q 8: Drawings for sewage and water installations are missing for the schools "Vuko Jovović" Danilovgard and "Branko Božović" Podgorica.	Bitermo
	A8: Please refer to the Technical descriptions of works A4/ pg A4-18 and A 4-52: *Since the exact position of sewerage installation is not known, nor it's condition in the walls and beneath the floors and the As-built. Design does not exist, drawings of the new sewerage installation have not been prepared. The contractor shall*	

	provide the routes and drawings of new sewerage installation, after revealing existing installation in walls and floors of the sanitary facilities planned for reconstruction. Before the commencement of the works, the Contractor will submit the necessary drawings to the Employer / Employer's Representative for approval. The Estimated Bill of Quantities was prepared on the basis of previous experience and similar scope of reconstruction works of sanitary rooms in other schools within this project.	
	Q 9: Is it possible to receive drawings in dwg format?	Roaming
	A 9: All drawings in dwg form attached to this document in Annex 2.	
	Q 10: Who is responsible for the removal of the furniture in the school before commencement of the works?	Bitermo
	A 10: School authorities will have to remove all furniture and the school equipment.	
	Q 11: Are the tender documents available in native form?	Fidija
	A 11: Only BoQ and forms; forms are enclosed in Annex 3 of this document. The BoQ in native form was provided with the tender documents.	
	Q 12: The native form of BoQ which is enclosed to the tender documents is protected**.**	Normal
	A 12: Only text and quantities are protected.	
	Q 13: Since all works which are offered have to be described in the *Conformity of the site* in details, is the Bidder allowed to change the description in the Bill of quantities?	Kroling
	A 13: The offered price shall be based on the BoQ provided in the section A5 Price schedule. The descriptions from the BoQ must not be changed. As a part of the technical offer, the Bidder has to provide in the section "Conformity of the Site"a detailed description of the equipment and components, with its technical characteristics and a detailed description on how the Bidder intends to organize the execution of the works on the site. Please see A1 Instructions to Bidders/3/3.2/3.2.1.1/15/Pg A1-12 as well.	

Annex 1 – attendance lists
Annex 2- drawings in dwg form (CD)
Annex 3- forms A 1-1 to A1-8

Annex 1

Country:	Montenegro
Employer:	Ministry of Economy
Project Name:	Energy Efficiency Program in Public Buildings, Cluster III
Invitation for bids announced:	13/06/2014
Submission of the bids:	01/09/2014 until 12:00
Ref. No.:	BMZ Nr. 202080554
Funding Source:	German Financial Cooperation Funds via KfW-Development Bank

MNE EEPPB Tender for Cluster III and IV, Pre – bid meeting

Attendance List

No.	Company	Name of the representative	Signature	Telephone number
1	BITERMO MNG Podgorica	SILVANA VOVK		00386 41 259 714
2	BITERMO MNG	ALEKSIĆ MIRKO		067/604-341
3	BITERMO MNG	VALTER FURHANIĆ		067 263 869
4	BITERMO MNG	PETER FILIPIČ		00386 51 623 760
5	BITERMO MNG	ANDREJ FILIPIČ		00386 41 687 450
6	KROLING	ĐORĐO IRIĆ		067/549-567
7	JV „FIDIJA" DOO – „BOMBETON" DOO	MRKELA GORAN		069 192 414
8	JV IGP „FIDIJA" DOO – „BOMBETON" DO	BOJKLA TADIĆ		067-236-135
9	NORMAL COMPANY PODGORICA	PETAR JOVANOVIĆ		067-207-897
10	ROAMING MONTENEGRO doo	ILIJA NIKOLIĆ		069 688 338
11	ROAMING MONTENEGRO doo	AYIJAH JAHIĆ		068 840 701
12	ROAMING MONTENEGRO doo	Katarina Bjelović		069 353 292

13	Rosatom Montenegro doo	Dalibor Milović		069 353 290
14	SIEMENSYS DOO	SLOBODAN MARKOVIĆ		067 215 922
15	SIENERSYS d.o.o.	STRUGAR IGOR		067 223 233
16	„KOPRING PMC"	VIKTOR MARKOVIĆ		
17	FICHTNER GmbH & Co. KG	UDO BECKER		
18	MINISTARSTVO EKONOMIJE	DRAGICA SEKULIĆ		020 482 274
19	MINISTARSTVO EKONOMIJE	TOMA SINIŠTAJ		067 9044 555
20	MINISTARSTVO EKONOMIJE	SAŠKA ŠIPČIĆ		020 482 288
21				
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C2. List of the bidders questions with answers – Cluster III

List of the bidders questions with answers – Cluster III

Country:	**Montenegro**
Employer:	**Ministry of Economy**
Project Name:	**Energy Efficiency Program in Public Buildings**
Tender :	**Tender for energy efficiency reconstruction and modernisation of the buildings of Cluster III**
Closing Date:	**01/09/2014**
Ref. No.:	**BMZ Nr. 202080554**
Funding Source:	**German Financial Cooperation Funds via KfW-Development Bank**

CLUSTER III – Vol. 02

Item	Subject	Responsible/ Remarks
Q1	A1 Instruction for Bidders - Cluster III, 3.2.1.1 Technical Envelope Please elaborate the difference of requested documentation – work program (sub clause 7) and mandatory detailed description (sub clause 15): '7**. Overall time schedule and work program…** The time schedule must be accompanied by a detailed step by step work program including milestones, describing how the contractor intends to perform the works. 15**. Conformity of the Site** … **A mandatory detailed description** on how the Bidder intends to organize the project execution on site.' -Is it required to prepare a set of two different documents, one for sub clause 7 and one for sub clause 15, or the wording of sub clause 7 only refers to requirements of sub clause 15?	
A1	The Bidder shall prepare one detailed **Conformity of the Site** document, as requested by sub clause 15. Under the item 7 **Overall time schedule and the work programme** the Bidder is requested to prepare detailed gant time schedule, indicating all major activities, milestones and number of staff involved. Time schedule should be in correlation with the detailed description presented in the **Conformity of the Site.**	
Q2	A1 Instruction for Bidders - Cluster III, 3.2.1.1 Technical Envelope Please elaborate in more plain English the requirements in sub clause 15 (text copied below). -What do »schedule of requirements« and »technical specification« refer to (which part of bidding documentation) or are they just general statements? **15. Conformity of the Site** … a paragraph-by-paragraph commentary on the **schedule of requirements** and **technical specification** demonstrating the equipment's, works' and services' substantial responsiveness to those documents or a statement of deviations and exceptions to the provisions of the documents and any other requirements specified.	
A2	The **Conformity of the Site** document has to show that the Bidder has analyzed in detail all works to be done and that he has chosen the most appropriate method to perform the works. General and particular tasks have to be described according to the activities planned in the **General Time Schedule**.	

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>Q3</td><td>A1 Instruction for Bidders - Cluster III, 5.4.2.1 Technical and commercial Evaluation
-Please indicate to which items of Technical Envelope the following 25 points are applicable to (3.2.1.1.), or are they applicable to a mix of different items (sub clause 15 Conformity of the Site or a mix with sub clause 15 and 7 Work program, see question no.1 above)?
Work methodology (25 points)
• Proposed set-up (with subcontractors if applicable) 11 points
• Proposed implementation methodology 11 points
-Please explain in brief »Proposed set-up«
-Please explain in brief »Proposed implementation methodology«</td><td></td></tr>
<tr><td>A3</td><td>The set-up evaluation considers the proposed overall organisation of the Bidder, including subcontractors, division of the tasks among parties involved, proposed number of workers per each task, and proposed machinery and equipment for performing of the works.
The implementation methodology considers the proposed Conformity of the Site document, including the proposed training schedule.</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Q4</td><td>A3 Particular Conditions of Contract cluster III; Sub-Clause 5.2 - Contractor's Documents
-Does the civil construction book represent basis for invoicing works completed with bi-monthly invoices, or is progress of the works assessed in another way?
The Contractor shall, from the start of Construction up to and including the issuance of Taking Over Certificate provide correct keeping of the site logbook, civil construction book, health & safety manual as well as inspection record book in compliance with the effective regulations in Montenegro.</td><td></td></tr>
<tr><td>A4</td><td>Civil construction book is not a base for invoices, since the contract is “turn key” based; the progress of the works is assessed by the supervision team.
Documents which are mentioned in the Technical Conditions are required by Montenegrin legislation.</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Q5</td><td>Instruction for Bidders - Cluster III - A1-5 List of key equipment and materials
-Several listed items (as one indicated below) refer to more than one item of price schedules (luminaries 19 items, items from I.4 to I.22). Is it necessary to expand the list and attach other documents (if required) for every single item of the price list mentioned although they are not separated in the A1-5 (List of key equipment and materials)?
<table>
<tr><td>37</td><td>Electric light luminaries</td><td>yes</td><td>I.4-22 in A.5.1.3</td></tr>
</table></td><td></td></tr>
<tr><td>A4</td><td>In a case like this all luminaries offered should be listed under the same item.</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Q6</td><td>A1 Instruction for Bidders - Cluster III, 3.2.1.1 Technical Envelope
- Is it possible to submit time schedules of individual schools where commencement date is later than April 1st 2015, as scope of works differs between the schools (when still taking into account requirements of completion of works no later than 5 months from April 1st 2015)?
Time and personnel schedule for each individual educational building, number and qualification of technical key personnel and engagement on site (per person) (A1-3) total number of personnel required and qualifications. The requested services (as per Section A4) shall be completed not later than 5 months after commencement of works (as per A3, sub clause 8.1). The works on all five educational buildings will be</td><td></td></tr>
</table>

	performed simultaneously.	
A6	General input is that the Bidder shall prepare a time schedule with a starting date of the 1st April 2015, starting date of the works on each school shall be proposed by the Bidder. Finishing date for all facilities shall be latest 5 months after 1st April 2015.	
Q7	A4 Technical Description of Works - Cluster III - thermo technical services Request for additional documentation: - If possible, please send calculations of heat transmissions for all buildings - If possible, please send Detailed Energy Audit Reports for all buildings	
A7	Calculations of heat transmission and Detailed Energy Audits are not part of the tender documents.	
Q8	A4 Technical Description of Works - Cluster III - thermo technical services Control of thermal energy consumption shall be achieved through ultrasonic heat flow meter, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system. - Is the above mentioned part of works included in the tender? If so, please answer: - On which computer will be installed this software, where will be the central control system for all the schools located, what kind of software will be installed, and who and how must do the network connections which allow to communicate with the local computer and central control system for all schools. - How the listed ultrasonic heat meters are to be connected to the listed boilers? Who will work with this system, were it must be mounted?	
A8	Preparation of the software, installation of the equipment for monitoring of the consumption and monitoring of the energy consumption is not in the scope of this contract. In this tender, only the equipment which will be required in the later stage, for establishing of the energy monitoring system, is required.	
Q9	A4 Technical Description of Works - Cluster III – Vol.II Drawings - Educational Building 4: "Mustafa Pećanin" Primary School, Rožaje. In the drawing 02-TTI-06 for energy management system is drawn that one measurement device for fuel is to be installed on a single pipe for both boilers, but as seen during the site visit there are two pipes, one for each boiler. Where is the device to be installed? - Educational Building 5: "Bećo Bašić" Primary School, Plav. Same question.	
A9	Installation details shall be determined at the site with the Supervision team. The Bidder shall base the offer on the description from the Bills of quantities.	
Q10	A1 Instruction for Bidders - Cluster III, 3.2.1.1 Technical Envelope 14. Provision of certificates and tests on Site The Bidder shall provide a statement that the following certificates and tests are included in the Bid: - Factory Test Certificates for installed materials and equipment - Previous Tests to Taking-Over Process: Based on the information received, works included in Cluster III are to be completed in 5	

	months; before September 1st 2015. As the weather conditions in that period are such that functionality of heating system cannot be checked in full, do we have to include in our bid another testing after Taking over, that is during winter time?	
A10	In a case that some testing can not be performed after finishing of the works, functional tests will be done after provisional taking over. Final testing of the heating equipment can be performed at the later date. This will not extend the defects liability period.	
Q11	A5 Price Schedules - Cluster III - Group A5.1.2 - thermo technical services - Secondary Vocational School in Pljevlja (similar for other buildings) - which are relevant data for preparing the commercial part of the bid (Price Schedules) in cases of differences in quantities, as the Price Schedules document quantities cannot be modified? Some examples: - Paragraph B.II item 15: 1 piece. Drawings: 2 pieces. - Paragraph B.II item 16: valves 12 pieces, - for 2 motor drives. Drawings: 2 pieces. - Paragraph B.II item 21: DN80 16 pieces. Drawings: 22 pieces. - Paragraph B.II item 21: DN25 0 pieces. Drawings: 6 pieces.	
A11	The bid shall be prepared based on the quantities as presented in the Bill of quantities (Price schedule).	
Q12	A5 Price Schedules - Cluster III - Group A5.1.2 - water and sewage services - Secondary Vocational School in Pljevlja (similar for other buildings) Paragraph II item 2.03: "Purchase and installation of EK angle valves DN 20mm. The valves shall be installed on each outflow point, except showers…« We believe that appropriate angle valves are DN 15mm in order to fit with the piping.	
A12	Please see A11.	
Q13	May we use facsimile to stamp the documentation?	
A13	It is allowed to use the facsimile of the person authorized to sign the bid.	
Q14	Would it be satisfactory if we enclose the copy of Consortium agreement?	
A14	The Bidder is allowed to submit the original or certified copy of the Consortia/ JV agreement, which confirm that there are no changes comparing to the documents submitted in the PQ.	

D. Particular conditions of contract

A3

Particular Conditions of Contract – Cluster III

Issue and Revision Record

No.	Date	Originator	Checker	Description
A	17/04/2014	U. Becker	P. Stojcic	-

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General

The Conditions of Contract comprise the “General Conditions”, which form part of the “Conditions of Contract for EPC/Turnkey Project” First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following “Particular Conditions”, which include amendments and additions to such General Conditions.

Where reference is made to any Clause or Sub-Clause, this shall mean, unless specifically stated otherwise, a Clause or Sub-Clause in the General Conditions of Contract, but with the amendments or additions given in these Particular Conditions.

In case of any difference between the General Conditions of Contract and the Particular Conditions, the Particular Conditions shall govern.

Sub-Clause 1.1 – Definitions

Add to Clause 1.1:

1.1.3.3 **"Time for Completion"** shall be
5 months for the cluster of five educational buildings

1.1.3.7 **"Defects Notification Period"** shall be 12 months starting after issue of the taking over certificate

1.1.3.10 “**Operation License**” means a document issued by the competent authority of Montenegro after receipt of the Technical Assurance Committee Protocol.

1.1.4.4 **Foreign currency** means “Euro”

1.1.6.2 **Country** refers to the country of Montenegro.

1.1.6.9 The “**Inspection for construction works**” is an authority in charge of inspection during construction works

1.1.6.10 "Turnkey Basis or Functional Specification" means the entire coverage of all Works for design, manufacture, testing, transport, construction, installation, commissioning, trial operation, etc. of all mechanical and electrical equipment and civil part of the buildings under the Contract and will include all such items of the buildings and equipment or Works whether mentioned in the Bidding Documents or not which are required to make the building operationally complete to fulfill the contracted scope of work, performance and purpose of the works.

Sub-Clause 1.3 – Communications

Add to Sub-Clause 1.3:

Details of communication during project implementation e.g. addresses, system of electronic communication are stated in the Bidding documents.

Sub-Clause 1.4 – Law and Language

Amend Sub-Clause 1.4 – Law and Language as follows:

a) The law which applies to the Contract is the law in force in Montenegro.
b) The language of the Contract is the English language. All correspondence, documentation, Operation and Maintenance Manuals etc. shall be in the English language, except the “As-built Design” and “Operation and maintenance manuals and similar documents” that shall be submitted additionally in the Montenegrin language. Furthermore labels for spare parts as well as labels, nameplates, instruction and warning plates necessary for the identification and safe operation of the plant, and all inscriptions shall be in the language of the Country.
c) All documents necessary to obtain permits from the local authorities shall be additionally provided in the language of the Country.

Sub-Clause 1.5 – Priority of Documents

Delete the entire Sub-Clause 1.5 and replace by:

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purpose of interpretation, the priority of the documents shall be in accordance with the stipulations of the Contract Agreement.

Sub-Clause 1.6 – Contract Agreement

The first sentence shall be replaced by:

The Contract shall come into full force, which will be considered as contract effective date, after the following conditions have been fulfilled:

1. No objection issued by the KfW Entwicklungsbank to the agreed and initialed Contract Agreement
2. Signing of the Contract Agreement
3. The Contractor has submitted to the Employer the Performance Security and the Advance Payment Guarantee
4. The Employer has paid the Contractor the advance payment.
5. The Employer has returned the Bid Security to the Contractor.

Sub-Clause 1.13 – Compliance with laws

Add as new item c):

The Contractor shall comply with the local laws and regulations of the Country.

The most important laws/regulations from Montenegro are:

- Law on spatial development and construction of structures (»Official Gazette of the Republic of Montenegro«, No 51/2008) with Amendments (»Official Gazette of the Republic of Montenegro«, No 34/11)
- The Rule book on the Content and Manner of Preparing Technical Documentation (»Official Gazette of the Republic of Montenegro«,
  No 22/2002)
- The Rule book on the Content and Manner of Preparing Civil Engineering Record, Civil Engineering Book and Control Book (»Official Gazette of the Republic of Montenegro«, No 54/2001)
- The Rule book on the Content and Manner of Execution of Technical Control for Main Projects (»Official Gazette of the Republic of Montenegro«, No 54/2001)
- The Rule book on the Content and Manner of Execution of Supervision during construction works (»Official Gazette of the Republic of Montenegro«, No 54/2001)
- The Rulebook on Conditions and Manner of verification and annulment of verification of the licenses for foreign citizens (»Official Gazette of the Republic of Montenegro«, No 68/2008)
- Law on protection at work (»Official Gazette of the Republic of Montenegro«, No 79/2004), with Amendments
- Law on Inspection Control (»Official Gazette of the Republic of Montenegro«, No 39/2003), with Amendments

Add as new item d):
The Contractor shall prepare a Report on Safety on Site, in particular with respect to safety during construction work of the pupils and teaching staff, in line with the regulations of the Country, and submit it to the Employer for approval.

Insert at the end of sub-clause 1.13:

The Contractor shall also obtain all consents including permits-to-work and approvals required for the Works. All required documents/information to obtain these permits must be provided by the Employer. The Contractor has to inform himself in advance, which documents are necessary to obtain the permits.

Sub-Clause 3.1 – The Employer's Representative

The Employer's Representative is:

FICHTNER GmbH & Co. KG
Jovana Tomasevica 9/2 - 11
81000 Podgorica
Montenegro

The Employer appointed the Employer's Representative for full assistance, to continuously inform the Employer related to the Project and to act with his consent in particular for design, documentation approval, inspection and supervision of equipment manufacturing, testing, supervision of erection and construction works, etc. for the Delivery and Works during the Contract implementation.

Furthermore, the Employer's Representative requires the consent of the Employer before exercising the following duties:

- issuance of orders which might cause modification of the Contract.
- releasing the Contractor of any responsibility with respect to the Contract.

Sub-Clause 4.1 – Contractor's General Obligations

The first paragraph shall be replaced by:
"The Contractor shall execute and perform the works in accordance with the Contract and the Design prepared by the Employer, and shall remedy any defects in the Works. When completed, the works

shall be fit for the purposes for which the works are intended as defined in the contract…"

In the second paragraph:
"design" should be excluded

Sub-Clause 4.19 – Electricity, Water and Gas

The following should be added:
Supplies on site will be responsibility of the Contractor.
Supplies on the Site are: Electricity and Water

a) Electricity: 400/230 V 3 phase 4 wire 50 Hz
b) Water: From water network.

Contractor should take into account those costs during preparation of the Bid.

Sub-Clause 4.2 – Performance Security

The second paragraph shall be replaced by:

The amount of the Performance Security shall be ten (10) percent of the Contract Price stated in the Contract Agreement, and shall be expressed in the currencies and proportions in which the Contract Price is payable.

The Contractor shall deliver the Performance Security, in the form of a bank guarantee, to the Employer within 14 days after all parties have initialed the Contract Agreement, but prior to commencement date. The Performance Security shall be issued from a reputable first class international bank (acceptable to the Employer and KfW in the form annexed to the Bid documents or in another form approved by the Employer and shall be valid at least until issue of the Performance Certificate.

The successful Bidder shall provide information about the intended bank for the performance security during contract negotiations for approval.

Sub-Clause 4.21 – Progress Reports

Further details are stated in Part A5 "Project Descriptions and Procedures".

Change title of Sub-Clause 4.21 into:
Progress Reports and Progress Meetings

Add as sub-point (i):

detailed cash flow estimate, of all payments to which the Contractor will be entitled under the Contract;

Add at the end of the Sub-Clause the following:

Coordination and design meetings
During execution of the Contract the Employer may call for coordination and design meetings, either at the Employer's head office, the office of the Employer's Representative, the site, or the office of the Contractor, as deemed necessary.

The object of these meetings is to coordinate the progress of work and its control, discuss approval procedures and technical details and to discuss all other matters pertinent to the Contract in order to achieve smooth and undisturbed progress of work as well as expeditious supply delivery. The Contractor's Representative as well as other responsible personnel and senior Representatives of each Sub-Contractor shall be present at this meeting.

Progress meetings on site
During construction on Site and tests of completion, daily or weekly and monthly progress meetings shall be conducted at the Site as directed by the Employer or the Employer's Representative. These meetings are to discuss and review in detail the up-to-date progress of Works at the Site.

In order to assist the Employer or the Employer's Representative in his review during the progress meeting of the work done, the Contractor shall provide; the Employer or the Employer's Representative with a detailed schedule of specific items of works that had been performed, with a comparison of the actual and planned schedule at least one (1) day in advance to each meeting.

If any work or part of work is delayed, the reasons for the delay shall be explained and the proposals how to expedite the delayed part of Works shall be submitted (see also Clause 8 [Commencement, Delays and Suspension])

At all such progress meetings, the Contractor shall provide at least one responsible authorized member of his organization, compulsory having adequate knowledge of the language for communications (defined in Sub-clause 1.4 [Law and Language]), to commit the Contractor to any agreement reached during said meetings.

Sub-Clause 4.4 – Subcontractors

Insert at the end of paragraph (a) the following:

No deviations from, or substitutions of the list of Subcontractors and suppliers submitted with the Bid shall be allowed without the written permission of the Employer.

Add to Sub-Clause 4.4 the following paragraphs:

The Employer will not recognize the existence of any subcontractor or supplier in any matter concerning the administration of the Contract. All correspondence from any subcontractor shall be submitted only through the Contractor. Correspondence by the subcontractor directly sent to the Employer and or Employer's Representative will not be acknowledged.

Subcontractors are subject to approval by the Employer.

Sub-Clause 5.1 – General Design Obligations

Delete in Sub-Clause 5.1 the last paragraph:

"However, the Employer shall be ..."

Sub-Clause 5.2 – Contractor's Documents

Further requirements for Documentation are laid down in Part A5 “Project Descriptions and Procedures” and general document procedure.

Add to the third paragraph of Sub-Clause 5.2:

The Contractor shall submit to the Employer for review all relevant documents in 3 copies. If the Employer instructs that further Contractors Documents are required, the Contractor shall prepare them promptly within a timeframe to be agreed

Insert at the end of the Sub-Clause 5.2 the following:

Should it be found at any time after approval has been given by the Employer to any documents submitted by the Contractor that the said documents do not comply with the terms and conditions of the Contract or that the details do not agree with any documents submitted previously, such alterations and additions as may be deemed necessary by the Employer shall be made therein by the Contractor and the work carried out accordingly without extra payment to the Contractor thereof.

The Contractor shall, from the start of Construction up to and including the issuance of Taking Over Certificate provide correct keeping of the site logbook, civil construction book, health & safety manual as well as inspection record book in compliance with the effective regulations in Montenegro.

The Contractor shall prepare and furnish for the Employer's approval, Safety Report (On site), prepared in compliance with the effective regulations in Montenegro.

Sub-Clause 5.4 – Technical Standards and Regulations

Add after the first paragraph:

All materials and equipment supplied and all work carried out shall comply with the specific standards stated in the General Technical Requirements and Particular Technical Requirements as well as the relevant local standards, regardless of the language used, with the issues valid at the date of Letter of Acceptance.

The Contractor shall observe the standards and technical regulations of the Country. International standards and regulations, as laid down in the General and Particular Technical Requirements, shall be only used if they are more stringent than the standards of the Country or no local standards are available. The Contractor is obliged to present a list of standards as well as a report proving that the standards intended to be used are more stringent than the standards of the Country.

If no specific standard is stated the technical codes of the International Organization for Standardization (ISO) shall be applied as well as the relevant local standards. For the electrical equipment the relevant IEC standard shall apply as well as the relevant local standards. Goods and special guarantees beyond the scope of ISO and IEC, and if no local standard is available, shall conform at least to the following standards and codes in the following priority:

1. EN,
2. DIN and VDE standards
3. BS,
4. ASTM,
5. Other internationally accepted standards which ensure a quality equal to or higher than the standards mentioned above, but only if these are submitted in the English language edition and accepted by the Employer.

It is the Contractor's responsibility to provide sufficient evidence that any other standard the Contractor proposes (other than those mentioned above) will ensure an equivalent or higher standard.

Insert at the end of Sub-Clause 5.4 the following:

The Contractor shall supply to the Employer free of charge two sets of all standards used in connection with the works of the contract latest 4 weeks after commencement date. The same set shall be kept at the Site Office of the Contractor and shall be accessible to the Employer/Employer's Representative's site personnel whenever required during the site work.

Sub-Clause 5.6 – As Built Documents

Replace the last phrase of the first chapter of sub-clause 5.6 by the following:

Three paper copies in Montenegrin and 2 CD's with copies in electronic form, both in English and Montenegrin language,shall be supplied to the Employer prior to the date of commencement of the Tests on Completion.

Sub-Clause 5.7 – Operation and Maintenance Manuals

Insert at the end of Sub-Clause 5.7 the following:

Operating and Maintenance Manuals shall be submitted in two copies.

Sub-Clause 5.8 – Design Error

Insert at the end of Sub-Clause 5.8 the following:

The Contractor shall promptly inform the Employer of any error, omission, fault and other defect in the design and other documents for the Works which are discovered when reviewing the Contract documents or in the process of execution of the Works.

Sub-Clause 6.1 – Engagement of Staff and Labor

Add the following paragraphs to Clause 6.1:

The Contractor may import any personnel who are necessary for the execution of the Works. The Contractor must ensure that these personnel are provided with the required residence visas and work permits. The Contractor shall be responsible for the return to the place where they were recruited or to the domicile of imported Contractor's Personnel. In the event of death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

Sub-Clause 6.5 – Working Hours

Delete this sub-clause.

Sub-Clause 6.8 – Contractor's Superintendence

Add the following paragraphs to Clause 6.8:

The Contractor shall assign the Project Manager, and the Site Managers and the Site Engineers for each site with adequate professional licenses and any other provisions required by the applicable regulations in Montenegro. The Project Manager shall be an experienced engineer and shall be the general coordinator of all activities of the Project and shall be the responsible person for the overall Project execution. The assigned Project Manager shall especially attend the Contract negotiations and all following contractual relevant meetings, and shall be the contact person for all major and important project related issues for the Employer / Employer's representative.

The assigned Site Managers and Site Engineers shall be present on the Sites as of the Commencement Date. The assigned Site Managers and Site Engineers, shall be always present on the Sites during working hours as well as during ongoing construction works.

If the above presence is not fulfilled, the Employer reserves the right to:
- stop the works without any claims from the Contractor.
- deduct the payments to the Contractor respectively.

The Employer shall be entitled to require in writing the departure from the Site of any member of staff of the Contractor, who by his misconduct and negligence violates the discipline, or acts improperly in the living and working area. The Contractor shall dismiss and replace such person.

The Contractor shall at his own cost undertake timely all prescribed measures to secure correct execution of the erection works, equipment, installations, plant and devices for safety of the labor, persons passing-by, traffic and neighboring structures, as well as for environmental and working area protection.

Sub-Clause 7.1 - Manner of Execution

Insert at the end of Sub-Clause 7.1 the following:

The materials furnished and used shall be new.

Sub-Clause 7.3 – Inspection

Delete in the second paragraph (b) the following words: “to the extent specified in the Contract”.

Insert at the end of Sub-Clause 7.3 the following:

Employer’s personnel in charge of supervision of the works may access the Site without any restrictions.

Sub-Clause 8.1: Commencement of Works

Sub-Paragraph (a) shall be deleted.
Sub-Paragraph (b): the words "within 42 days after" shall be deleted and add “within fourteen days after”

Sub-Clause 8.3 – Program

Add after the second sentence of Sub-Clause 8.3 the following:

“The bar chart of this time program will be frozen as stipulated in the Bidding documents”.

The words “of each major stage of the works” of paragraph (a) of Sub- Clause 8.3 shall be replaced by “of each stage of design, procurement, testing, manufacture, delivery to site, customs clearance, construction, supervision, erection, commissioning and trial operation”.

Add at the end of Sub-Clause 8.3, last sentence the words:
"within two weeks from the date of such notice".

Add to the last paragraph:

The time program shall be a network type program identifying the critical path and early/late starts and finish dates for all activities. The program shall be supported by information of resources that will be dedicated to each activity to accomplish each within the duration programmed.

Sub-Clause 8.7 – Delay Damages

Add to Sub-Clause 8.7 the following:

In Sub-Clause 8.7, the sum referred to in the second sentence shall be 0.1% of the Contract Price , as delay damages in respect of the Works, payable (per day) in the proportions of currencies in which the Contract Price is payable.

The maximum amount of delay damages shall be ten percent (10%) of the Contract Price.

Sub-Clause 9.1 – Contractor's Obligation

Add at the end of Sub-Clause 9.1 the following:

Technical Acceptance

The technical acceptance will be performed in accordance with the Law on spatial development and construction of structures (»Official Gazette of the Republic of Montenegro«, No 51/2008) with Amendments (»Official Gazette of the Republic of Montenegro«, No 34/11)

The technical acceptance will be organized by the Employer not later than 21 days after receiving a notice form the Contractor that the contracted services are completed.

Sub-Clause 10.1 – Taking Over of the Works

Add at the end of the second paragraph:

“Precondition for applying for Taking Over is the receipt of the Operation License.”, this applies only if boiler is to be installed.

The last paragraph of sub-clause 10. 1 shall be deleted.

The above requirements must be considered in the time schedule of the Contractor.

Sub-Clause 10.2 Taking Over of Parts of the Works

Delete the entire Sub-Clause 10.2 and replace by:

Parts of the works might be taken over separately. Handing over of parts of the works is at the sole discretion of the Employer.

Sub-Clause 11.1 – Completion of Outstanding Works and Remedying Defects

Delete the following from the first sentence:

“or as soon as practicable thereafter”

Add as sub-clause 11.1 (c):

“ undertake all modifications, adjustments as necessary for fulfilling the Contract requirements, and replace all parts and equipment which shall be found defective.

Replace the last sentence of Sub-Clause 11.1 by the following:

“If any such defect appears or damage occurs, the Employer or the Employer’s Representative shall forthwith notify the Contractor thereof. The Notice of Defects shall be given in writing. The Contractor shall act accordingly within 7 days from receipt of the Notice.”

Sub-Clause 11.3 –Extension of Defects Notification Period

Add the following:

If, during the Defects Notification Period, it is deemed necessary to replace some element due to functional failure, the Defects Notification Period for this element starts from the replacement of this part

Sub-Clause 11.9 – Performance Certificate

Delete all paragraphs except the first and add the following:

One month prior to expiration of the Defects Notification Period, including extensions subject to sub-clause 11.3, Extension of Defects Notification Period, after elimination of all defects, the Contractor shall in writing require Final Taking Over (Performance Certificate) and submit Statement for Final Payment Certificate.

Immediately after the Contractor's request, a Committee shall be nominated by the Employer to perform the Final Taking-Over, consisting of Technical Acceptance, only where building permit is issued, for other building Client’s acceptance and Final Payment Calculation. The Committee shall be nominated and perform all activities as for the Taking-Over.

The Employer may deem necessary to perform all tests as for the Taking-Over. The scope and method of tests are defined in the

Technical Requirements and Test Program. Results of such tests shall meet the required values, provided that use of equipment is carried out in accordance with the Operation and Maintenance Manuals.

If the Works do not satisfy the guaranteed technical characteristics, Final Taking-Over shall be postponed, and adequate period shall be granted to the Contractor for repair, adjustments and for repeated tests.

If results of repeated tests do not satisfy the guaranteed technical characteristics, with prescribed tolerances, the Employer may be entitled to reject Taking-Over of Delivery and Works subject to sub-clause 11.4 (c).

If the results of repeated tests are not acceptable to MoE new tests shall be performed. For these tests, the Employer shall determine a qualified institution or institutions, not included in the previous tests. Costs of such tests shall be borne by the disagreeing Party.

If Final Taking-Over is not completed and the Performance Certificate is not issued within 28 days after expiring of the Defects Notification Period including extensions subject to sub-clause 11.3, Extension of Defects Notification Period, the Contractor is entitled to claim additional costs, these costs shall be borne by the Employer.

Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

Sub-Clause 13.8 – Adjustments for Changes in Cost

Delete entire Sub-Clause 13.8.

Sub-Clause 14.1 - The Contract Price

Add paragraph (c) to Sub-Clause 14.1:

(c) any quantities which may be set out in a Schedule or in the description of the scope of supply are minimum estimated quantities and are not to be taken as the actual and correct quantities of the Works which the Contractor is required to execute on a Turnkey Basis to fulfill the purpose of the Works

Sub-Clause 14.2 - Advance Payment

Amend Sub-Clause 14.2 paragraph (a) to read as follows:

The Employer will make an advance payment to the Contractor in an amount stated of fifteen (15) percent of the Contract Price stated in the Contract agreement.

Sub-Clause 14.4 – Schedule for payments

Sub-Clause 14.4 shall be deleted in its entirety and substituted by the following:

The Employer shall pay to the Contractor in the following manner the Contract Sum adjusted to give effect to such additions thereto and such deductions therefrom as are provided in these Conditions:

14.4.1 Schedule for Payments

Payment for supply and delivery of the works, erection and civil engineering works will be made by the direct disbursement procedure in accordance with KfW's Guidelines for the Disbursement of Funds of Financial Co-operation with Developing Countries and Comparable Programs.

The Employer will pay to the Contractor under the terms and condition of KfW's Guidelines for the Disbursement, as follows:

For Works and Erection

15% of the contracted value as an advance payment against presentation of the Advance Payment Guarantee and Performance Security.

75% of the contracted value will be paid in bi-monthly instalments (i.e. every 2nd month), based on the progress of the work**s**

10% of the contracted value shall be the amount of the retention money, which will be paid as described in 14.9

14.4.2 Other Conditions

No extra payment in respect of overtime, additional materials, special conditions and hardship or otherwise shall be claimed by the Contractor.

Minimum amount of application for payments

Application for payments are not acceptable if the net amount thereof after all retention's and deductions would be less than 2.5% of Contract value.

Application for Payment on Erection and Construction Works

A statement in respect of progress or completion of the Works on Site shall be given, certified by the Employer / Employer's Representative.

Disbursement Schedule
The Contractor shall submit, together with each invoice, a disbursement schedule showing: invoice number, type of invoice, invoicing date, invoiced amount, amount received, date received. An updated version shall be added to the Progress Reports.

The Contractor shall submit the current status of invoicing for each item of the supply & services, by extending the price sheets by the following (in electronic form): already invoiced amount, current invoice & invoiced amount, remaining amount to be invoiced. An electronic copy of the modified price sheets shall be submitted together with each invoice.

Sub-Clause 14.8 – Delayed Payment

Delete entire Sub-Clause 14.8.

Sub-Clause 14.9 - Payment of Retention Money

Delete the last sentence in the first paragraph: It the Taking-Over certificate is issued for a Section, the relevant percentage of the first half of the Retention Money shall be paid when the section passes all the test.

Replace the words "the first half of the Retention Money" in the first paragraph by "the first part".

Replace the words "the second half" in the second paragraph by "the second part".

Replace the words "of either half" in the third paragraph by "of either part".

Insert at the end of the Sub-Clause:

The Employer shall make payment of the second part of the Retention Money to the Contractor if he obtains a guarantee, in a form and provided by an entity approved by the Employer, in amounts and currencies equal to the payment.

The Contractor shall ensure that the guarantee is valid and enforceable until the Contractor has executed and completed the works and remedied any defects, as specified for the Performance Security in Sub-Clause 4.2, and shall be returned to the Contractor accordingly. This release of retention shall be in lieu of the release of the second part of the Retention Money under the second paragraph of Sub-Clause 14.9.

Add to Clause 14 – Contract Price and Payment the following Sub-Clauses:

Sub-Clause 14.16 – Taxation

Except as otherwise stated, the following provisions shall be applied for the taxation of supplies and services.
There will not be tax or custom duty exemption for any service, material or equipment used under this contract.

The payment made to the Contractor for the services rendered by the local personnel shall not be exempted from the income tax of the Country.

It is the responsibility of the Contractor to acquaint himself fully with the tax and excise laws of the Country prior to the commencement of the Contract.

The Contractor shall make himself familiar with the administrative procedures for obtaining import permits and licenses and shall assist and cooperate with the Employer when obtaining the necessary permits and licenses and shall make available all necessary and appropriate documents in due time.

Sub-Clause 14.17 - Repayment Clause

If payments due under this Contract for goods and services are to be made from the Funds, any reimbursement, guarantee or similar claimable payments and any insurance paymentshallbeeffectedto KfW,FrankfurtamMain, IBAN: DE53 5002 0400 3800 0000 00, BIC: KFWIDEFF, account no.38 000 000 00foraccountof MoE.

Such funds may be re-utilized for the execution of the Projects with KfW's consent.

Sub-Clause 17.2 – Contractor's Care of the Works

The following sub-paragraphs shall be added:

The Contractor has to check the faultlessness of all equipment after arriving on site for erection. Any defects, detected after arrival of the equipment on site or during erection, are to be reported to the Employer immediately after detection of such defects and is to be included in the next Progress Report.

From commencement of Works up to issuance of Taking Over, the Contractor shall at his own cost provide guardians for the equipment

and materials, secure protection against damage, weathering, removal or destruction. It shall be the Contractor's obligation to construct fences and shelters, lighting, guardian service and all relevant measures in fulfillment of his duties.
In addition to correct storage and keeping of equipment, materials and tools necessary for the Works, the Contractor shall inspect the quantity and quality of the goods, by keeping records on received and delivered equipment, accompanied by technical documentation.

Sub-Clause 18.1 – General Requirements for Insurance

Replace the sixth paragraph of Sub-Clause 18.1 "The relevant insuring party shall ... to the other party" by the following:

"Within 28 days (calculated from commencement date) the contractor shall submit to the Employer:"

Insert at the end of Sub-Clause 18.1 the following:

Effectiveness of all insurance policies shall be from the first working day after the commencement date until issuing of the Performance Certificate in respect of the Works or any section or part there of as the case may be.

The insurance shall cover an amount of minimum 110 % of the contract value of the goods.

Sub-Clause 18.2 – Insurance for Work's and Contractors Equipment

The following sub-paragraphs shall be added:

The Contractor shall arrange in the contractual currency an all risk cargo insurance from a reputed insurance company covering all costs and expenditures for insurance till the material is covered by the inland transport insurance.

a) Insurance costs and payments
The insurance has to be taken out in freely convertible currency as far as foreign exchange costs are concerned.

The insurance cover note shall provide for payments to be made for the account of the Employer as per sub-clause 14.17.

b) Site storage/work/erection insurance

The Contractor shall arrange site storage/work/erection insurance including third party liability from a reputed insurance company and policies to be taken in foreign/local currency wherever necessary and the payment of premiums shall be made by the Contractor in local/foreign currency and the claims thereto may also be dealt with by the Contractor, if any. The above type of policy has to be taken by the Contractor wherever considered necessary as per approval of the Employer. The insurance cover shall be in accordance with the prevailing laws and regulations of the Country. The insurance shall be valid until issuing of Performance Certificate.

Sub-Clause 18.3 – Insurance against Injury to Persons and Damage to Property

Insert at the end of Sub-Clause 18.3 the following:

The insurance shall be for an minimum amount of EUR 40.000,- per occurrence or the equivalent amount in the currency of the Country.

Sub-Clause 20.1 – Contractor's Claims

Insert at the end of the first paragraph:

The notice shall make reference to this sub-clause 20.1. The notice shall be in writing (fax or letter but not being part of another document e.g. progress reports) and delivered by hand (against receipt) or submitted by fax. A notice not fulfilling these conditions will be considered as failure to give notice of a claim.

Sub-Clause 20.3 – Failure to Agree Dispute Adjudication Board

Insert at the end of Sub-Clause 20.3 the following:
The appointing entity or official shall be the President of FIDIC or a person appointed by its President.
FIDIC - Fédération Internationale des Ingénieurs-Conseils
P.O. Box 86
CH-1000 Lausanne 12
Switzerland
Tel.: +41-21-653 5003 Fax: +41-21-6535432

The Adjudicator so designated shall be deemed to be jointly accepted by the Employer and the Contractor.

D. Posebni uslovi ugovora

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Opšti dio

Uslovi Ugovora čine "Opšti uslovi", koji čine dio "Uslova ugovaranja za EPC/Ključ u ruke projekte" prvo izdanje od 1999. godine, u izdanju Međunarodne federacije inženjera konsultanata (Fédération Internationale des Ingénieurs-Conseils) (FIDIC), kao i "Posebne uslove", koji uključuju izmjene i dopune Opštih uslova.

Tamo gdje se pominju klauzule ili Podklauzule, to podrazumijeva, osim ukoliko nije drugačije utvrđeno, klauzulu ili podklauzulu u Opštim uslovima ugovora, ali sa izmjenama i dopunama koje su navedene u ovim Posebnim uslovima.

U slučaju da postoji bilo koja razlika između Opštih uslova ugovora i Posebnih uslova, Posebni uslovi će se smatrati važnijim.

Podklauzula 1.1 – Definicije

Dodati Klauzuli 1.1:

1.1.3.3 **"Rok za završetak radova"** mora biti 6 mjeseci za klaster od pet obrazovnih objekata

1.1.3.7 **"Obavještajni period za nedostatke"** mora biti 12 mjeseci, počevši od izdavanja sertifikata o preuzimanju

1.1.3.10 "**Licenca za rad**" podrazumijeva dokument izdat od strane nadležnog organa Crne Gore, nakon prijema od strane Tehničkog komiteta

1.1.4.4 **Stranu valutu** predstavlja "Euro"

1.1.6.2 **Zemlju** predstavlja Crna Gora

1.1.6.9 "**Inspekcija za građevinske radove**" je organ nadležan za obavljanje inspekcije tokom građevinskih radova

1.1.6.10 **"Osnova za ključ u ruke ili funkcionalna specifikacija"** označava cjelokupno pokrivanje radova u pogledu projektovanja, proizvodnje, ispitivanje, prevoz, izgradnju, instalaciju, prijem objekta, probni rad, funkcionisanje itd., cjelokupne mehaničke i električne opreme i djelove objekata na osnovu ugovora i obuhvatiće sve ove djelove zgrada i opreme ili radova, bez obzira da li su pomenuti u Tenderskim dokumentima ili ne, koji su potrebni kako bi objekat normalno funkcionisao, i kako bi se ispunio ugovoreni obim radova, karakteristike i svrha radova.

Podklauzula 1.3 – Komunikacija

Dodati podklauzuli 1.3:

Detalji vezani za komunikaciju tokom realizacije projekta, npr. adrese, sistem elektronske komunikacije su navedeni u Tenderskoj dokumentaciji.

Podklauzula 1.4 – Zakon i jezik

Izmijeniti i dopuniti podklauzulu 1.4 - Zakon i jezik na sledeći način:

a) Zakon koji se primjenjuje na Ugovor, jeste zakon koji je na snazi u Crnoj Gori.

b) Jezik ugovora je engleski jezik. Sva komunikacija, dokumentacija, Priručnici za upravljanje i održavanje, itd. moraju biti na engleskom jeziku, osim "Projekat izvedenog stanja" i Radna uputstva koja se dodatno dostavljaju na crnogorskom jeziku. Pored toga, oznake rezervnih djelova, kao i naljepnice, pločice sa imenima, oznake za instrukcije i upozorenja neophodne za identifikaciju i bezbijedan rad postrojenja, i svi natpisi moraju biti na jeziku zemlje.
c) Svi dokumenti potrebni za dobijanje dozvola do strane državnih organa, moraju biti i na jeziku zemlje.

Podklauzula 1.5 – Prioritet dokumenata

Izbrisati cijelu Podklauzulu 1.5 i izmijeniti je sa dolje navedenim:

Dokumenti koji čine Ugovor moraju se posmatrati na način na koji će međusobno objašnjavati jedan drugog. U cilju tumačenja, prioritet dokumenata je u skladu sa odredbama navedenim u Ugovoru.

Podklauzula 1.6 – Ugovor

Prva rečenica se mijenja sa:

Ugovor stupa na snagu, što će se smatrati početkom stupanja na snagu Ugovora, nakon što se ispune sljedeći uslovi:

1. Saglasnost od strane Njemačke razvojne banke (KfW) na dogovoreni i parafirani ugovorni sporazum
2. Potpisivanje ugovornog sporazuma
3. Izvođač radova je podnio Poslodavcu garanciju za dobro izvršavanje posla i garanciju za avansna plaćanja
4. Investitor je izvođaču radova izvršio avansno plaćanje.

Podklauzula 1.13 – Poštovanje zakona

Dodati kao novu stavku c):

Izvođač radova poštuje lokalne zakone i propise zemlje.

Najvažniji zakoni/propisi Crne Gore su:

- Zakon o uređenju prostora i izgradnji objekata ("Službeni list Crne Gore, broj 51/2008") sa izmjenama i dopunama ("Službeni list Crne Gore, No 34/11")
- Pravilnik o načinu izrade i sadržini tehničke dokumentacije ("Službeni list Republike Crne Gore, broj 22/2002")
- Pravilnik o sadržini i načinu vođenja građevinskog dnevnika, građevinske knjige i knjige inspekcije ("Službeni list Republike Crne Gore, broj 54/2001")
- Pravilnik o sadržini i načinu vršenja tehničke kontrole glavnih projekata ("Službeni list Republike Crne Gore, broj 54/2001")
- Pravilnik o sadržini i načinu vršenja stručnog nadzora tokom izgradnje objekata ("Službeni list Republike Crne Gore, broj 54/2001")
- Pravilnik o uslovima i načinu verifikacije i poništavanje verifikacije dozvola za strane državljane ("Službeni list Republike Crne Gore, broj 68/2008")
- Zakon o zaštiti na radu ("Službeni list Republike Crne Gore, broj 79/2004"), sa izmjenama i dopunama

- Zakon o inspekcijskom nadzoru ("Službeni list Republike Crne Gore, broj 39/2003"), sa izmjenama i dopunama.

Dodati kao novu stavku d):

Izvođač priprema Izvjestaju o bezbijednosti na gradilištu, posebno u pogledu bezbijednosti đaka i nastavnog osoblja tokom izvođenja građevinskih radova, u skladu sa propisima države, i dostavlja ga investitoru na odobrenje.

Dodati na kraju podklauzule 1.13:

Izvođač takođe dobija sve saglasnosti, uključujući dozvole za rad kao i odobrenja koja su potrebna za izvođenje radova. Sva potrebna dokumenta/informacije za dobijanje ovih dozvola, obezbjeđuje Investitor. Izvođač mora unaprijed navesti koja su dokumenta potrebna za dobijanje dozvole.

Podklauzula 3.1 – Predstavnik Investitora

Predstavnik investitora je:

FICHTNER GmbH & Co. KG
Jovana Tomasevica 9/2 - 11
81000 Podgorica
Crna Gora

Investitor je ovlastio Predstavnika Investitora za punu pomoć, konstantno obavještava Investitora o Projektu, kao i da djeluje uz njegovu saglasnost, a vezano za projektovanje, odobravanje dokumentacije, inspekciju i nadzor opreme za proizvodnju, testiranje, nadzor izgradnje i građevinskih radova, itd., za Isporuku i Radove tokom realizacije ugovora.

Dodatno, Predstavnik Investitora mora zahtijevati saglasnost Investitora prije izvršenja sljedećih poslova:

- Izdavanje naloga koji mogu izazvati izmjenu Ugovora
- Oslobađanje Izvođača radova od bilo koje odgovornosti u vezi sa Ugovorom.

Podklauzula 4.1 – Opšte obaveze Izvođača radova

Prvi pasus se zamjenjuje sa dolje navedenim:

"Izvođač radova će izvršiti i izvoditi radove u skladu sa Ugovorom i Projektom pripremljenim od strane Investitora, i mora otkloniti bilo koje nedostake u radovima. Nakon što se završe, rezultat radova će odgovarati svrsi kojoj su radovi i bili namijenjeni, kao što je navedeno u ugovoru..."

U drugom stavu:

"Projekat" se isključuje.

Podklauzula 4.19 – Struja, Voda i Gas

Dolje navedeno treba dodati:
Predmeti snabdijevanja na gradilištu će biti odgovornost Izvođača radova.
Predmeti snabdijevanja na gradilištu su: struja i voda.

a) Struja: 400/230 V 3 faza 4 zica 50 Hz
b) Voda: od vodovodne mreže.

Izvođač radova treba da uzme u obzir te troškove prilikom pripreme ponude.

Podklauzula 4.2 – Grancija za dobro izvršenje posla

Drugi stav se zamjenjuje sledećim:

Iznos garancije o dobro izvršenom poslu biće 10 (deset) posto ugovorne cijene, koja je navedena u Ugovornom sporazumu i izražava se u valutama i iznosima u kojima se isplaćuje ugovorna cijena.

Izvođač dostavlja garanciju o dobro izvršenom poslu, u obliku bankovne garancije, Investitoru, u roku od 14 dana nakon što su sve strane parafirale ugovorni sporazum, ali prije datuma početka. Potvrda o dobro izvršenom poslu izdaje eminentna međunarodna banka (koja je prihvatljiva Investitoru i Njemačkoj razvojnoj banci) u obliku koji je priložen u tenderskom dokumentu ili u drugom obliku, koji je odobren od strane Investitora i važiće najmanje do izdavanja potvrde o dobro izvršenom poslu.

Uspješni ponuđač će tokom pregovora radi dobijanja saglasnosti, dostaviti informacije o banci koja će biti zadužena za potvrdu o dobro izvršenom poslu.

Podklauzula 4.21 – Izvještaji o napretku

Ostali detalji su navedeni u dijelu A5 "Opis projekta i procedura".

Promijeniti naslov Podklauzule 4.21 u:

Izvještaji o napretku i Sastanci o napretku

Dodati podtački (i):

Detaljna procjena novčanog toka, svih uplata na koje Izvođač radova ima pravo po Ugovoru;

Na kraju Podklauzule dodati dolje navedeno:

Koordinacioni sastanci i sastanci sa projektantima

Prilikom realizacije Ugovora, Investitor može zatražiti koordinacione sastanke i sastanke sa projektantima, ili u sjedištu Investitora, u kancelarijama Predstavnika Investitora, na gradilištu, ili u kancelarijama Izvođača radova, po potrebi.

Cilj ovih sastanaka je da se kroz njih koordinira napredak rada i kontrole, diskutuje o procedurama odobravanja i tehničkim detaljima i da se diskutuje o svim drugim segmentima koje su od velikog značaja za Ugovor, kako bi se postigao nesmetan tok radova, kao i ekspeditivno snabdijevanje isporuke. Predstavnik Izvođača radova, kao i ostali odgovorni radnici i visoki predstavnici svih podizvođača moraju biti prisutni na ovom sastanku.

Sastanci o napretku na gradilištu

Prilikom gradnje na gradilištu i testiranja završetka radova, dnevni, nedeljni i mjesečni sastanci o napretku vršiće se na gradilištu, shodno zahtjevima Investitora ili Predstavnika Investitora. Ovi sastanci će sluziti kako bi se detaljno diskutovalo i razmatralo o progresu i napretku radova na gradilištu.

U cilju pružanja pomoći Poslodavcu ili Predstavniku Investitora u svom prikazu izvedenih radova tokom sastanaka, Izvođač će obezbijediti Poslodavcu ili Predstavniku Investitora detaljni raspored pojedinih stavki radova koje su završene, uz poređenje aktuelnog i planiranog rasporeda najmanje jedan (1) dan prije svakog sastanka.

Ukoliko bilo koji rad ili dio rada kasni, razlozi kašnjenja moraju biti obrazloženi i predlozi kako da se ubrzaju radovi moraju se podnijeti (Klauzula 8 [Početak, Kašnjenje i Obustava]).

Na svim Sastancima o napretku, Izvođač radova mora obezbijediti najmanje jednog ovlašćenog člana svoje organizacije kako bi se obavezao Poslodavcu kada je riječ o dogovorima postignutim tokom sastanaka.

Podklauzula 4.4 – Podizvođači

Na kraju pasusa (a) dodati sledeće:

Odstupanja, odnosno izmjene liste Podizvođača i dobavljača koja je poslata zajedno sa Ponudom nijesu dozvoljena bez pismenog odobrenja Investitora.

Dodati Podklauzuli 4.4 dolje navedeno:

Investitor neće priznati postojanje bilo kog podizvođača ili dobavljača u bilo kojoj stavci koja se odnosi na primjenu Ugovora. Sva korespondencija od strane podizvođača dostavlja se samo kroz Izvođača radova. Korespondencija podizovdjaca poslata direktno Izvođaču i/ili Predstavniku Izvođača neće biti priznata.

Podizvođači moraju biti odobreni od strane Investitora.

Podklauzula 5.1 – Opšte obaveze u projektovanju

Izbrisati Podklauzulu 5.1 u poslednjem pasusu:

"Međutim, Investitor je dužan da...".

Podklauzula 5.2 – Dokumentacija izvođača

Dodatni zahtjevi za dokumentaciju su utvrđeni u dijelu A5 "Opis projekta i procedura" i opštim postupkom dokumenata.

Dodati trećem pasusu Podklauzule 5.2:

Izvođač radova treba da dostavi poslodavcu na razmatranje sva relevantna dokumenta u 3 primjeraka. Ukoliko investitor uputi na to da su dodatna dokumenta potrebna, Izvođač će ih pripremiti bez odlaganja, u vremenskom roku sa kojim će se obije strane složiti.

Na kraju Podklauzule 5.2 dodati dolje navedeno:

Ukoliko se u bilo kom trenutku dođe do saznanja, nakon davanja odobrenja od strane investitora, da dokumentacija Izvođača nije u saglasnosti sa uslovima ovog Ugovora ili da se pojedini djelovi ne poklapaju sa dokumentacijom koja je ranije predata, takve izmjene će izvršiti Izvođač, ukoliko Investitor nalazi za shodno, a za taj dodatni rad Izvođač neće biti dodatno plaćen.

Izvođač će, od početka izgradnje do/uključujući i izdavanje sertifikata o preuzimanju radova, izdavati knjigu sa pravilnim vođenjem gradilišta, uputstvo za zdravlje i bezbjednost, kao i inspekcijsku upisnicu, u skladu sa važećim propisima u Crnoj Gori.

Izvođač će pripremiti i dostaviti na saglasnost Investitora, Izvještaj o bezbjednosti (na gradilištu), pripremljen u skladu sa važećim propisima u Crnoj Gori.

Podklauzula 5.4 – Tehnički standardi i propisi

Dodati poslije prvog pasusa:

Svi isporučeni materijali i oprema i svi sprovedeni radovi moraju biti u skladu sa specifičnim standardima navedenim u Opštim tehničkim uslovima i Posebnim tehničkim zahtjevima, kao i relevantnim lokalnim standardima, bez obzira na jezik koji se koristi, sa pitanjima koja su važeća na dan Prihvatanja pisma.

Izvođač radova mora poštovati standarde i tehničke zahtjeve zemlje. Međunarodni standardi i propisi, kao što je navedeno u Opštim i Posebnim tehničkim uslovima, koriste se samo u slučaju da su strožiji od standarda u zemlji ili ne postoje lokalni standardi koji su dostupni. Izvođač radova je dužan da dostavi spisak standarda, kao i izvještaj kojim se dokazuje da su standardi koji se namjeravaju koristiti strožiji od standarda u zemlji.

Ukoliko nijedan standard nije naveden, tehnički kodovi Međunarodne organizacije za standardizaciju (ISO) se primjenjuju, kao i relevantni lokalni standardi. Za električnu opremu, relevantni IEC standard se primjenjuje, kao i relevantni domaci standardi. Roba i posebne garancije koje su izvan opsega ISO i IEC, ukoliko lokalni standardi nijesu dostupni, moraju u najmanju ruku biti u skladu sa sledećim standardima i propisima u sledećem prioritetu:

1. EN,
2. DIN i VDE standardi
3. BS,
4. ASTM,
5. Drugi međunarodno priznati standardi koji obezbjeđuju kvalitet jedan ili veći od pomenutih standarda, ali samo ako su podnijeti na engleskom jeziku i prihvaćeni od strane Investitora.

Odgovornost je Izvođača radova da pruzi dovoljno dokaza da bilo koji drugi standard koji Izvođač predloži (osim onih koji su navedeni gore) obezbijedi isti ili viši standard.

Ubaciti na kraju Podklauzule 5.4 dolja navedeno:

Izvođač radova je u obavezi da Poslodavcu besplatno obezbijedi dva seta svih standarda koji će se koristiti prilikom radova predviđenih ugovorom, najkasnije 4 nedelje nakon započinjanja radova. Isti set se čuva u kancelariji izvođača radova na gradilištu i moraju biti dostupni osoblju na gradilištu Investitora/Predstavniku investitora kad god je to potrebno prilikom rada na gradilištu.

Podklauzula 5.6 – Dokumentacija izvedenog stanja

Na kraju Podklauzule 5.6 dodati dolje navedeno:

Broj primjeraka (3 štampane kopije na crnogorskom i 2 CD-a sa kopijama u elektronskoj verziji, na engleskom i crnogorskom jeziku) i datum podnošenja dokumentacije izvedenog stanja koja je data u Tenderskom dokumentu.

Podklauzula 5.7 – Uputstva za rad i održavanje

Na kraju Podklauzule 5.7 dodati dolje navedeno:

Broj kopija (2 primjerka) i datum podnošenja Uputstva za rad i održavanje je dat u Tenderskoj dokumentaciji.

Podklauzula 5.8 – Projektna greška

Na kraju Podklauzule 5.8 dodati dolje navedeno:

Izvođač radova mora odmah obavijestiti Investitora o bilo kojoj grešci, propustu i ostalim nedostacima u projektu i drugim dokumentima za radove, koji su otkriveni prilikom razmatranja Ugovora ili tokom procesa izvođenja radova.

Podklauzula 6.1 – Angažovanje osoblja i radnika

Dodati sljedeće stavove Klauzuli 6.1:

Izvođač može da angažuje bilo kog člana osoblja koji bi bio neophodan za izvršenje radova. Izvođač se mora pobrinuti o tome da svo osoblje ima potrebne vize za boravak i rad. Izvođač radova će biti odgovoran kada je u pitanu povratak na mjesto sa kojeg su bili angažovani ili u matičnu zemlju dovedenih članova osoblja Izvođača radova. U slučaju smrti u zemlji bilo kog člana osoblja ili članova njihovih porodica, Izvođač mora biti na sličan način odgovoran za organizovanje adekvatnih aranžmana za njihov povratak ili sahranu.

Podklauzula 6.5 – Radno vrijeme

Izbrisati ovu Podklauzulu.

Podklauzula 6.8 – Nadzor izvođača radova

Dodati sledeće stavove na Klauzuli 6.8:

Izvođač radova treba da predloži šefove gradilišta i pomoćnike šefova gradilišta sa odgovarajućim stručnim dozvolama i drugim odredbama koje su potrebne shodno važećim propisima u Crnoj Gori. Predloženi šefovi ili pomoćnici moraju uvijek biti prisutni na gradilištima u toku radnog vremena, kao i tokom aktuelnih radova. Ukoliko gore navedeno prisustvo nije ispunjeno, Investitor zadržava pravo da prekine radove, bez bilo kakvih potraživanja od strane ugovarača.

Investitor ima pravo da pismeno traži odlazak sa gradilišta bilo kog člana osoblja izvođača radova, koji zbog svog nedoličnog ponašanja i nemara krši disciplinu ili se ponaša na neadekvatan način u životnoj i radnoj sredini. Izvođač radova mora otpustiti i zamijeniti tu osobu.

Izvođač mora o svom trošku blagovremeno preduzeti sve propisane mjere, kako bi obezbijedio pravilno sprovođenje montažnih radova, opreme, instalacija, postrojenja i uređaja koji obezbjeđuju sigurnost rada, prolaznika, saobraćaja i susjednih objekata, kao i zaštitu životne i radne sredine.

Podklauzula 7.1 - Način izvođenja radova

Na kraju Podklauzule 7.1 dodati dolje navedeno:

Materijali koji će se koristiti moraju biti novi.

Podklauzula 7.3 – Inspekcija

U drugom pasusu (b) izbrisati sledeće riječi: "do stepena opisanog u Ugovoru".

Na kraju Podklauzule 7.3 dodati dolje navedeno:

Osoblje investitora, zaduženo za nadzor radova, može pristupati gradilištu bez ikakvih ograničenja.

Podklauzula 8.1: Početak radova

Podstav (a) se briše.

Podstav (b): riječi "u roku od 42 dana poslije" se brišu i umjesto njih se dodaje "u roku od 14 dana poslije".

Podklauzula 8.3 – Program radova

Nakon druge rečenice podklauzule 8.3 dodati sledeće:

"Dinamički plan će biti zamrznut, kao što je predviđeno u Tenderskoj dokumentaciji."

Riječi "za svaku glavnu fazu radova" iz pasusa (a) Podklauzule 8.3 zamjenjuje se sa "u svakoj fazi projektovanja, nabavke, ispitivanja, proizvodnje, isporuke na gradilištu, carinjenja, izgradnje, nadzora, montaže, puštanja u rad i probnog rada."

Na kraju podklauzule 8.3, poslednjoj rečenici dodati sledeće:

"u roku od dvije nedjelje od dana objavljivanja takvog obavještenja".

U poslednjem pasusu dodati sledeće:

Dinamički plan treba da bude program mrežnog tipa, koji će identifikovati kritični put kao i rano/kasno počinjanje, kao i datum završetka za sve aktivnosti. Plan treba da sadrži informacije koje će biti posvećene svakoj aktivnosti kako bi se realizovale u predviđenom roku.

Podklauzula 8.7 – Obeštećenje za kašnjenje

Podklauzuli 8.7 dodati sledeće:

U podklauzuli 8.7, suma iz druge rečenice je 0.1% od ugovorene cijene, kao obeštećenje za kašnjenje radova, koja će se moći plaćati na dnevnoj osnovi, proporcijalno valutama u kojima se ugovorena cijena plaća.

Maksimalni iznos obeštećenja za kašnjenje je deset posto (10%) od ugovorene cijene.

Podklauzula 9.1 – Obaveze izvođača radova

Na kraju poklauzule 9.1 dodati sledeće:

Tehnički prijem

Tehnički prijem će se vršiti u skladu sa Zakonom o uređenju prostora i izgradnji objekata (Službeni list RCG", broj 51/2008) sa Izmjenama i dopunama ("Službeni list RCG", broj 34/11).

Tehnički prijem će organizovati Investitor u roku od 21 dana od dana prijema obavještenja od strane Izvođača radova da su ugovorene usluge izvršene.

Podklauzula 10.1 – Prijem radova

Na kraju drugog pasusa dodati:

"Preduslov za podnošenje zahtjeva za prijem radova je prijem potvrde o upotrebi", to važi samo ukoliko kotao treba da se instalira.

Poslednji pasus Podklauzule 10.1 se briše.

Gore navedeni zahtjevi moraju se razmatrati u vremenskom rasporedu Izvođača.

Podklauzula 10.2 - Prijem pojedinih djelova radova

Izbrisati cijelu podklauzulu 10.2 i zamijeniti je dolje navedenim:

Djelovi radova se mogu preuzeti odvojeno. Preuzimanje djelova radova se vrši po odluci Investitora.

Podklauzula 11.1 – Završetak izuzetnih radova i otklanjanje nedostataka

Izbrisati sledeće iz prve rečenice:

"ili što je prije moguće nakon toga".

Dodati poklauzulu 11.1 (c):

"izvršiti sve izmjene, korekcije po potrebi za ispunjavanje uslova ugovora, i zamijeniti sve djelove i opremu koji su u kvaru".

Izmijeniti poslednju rečenicu podklauzule 11.1 sa dolje navedenim:

"Ukoliko se takav kvar ili oštećenje dogodi", Investitor ili Predstavnik Investitora će odmah obavijestiti Izvođača. Obavještenje o nedostacima se daje u pisanoj formi. Izvođač mora reagovati u roku od 7 dana od dana prijema obavještenja."

Podklauzula 11.3 –Produžetak perioda za obaveštenje o nedostacima

Dodati sledeće:

Ukoliko se, tokom roka za obavještenje o nedostacima, bude smatralo neophodnim da se zamjeni neki element zbog funkcionalnog kvara, rok za obavještenje o nedostacima za ovaj element počinje zamjenom ovog dijela.

Podklauzula 11.9 – Potvrda o dobrom izvršenju posla

Izbrisati sve stavove osim prvog i dodati sledeće:

Mjesec dana prije isteka roka za obavještenje o nedostacima, uključujući produžetke koji se odnose na podklauzule 11.3, Produžetak roka za obavještenje o nedostacima, nakon otklanjanja svih nedostaka, Izvođač će pismeno zahtijevati finalnu potvrdu o dobrom izvršenju posla i dostaviće Izjavu za finalno plaćanje.

Odmah nakon zahtjeva Izvođača, Investitor predlaže komisiju kako bi izvršila poslednji prijem, koji se sastoji od tehničkog prijema, samo u slučaju da je građevinska dozvola bila izdata, za ostale objekte prihvatanje od strane klijenta i obračun poslednje isplate. Komisija se predlaže i obavlja sve aktivnosti koje se odnose na prijem preuzimanje.

Investitor može smatrati neophodnim da se obave svi testovi potrebni za prijem. Obim i način ispitivanja su definisani u tehničkim uslovima i programu koji se odnosi na testiranja. Rezultati tih testova moraju ispuniti potrebne vrijednosti, pod uslovom da se korišćenje opreme vrši u skladu sa priručnikom za korišćenje i održavanje.

Ukoliko radovi ne ispunjavaju garantovane tehničke karakteristike, završni prijem biće odložen, a adekvatan period se odobrava Izvođaču za popravke, podešavanja i ponovna testiranja.

Ukoliko rezultati ponovljenih testiranja ne ispunjavaju garantovane tehničke karakteristike, sa propisanim tolerancijama, Investitor ima pravo da odbije prijem isporuke i radova koji su predmet podklauzule 11.4(c).

Ukoliko rezultati ponovljenih testiranja nisu prihvatljivi Ministarstvu ekonomije, izvršiće se novo testiranje. Za ove testove, Investitor je dužan da odredi kvalifikovanu instituciju ili institucije, koje nijesu bile uključene u prethodnim testiranjima. Troškove tih testiranja snovi strana koja se nije saglasila.

Ukoliko završni prijem nije završen i potvrda o dobro izvršenom poslu nije izdata 28 dana nakon isticanja perioda za obaveštavanje o manjkavostima, uključujući i produžetke navedene u podkauzuli 11.3, produžeci perioda za obaveštavanje o manjkavostima, izvođač ima pravo da zahtijeva dodatne troškove, koje će snositi investitor.

Smatraće se da samo potvrda o dobrom izvršenju predstavlja prijem radova.

Podklauzula 13.8 – Korekcije zbog izmjene u troškovima

Izbrisati cijelu podklauzulu 13.8

Podklauzula 14.1 – Ugovorna cijena

Dodati pasus (c) podklauzuli 14.1:

(c) sve količine koje mogu biti navedene u programu ili u opisu obima isporuke predstavljaju minimalne procijenjene količine i ne trebaju se smatrati stvarnim ili tačnim količinama radova, koje je Izvođač u obavezi da izvrši po sistemu "ključ u ruke", kako bi ispunio svrhu radova.

Podklauzula 14.2 – Avansno plaćanje

Izmijeniti i dopuniti stav (a) podklauzule 14.2, tako da glasi:

Investitor će uplatiti avans Izvođaču u iznosu od petnaest (15) posto od ugovorne cijene navedene u Ugovoru.

Podklauzula 14.4 – Vremenski raspored plaćanja

Podklauzula 14.4 se briše u cijelosti i mijenja na sledeći način:

Investitor je u obavezi da Izvođaču plati na sledeći način prilagođenu sumu iz Ugovora kako bi bili uključeni dodaci i odbici, shodno navedenom u ovim uslovima:

14.4.1 Raspored plaćanja

Plaćanje za nabavku i isporuku radova, montažu i radove niskogradnje uspostavlja se putem direktnog postupka isplate, u skladu sa KfW-ovim Smjernicama za isplate sredstava putem finansijske saradnje sa zemljama u razvoju i sličnim programima.

Investitor će platiti Izvođaču shodno uslovima i pravilima KfW-ovih smjernica za isplate, na sledeći način:

Za radove i izgradnju

15% ugovorne cijene kao avans shodno garanciji o avansnom plaćanju i potvrdi o dobrom izvršenju posla.
75% ugovorene cijene će se plaćati u dvomjesečne rate (tj. svaka 2 mjeseca), na osnovu napretka radova.
10% ugovorene cijene predstavlja iznos zadržanog novca koji će se uplatiti kao što je opisano u 14.9.

14.4.2 Ostali uslovi

Izvođač ne može tražiti dodatno plaćanje za prekovremeno radno vrijeme, dodatne materijale, posebne uslove, poteškoće ili slično.

Minimalni iznos zahtjeva za plaćanje

Zahtjev za plaćanje neće biti prihvaćen ukoliko je njegova neto vrijednost nakon svih zadržavanja i odbitaka manja od 2,5% od ugovorne cijene.

Zahtjev za plaćanje za izgradnju i građevinske radove

Potvrda o napretku ili završetku radova na gradilištu se mora priložiti, potpisana od strane Investitiora/Predstavnika Investitora.

Raspored isplata

Izvođač dostavlja, uz svaku fakturu, raspored isplata koji prikazuje: broj fakture, vrstu fakture, datum izdavanja računa, iznos fakture, primljen iznos, datum prijema. Ažurirana verzija dodaje se izvještajima o napretku.

Izvođač dostavlja aktuelni status fakturisanja za svaku tačku isporuke i usluga, proširujući liste cijena sledećim podacima (u elektronskoj formi): iznos računa, sadašnji iznos faktura i fakturisano, preostali iznos koji treba da se fakturiše. Elektronska verzija izmijenjene liste cijena šalje se zajedno sa svakom fakturom.

Podklauzula 14.8 – Odložena plaćanja

Izbrisati cijelu podklauzulu 14.8

Podklauzula 14.9 – Isplata zadržanog novca

Izbrisati poslednju rečenicu u prvom pasusu: Ukoliko je Potvrda o prijemu radova izdata samo za sekciju, relevantni procenat prve polovine zadržanog novca plaća se kada taj dio prođe sva testiranja.

Zamijeniti riječi “prva polovina zadržanog novca" u prvom pasusu sa “prvi dio”.

Zamijeniti riječi “druga polovina” u drugom pasusu sa “drugi dio”.

Zamijeniti riječi “bilo koje polovine” u trećem pasusu sa “bilo kog dijela”.

Na kraju podklauzule dodati:

Investitor je dužan da izvrši plaćanje drugog dijela zadržanog novca izvođaču radova ukoliko obezbijedi garanciju vidu obrasca od strane lica i odobrenu od strane Investitora, u iznosima i valutama jednakim tom plaćanju.

Izvođač mora obezbijediti da je garancija važeća i primjenljiva sve dok izvođač ne izvrši i završi radove i otkloni nedostatke, kako je navedeno u potvrdi o dobrom izvršenju posla u podklauzuli 4.2 i garancija će se shodno tome vratiti Izvođaču. Ovo puštanje zadržanog novca predstavljaće zamjenu za oslobađanje drugog dijela zadržanog novca, shodno drugom pasusu podklauzule 14.9.

Dodati Klauzuli 14 – Ugovorna cijena i plaćanje sledeće podklauzule:

Podklauzula 14.16 – Oporezivanje

Osim ukoliko nije drugačije navedeno, sledeće odredbe će se primijeniti za oporezivanje roba i usluga.

Neće biti oslobađanja od plaćanja poreza ili carine za bilo koju uslugu, materijal ili opremu koja se koristi u okviru ovog Ugovora.

Isplata prema Izvođaču za usluge od strane lokalnog osoblja neće biti oslobođene poreza na dobit u zemlji.

Odgovornost je izvođača da se u potpunosti upozna sa zakonom o porezu i akcizama zemlje prije početka Ugovora.

Izvođač se mora upoznati sa administrativnim procedurama za dobijanje dozvola i licenci za uvoz i pružiće podršku i sarađivaće sa Investitorom za dobijanje neophodnih dozvola i licenci i mora imati na raspolaganju sve neophodne i odgovarajuće dokumente u dogledno vrijeme.

Podklauzula 14.17 – Klauzula otplata

Ukoliko se plaćanja po osnovu ovog Ugovora za robe i usluge vrše iz fondova, bilo kojih naknada, garancija ili sličnih plaćanja ili osiguranja, plaćanja se vrše preko KfW, Frankfurt am Main (IBAN: DE53 5002 0400 3800 0000 00, BLZ 500 204 00, BIC: KFWIDEFF), broj računa 38 000 000 00 za račun Ministarstva ekonomije.

Takva sredstva mogu se ponovo koristiti za realizaciju projekata uz saglasnost KfW-a.

Podklauzula 17.2 – Izvođačeva briga o radovima

Treba dodati sledeći podstav:

Izvođač mora da provjeri ispravnost sve opreme prije dolaska na gradilište. Svi nedostaci otkriveni nakon dolaska opreme na gradilište ili tokom izvođenja radova, moraju se odmah nakon otkrivanja prijaviti poslodavcu i to se mora uključiti i naredni izvještaj o napretku.

Od početka do preuzimanja radova, Izvođač je dužan da o svom trošku obezbijedi stražara za opremu i materijale, sigurnosnu zaštitu od oštećenja, vremenskih uslova, uklanjanja ili oštećenja. Odgovornost je i obaveza Izvođača radova da izgradi ograde i skloništa, osvjetljenje, zaštitu i sve relevantne mjere za ispunjavanje svojih dužnosti.

Pored pravilnog skladištenja i čuvanja opreme, materijala, potrebnih alata za izvođenje radova, Izvođač mora pregledati količinu i kvalitet robe, kao i voditi evidenciju o primljenoj i isporučenoj opremi, zajedno sa tehničkom dokumentacijom.

Podklauzula 18.1 – Opšti uslovi za osiguranje

Zamijeniti šesti pasus podklauzule 18.1 “relevantna strana će…drugoj strani” sledećim:

“U roku od 28 dana (od početnog dana) Izvođač mora dostaviti Investitoru:”

Na kraju podklauzule 18.1 dodati sledeće:

Djelotvornost svih polisa osiguranja računaće se od prvog radnog dana nakon početka radova sve do izdavanja sertifikata o učinku u pogledu radova ili bilo kojeg dijela radova u zavisnosti od slučaja.

Osiguranje pokriva iznos od najmanje 110% ugovorene vrijednosti robe.

Podklauzula 18.2 – Osiguranje radova i opreme Izvođača

Treba dodati sledeći podstav:

Izvođač mora obezbijediti u ugovorenoj valuti osiguranje od svih vrsta rizika od strane eminentnog osiguravajućeg društva koja će pokriti sve troškove i izdatke za osiguranja sve dok je materijal pokriven unutrašnjim transportnim osiguranjem.

a) Troškovi osiguranja i isplata

Osiguranje se mora uzeti u slobodno-konvertibilnoj valuti, kada su u pitanju troškovi strane valute.

Napomena osiguranja će obezbijediti isplate za račun investitora, kao što je predviđeno podklauzulom 14.17.

b) Osiguranje mjesta za skladištenje/rad/montažu

Izvođač će obezbijediti osiguranje mjesta za skladištenje/rad/montažu uključujući odgovornost trećeg lica od strane eminentne osiguravajuće kuće u stranoj/domaćoj valuti kada je to neophodno i premijus plaćanje treba biti isplaćeno od strane izvođača u lokalnoj/stranoj valuti i potraživanja, ukoliko ih ima, se takođe vrše preko izvođača. Gore navedena polisa mora biti preduzeta od strane Izvođača kada se god to smatra neophodnim nakon dobijanja saglasnosti od strane Investitora. Osiguranje mora biti u skladu sa važećim zakonima i propisima zemlje. Osiguranje mora važiti do izdavanja potvrde o dobrom izvršenom poslu.

Podklauzula 18.3 – Osiguranje od povreda lica i štete imovini

Na kraju podklauzule 18.3 dodati sledeće:

Osiguranje mora biti u minimalnom iznosu od EUR 40.000, - po događaju ili ekvivalentni iznos u valuti zemlje.

Podklauzula 20.1 – Potraživanja ugovarača

Na kraju prvog pasusa dodati:

Obavještenje se mora pozvati na podklauzulu 20.1. Obavještenje mora biti u pisanoj formi (faks ili pismo, ali ne kao dio drugog dokumenta, npr. izvještaj o progresu) i predat ručno (sa potvrdom) ili poslat faksom. Obavještenje koje ne ispunjava ove uslove, smatraće se kao neuspjelo obavještenje o zahtjevu.

Podklauzula 20.3 – Nesaglasnost oko imenovanja Komisije za rješavanje sporova

Na kraju podkauzule 20.3 dodati sledeće:

Imenovano lice ili službenik mora biti predsjednik FIDIC-a ili lice koje imenuje predsjednik.

FIDIC - Fédération Internationale des Ingénieurs-Conseils
P.O. Box 86
CH-1000 Lausanne 12
Switzerland
Tel.: +41-21-653 5003 Fax: +41-21-6535432

Sudija koji je imenovan, smatraće se da je zajednički prihvaćen od strane investitora i izvođača.

E. General conditions of contract

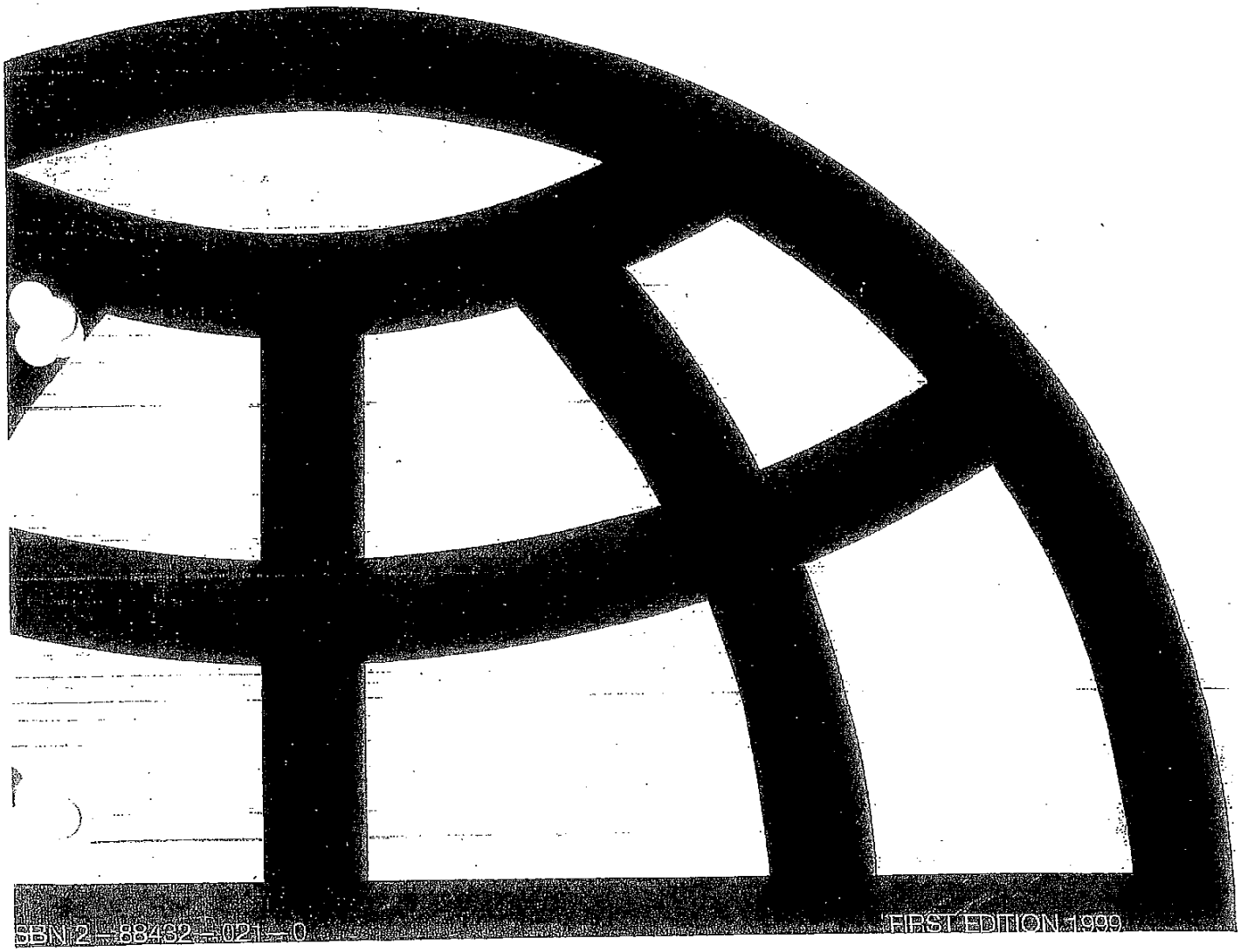
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General Conditions of Contract (FIDIC)

Fédération Internationale des Ingénieurs-Conseils
International Federation of Consulting Engineers
Internationale Vereinigung Beratender Ingenieure
Federación Internacional de Ingenieros Consultores

Conditions of Contract for **EPC/Turnkey Projects**

GENERAL CONDITIONS
GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS
FORMS OF TENDER, CONTRACT AGREEMENT AND
DISPUTE ADJUDICATION AGREEMENT



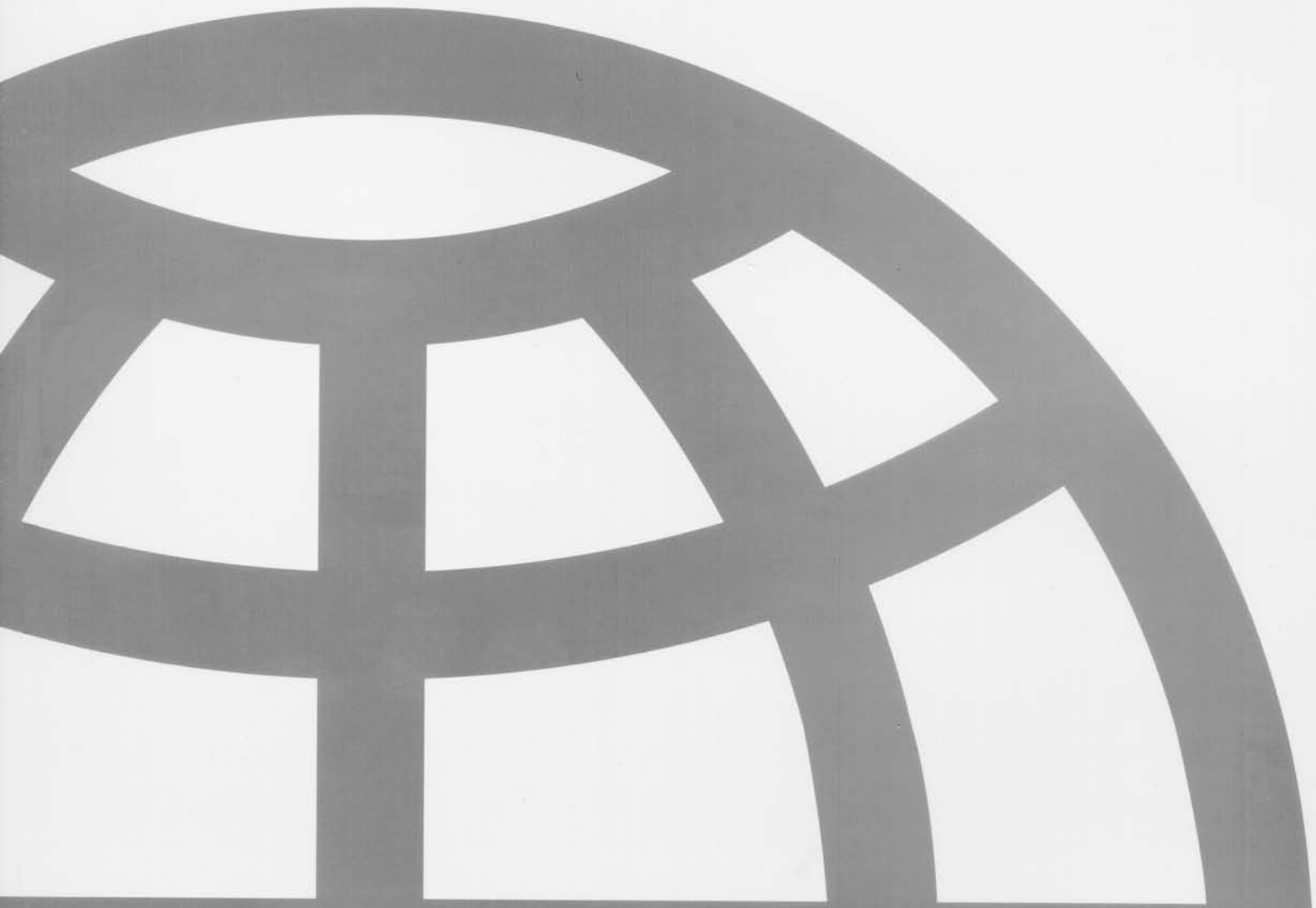
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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

ERRATA to the First Edition, 1999

The following significant errata are corrected in this reprinting of the First Edition of the EPC/Turnkey Contract. Several minor typographical errors and layout irregularities have also been corrected.

GENERAL PROVISIONS

Page 36 In the title of Sub-Clause 14.2, delete "Advanced" and substitute "Advance".

Page 54 In the fifth line of the fifth paragraph, after "Clause 20.4", insert the italicised title "[*Obtaining Dispute Adjudication Board's Decision*]".
Sub-Clause 20.4: in the fifth line, delete each of the italicised acronyms "*DAB*" and substitute the italicised "*Dispute Adjudication Board'"*.

Page 55 In the third paragraph: in the second line, delete the word "the" from the phrase "General Conditions of the Dispute Adjudication Agreement"; and in the sixth line, delete "Member" and substitute "member".

Page 59 In sub-paragraph (ii): delete "day's" and substitute "days'"; and in the third line, delete "an other" and substitute "another".
In the middle of the page, delete "Agreement until each member has been paid" and substitute "Agreement until each of the Members has been paid".
At the end of the next paragraph, after "a decision shall have", insert "been".
In the last sentence of Clause 6, delete the comma after the phrase "Any such notice".

Page 68 In the third line of Clause 6, delete the first two words "notice to".

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

Annexes Delete "© FIDIC".

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INTRODUCTORY NOTE TO FIRST EDITION

FIDIC's Red and Yellow Books (i.e. standard forms of contract for works of civil engineering construction and for electrical and mechanical works) have been in widespread use for several decades, and have been recognised - among other things - for their principles of balanced risk sharing between the Employer and the Contractor. These risk sharing principles have been beneficial for both parties, the Employer signing a contract at a lower price and only having further costs when particular unusual risks actually eventuate, and the Contractor avoiding pricing such risks which are not easy to evaluate. The principles of balanced risk sharing are continued in the new "Construction" and "Plant and Design-Build" Books.

During recent years it has been noticed that much of the construction market requires a form of contract where certainty of final price, and often of completion date, are of extreme importance. Employers on such turnkey projects are willing to pay more - sometimes considerably more - for their project if they can be more certain that the agreed final price will not be exceeded. Among such projects can be found many projects financed by private funds, where the lenders require greater certainty about a project's costs to the Employer than is allowed for under the allocation of risks provided for by FIDIC's traditional forms of contracts. Often the construction project (the EPC - Engineer, Procure, Construct - Contract) is only one part of a complicated commercial venture, and financial or other failure of this construction project will jeopardize the whole venture.

For such projects it is necessary for the Contractor to assume responsibility for a wider range of risks than under the traditional Red and Yellow Books. To obtain increased certainty of the final price, the Contractor is often asked to cover such risks as the occurrence of poor or unexpected ground conditions, and that what is set out in the requirements prepared by the Employer actually will result in the desired objective. If the Contractor is to carry such risks, the Employer obviously must give him the time and opportunity to obtain and consider all relevant information before the Contractor is asked to sign on a fixed contract price. The Employer must also realize that asking responsible contractors to price such risks will increase the construction cost and result in some projects not being commercially viable.

Even under such contracts the Employer does carry certain risks such as the risks of war, terrorism and the like and the other risks of Force Majeure, and it is always possible, and sometimes advisable, for the Parties to discuss other risk sharing arrangements before entering into the Contract. In the case of BOT (Build-Operate-Transfer) type projects, which are normally negotiated as a package, the allocation of risk provided for in the turnkey construction Contract negotiated initially between the Sponsors and the EPC Contractor may need to be adjusted in order to take into account the final allocation of all risks between the various contracts forming the total package.

Apart from the more recent and rapid development of privately financed projects demanding contract terms ensuring increased certainty of price, time and performance, it has long been apparent that many employers, particularly in the public sector, in a wide range of countries have demanded similar contract terms, at least for turnkey contracts. They have often irreverently taken the FIDIC Red or Yellow Books and altered the terms so that risks placed on the Employer in the FIDIC Books have been transferred to the Contractor, thus effectively removing FIDIC's traditional principles of balanced risk sharing. This need of many employers has not gone unnoticed, and FIDIC has considered it better for all parties for this need to be openly recognised and regularised. By providing a standard FIDIC form for use in such contracts, the Employer's requirements for more risk to be taken by the Contractor are clearly stated. Thus the Employer does not have to attempt to alter a standard form intended for another risk arrangement, and the Contractor is fully aware of

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the increased risks he must bear. Clearly the Contractor will rightly increase his tender price to account for such extra risks.

This form for EPC/Turnkey Projects is thus intended to be suitable, not only for EPC Contracts within a BOT or similar type venture, but also for all the many projects, both large and smaller, particularly E & M (Electrical and Mechanical) and other process plant projects, being carried out around the world by all types of employers, often in a civil law environment, where the government departments or private developers wish to implement their project on a fixed-price turnkey basis and with a strictly two party approach.

Employers using this form must realise that the "Employer's Requirements" which they prepare should describe the principle and basic design of the plant on a functional basis. The Tenderer should then be permitted and required to verify all relevant information and data and make any necessary investigations. He shall also carry out any necessary design and detailing of the specific equipment and plant he is offering, allowing him to offer solutions best suited to his equipment and experience. Therefore the tendering procedure has to permit discussions between the Tenderer and the Employer about technical matters and commercial conditions. All such matters, when agreed, shall then form part of the signed Contract.

Thereafter the Contractor should be given freedom to carry out the work in his chosen manner, provided the end result meets the performance criteria specified by the Employer. Consequently, the Employer should only exercise limited control over and should in general not interfere with the Contractor's work. Clearly the Employer will wish to know and follow progress of the work and be assured that the time programme is being followed. He will also wish to know that the work quality is as specified, that third parties are not being disturbed, that performance tests are met, and otherwise that the "Employer's Requirements" are being complied with.

A feature of this type of contract is that the Contractor has to prove the reliability and performance of his plant and equipment. Therefore special attention is given to the "Tests on Completion", which often take place over a considerable time period, and Taking Over shall take place only after successful completion of these tests.

FIDIC recognizes that privately-financed projects are usually subject to more negotiation than publicly-financed ones and that therefore changes are likely to have to be made in any standard form of contract proposed for projects within a BOT or similar type venture. Among other things, such form may need to be adapted to take account of the special, if not unique, characteristics of each project, as well as the requirements of lenders and others providing financing. Nevertheless, such changes do not do away with the need for a standard form.

These Conditions of Contract for EPC/Turnkey Projects are not suitable for use in the following circumstances:

- If there is insufficient time or information for tenderers to scrutinise and check the Employer's Requirements or for them to carry out their designs, risk assessment studies and estimating (taking particular account of Sub-Clauses 4.12 and 5.1).
- If construction will involve substantial work underground or work in other areas which tenderers cannot inspect.
- If the Employer intends to supervise closely or control the Contractor's work, or to review most of the construction drawings.
- If the amount of each interim payment is to be determined by an official or other intermediary.

FIDIC recommends that the Conditions of Contract for Plant and Design-Build be used in the above circumstances for Works designed by (or on behalf of) the Contractor.

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ACKNOWLEDGEMENTS

Fédération Internationale des Ingénieurs-Conseils (FIDIC) extends special thanks to the following members of its Update Task Group: Christopher Wade (Group Leader), SWECO-VBB, Sweden; Peter L Booen (Principal Drafter), GIBB Ltd, UK; Hermann Bayerlein, Fichtner, Germany; Christopher R Seppala (Legal Adviser), White & Case, France; and José F Speziale, IATASA, Argentina.

The preparation was carried out under the general direction of the FIDIC Contracts Committee which comprised John B Bowcock, Consulting Engineer, UK (Chairman); Michael Mortimer-Hawkins, SwedPower, Sweden; and Axel-Volkmar Jaeger, Schmidt Reuter Partner, Germany; together with K B (Tony) Norris as Special Adviser.

Drafts were reviewed by many persons and organisations, including those listed below. Their comments were duly studied by the Update Task Group and, where considered appropriate, have influenced the wording of the clauses. Mushtaq Ahmad, NESPAK, Pakistan; Peter Batty, Post Buckley International, USA; Roeland Bertrams, Clifford Chance, Netherlands; Charles G Borthwick, SwedPower, Sweden; Manfred Breege, Lahmeyer International, Germany; Pablo Bueno, TYPSA, Spain; Nael G Bunni, Consulting Engineer, Ireland; Ian Fraser, Beca Carter Hollings & Ferner, New Zealand; Roy Goode, Oxford University, UK; Dan W Graham, Bristows Cooke & Carpmael, UK; Mark Griffiths, Griffiths & Armour, UK; Geoffrey F Hawker, Consulting Engineer, UK; Hesse & Steinberger, VDMA, Germany; Poul E Hvilsted, Elsamprojekt, Denmark; Lennart Iwar, Lindahl, Sweden; Gordon L Jaynes, Whitman Breed Abbott & Morgan, UK; Tonny Jensen (Chairman of FIDIC Quality Management Committee), COWI, Denmark; Martin Klapper, Hopgood and Ganim, Australia; Philip Loots & Associates, South Africa; Neil McCole, Merz and McLellan, UK; Matthew Needham-Laing, Victoria Russell & Paul J Taylor, Berrymans Lace Mawer, UK; J Gordon Rees, Binnie Black & Veatch, UK; Tim Reynolds, Constant & Constant, UK; David R Wightman & Gerlando Butera, Nabarro Nathanson, UK; the Association of Japanese Consulting Engineers; the Construction Industry Authority of the Philippines; the Dutch Vereniging voor Bouwrecht; the European International Contractors (EIC); ORGAnisme de Liaison Industries Métalliques Européennes (ORGALIME); the International Association of Dredging Contractors; the International Bar Association; the Asian Development Bank; and the World Bank. Acknowledgement of reviewers does not mean that such persons or organizations approve of the wording of all clauses. In particular, EIC and ORGALIME have expressed reservations about some clauses of this EPC Contract.

FIDIC wishes to record its appreciation of the time and effort devoted by all the above.

The ultimate decision on the form and content of the document rests with FIDIC.

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FOREWORD

The Fédération Internationale des Ingénieurs-Conseils (FIDIC) published, in 1999, First Editions of four new standard forms of contract:

Conditions of Contract for Construction,
which are recommended for building or engineering works designed by the Employer or by his representative, the Engineer. Under the usual arrangements for this type of contract, the Contractor constructs the works in accordance with a design provided by the Employer. However, the works may include some elements of Contractor-designed civil, mechanical, electrical and/or construction works.

Conditions of Contract for Plant and Design-Build,
which are recommended for the provision of electrical and/or mechanical plant, and for the design and execution of building or engineering works. Under the usual arrangements for this type of contract, the Contractor designs and provides, in accordance with the Employer's requirements, plant and/or other works; which may include any combination of civil, mechanical, electrical and/or construction works.

Conditions of Contract for EPC/Turnkey Projects,
which may be suitable for the provision on a turnkey basis of a process or power plant, of a factory or similar facility, or of an infrastructure project or other type of development, where (i) a higher degree of certainty of final price and time is required, and (ii) the Contractor takes total responsibility for the design and execution of the project, with little involvement of the Employer. Under the usual arrangements for turnkey projects, the Contractor carries out all the Engineering, Procurement and Construction (EPC): providing a fully-equipped facility, ready for operation (at the "turn of the key").

Short Form of Contract,
which is recommended for building or engineering works of relatively small capital value. Depending on the type of work and the circumstances, this form may also be suitable for contracts of greater value, particularly for relatively simple or repetitive work or work of short duration. Under the usual arrangements for this type of contract, the Contractor constructs the works in accordance with a design provided by the Employer or by his representative (if any), but this form may also be suitable for a contract which includes, or wholly comprises, Contractor-designed civil, mechanical, electrical and/or construction works.

The forms are recommended for general use where tenders are invited on an international basis. Modifications may be required in some jurisdictions, particularly if the Conditions are to be used on domestic contracts. FIDIC considers the official and authentic texts to be the versions in the English language.

In the preparation of these Conditions of Contract for EPC/Turnkey Projects, it was recognised that, while there are many sub-clauses which will be generally applicable, there are some sub-clauses which must necessarily vary to take account of the

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circumstances relevant to the particular contract. The sub-clauses which were considered to be applicable to many (but not all) contracts have been included in the General Conditions, in order to facilitate their incorporation into each contract.

The General Conditions and the Particular Conditions will together comprise the Conditions of Contract governing the rights and obligations of the parties. It will be necessary to prepare the Particular Conditions for each individual contract, and to take account of those sub-clauses in the General Conditions which mention the Particular Conditions.

For this publication, the General Conditions were prepared on the following basis:

(i) interim payments, in respect of the lump sum Contract Price, will be made as work proceeds, and will typically be based on instalments specified in a schedule;

(ii) if the wording in the General Conditions necessitates further data which would typically be prescribed by the Employer, then the sub-clause makes reference to this data being contained in the Particular Conditions or in the Employer's Requirements;

(iii) where a sub-clause in the General Conditions deals with a matter on which different contract terms are likely to be applicable for different contracts, the principles applied in writing the sub-clause were:

(a) users would find it more convenient if any provisions which they did not wish to apply could simply be deleted or not invoked, than if additional text had to be written (in the Particular Conditions) because the General Conditions did not cover their requirements; or

(b) in other cases, where the application of (a) was thought to be inappropriate, the sub-clause contains the provisions which were considered applicable to most contracts.

For example, Sub-Clause 14.2 [*Advance Payment*] is included for convenience, not because of any FIDIC policy in respect of advance payments. This Sub-Clause becomes inapplicable (even if it is not deleted) if it is disregarded by not specifying the amount of the advance. It should therefore be noted that some of the provisions contained in the General Conditions may not be appropriate for an apparently-typical contract.

Further information on these aspects, example wording for other arrangements, and other explanatory material and a check-list and example wording to assist in the preparation of the Particular Conditions and the other tender documents, are included within this publication as Guidance for the Preparation of the Particular Conditions. Before incorporating any example wording, it must be checked to ensure that it is wholly suitable for the particular circumstances; if not, it must be amended.

Where example wording is amended, and in all cases where other amendments or additions are made, care must be taken to ensure that no ambiguity is created, either with the General Conditions or between the clauses in the Particular Conditions. It is essential that all these drafting tasks, and the entire preparation of the tender

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documents, are entrusted to personnel with the relevant expertise, including the contractual, technical and procurement aspects.

This publication concludes with example forms for the Letter of Tender, the Contract Agreement, and alternatives for the Dispute Adjudication Agreement. This Dispute Adjudication Agreement provides text for the agreement between the Employer, the Contractor and the person appointed to act either as sole adjudicator or as a member of a three-person dispute adjudication board; and incorporates (by reference) the terms in the Appendix to the General Conditions.

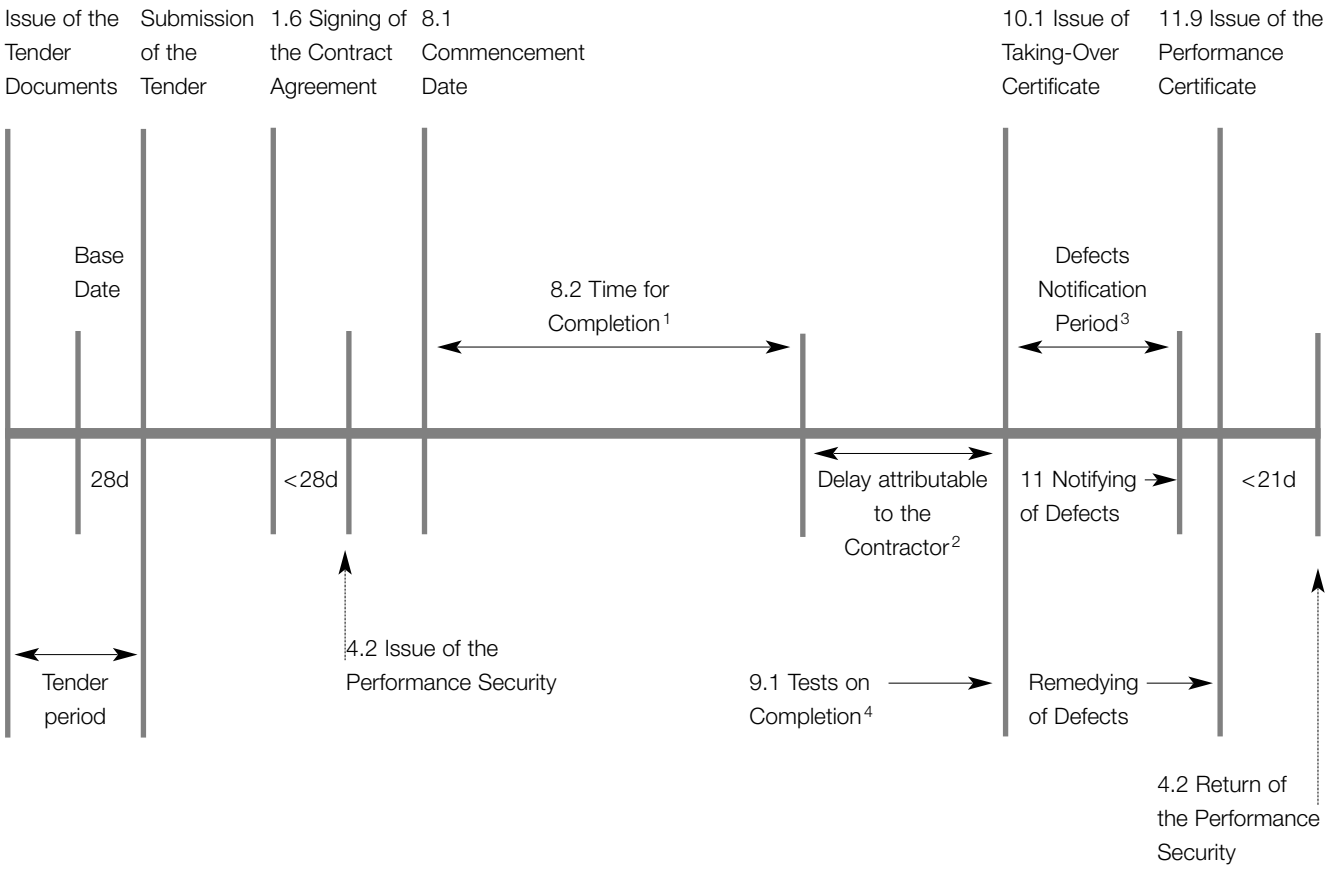
FIDIC intends to publish a guide to the use of its Conditions of Contract for Construction, for Plant and Design-Build, and for EPC/Turnkey Projects.

In order to clarify the sequence of Contract activities, reference may be made to the charts on the next two pages and to the Sub-Clauses listed below (some Sub-Clause numbers are also stated in the charts). The charts are illustrative and must not be taken into consideration in the interpretation of the Conditions of Contract.

1.1.3.1	&	13.7	Base Date
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1.1.6.6	&	4.2	Performance Security
1.1.3.3	&	8.2	Time for Completion (as extended under 8.4)
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1.1.3.6	&	12.1	Tests after Completion (if any)
1.1.3.7	&	11.1	Defects Notification Period (as extended under 11.3)
1.1.3.8	&	11.9	Performance Certificate

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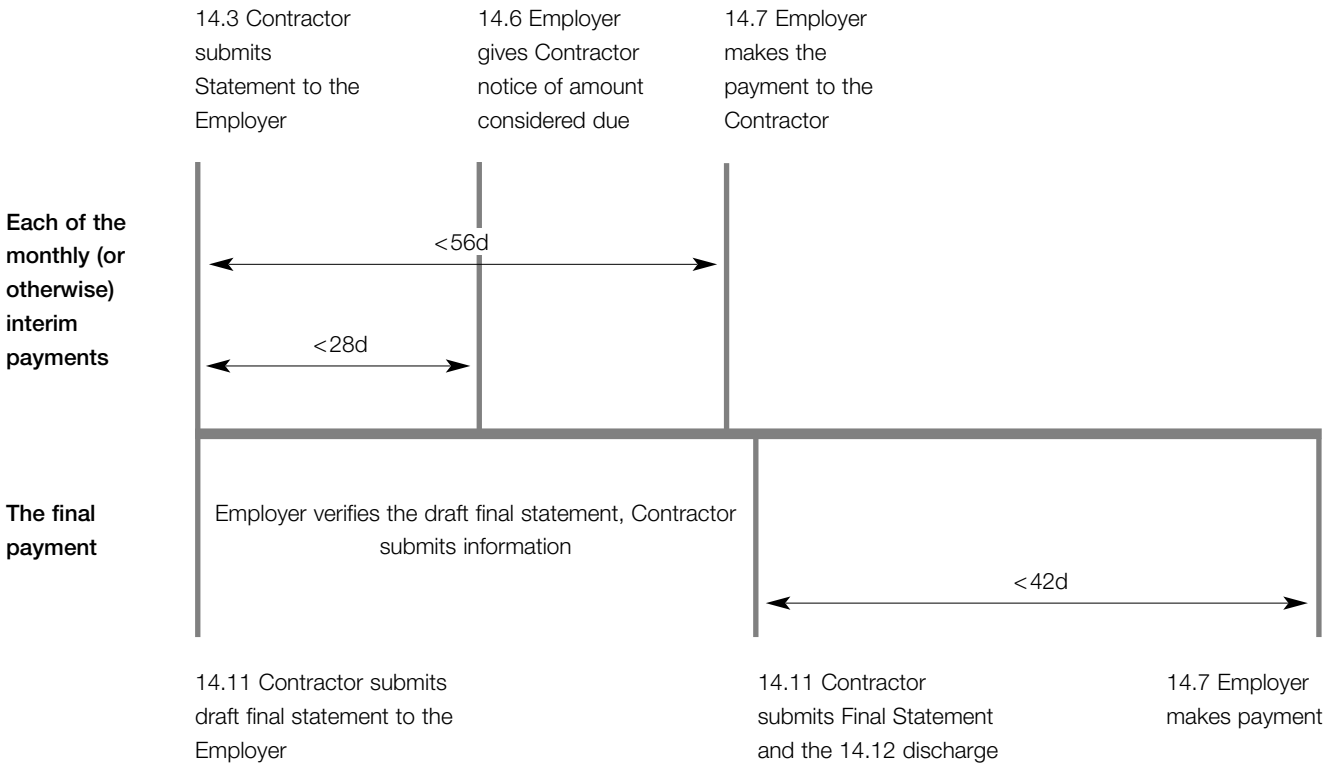


Typical sequence of Principal Events during Contracts for EC/Turnkey Projects

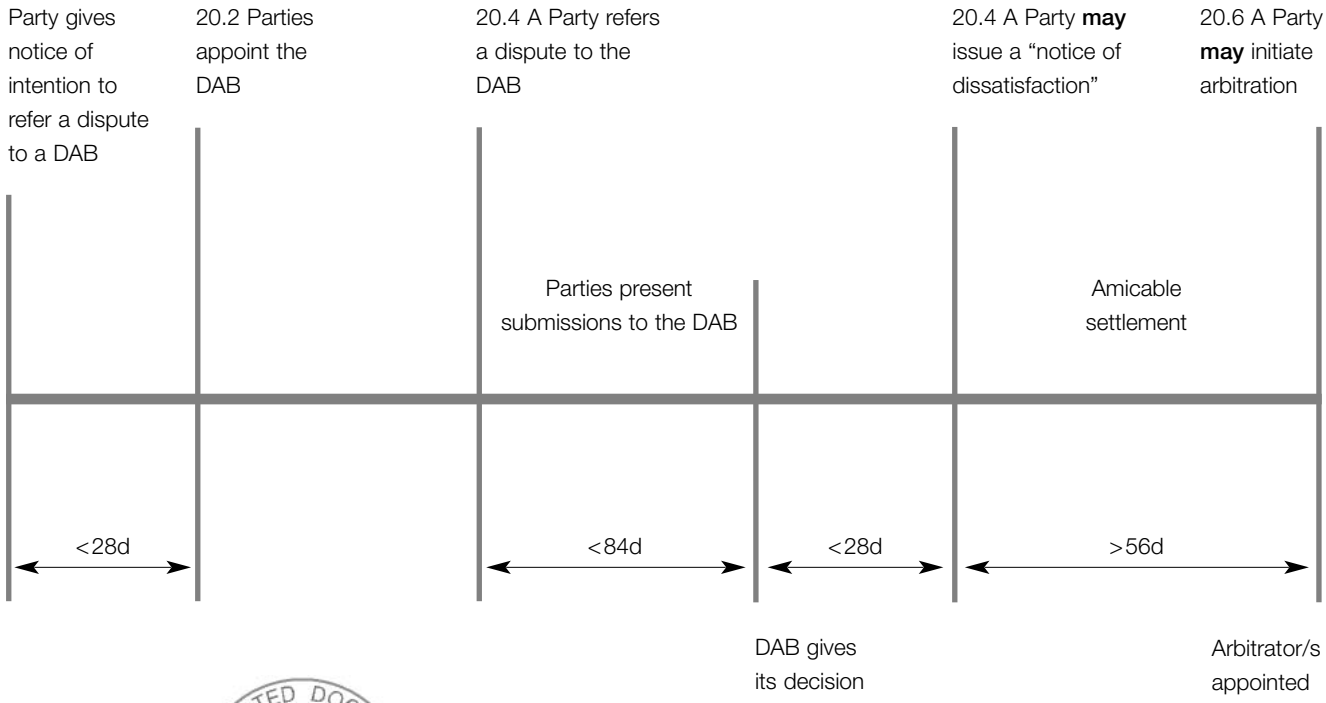
1. The Time for Completion is to be stated (in the Particular Conditions) as a number of days, to which is added any extensions of time under Sub-Clause 8.4.
2. In order to indicate the sequence of events, the above diagram is based upon the example of the Contractor failing to comply with Sub-Clause 8.2.
3. The Defects Notification Period is to be stated (in the Particular Conditions) as a number of days, to which is added any extensions under Sub-Clause 11.3.
4. Depending on the type of Works, Tests after Completion may also be required.

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Typical sequence of Payment Events envisaged in Clause 14



Typical sequence of Dispute Events envisaged in Clause 20

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GENERAL CONDITIONS

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

FORMS OF LETTER OF TENDER, CONTRACT AGREEMENT AND DISPUTE ADJUDICATION AGREEMENT

Conditions of Contract for **EPC/Turnkey Projects**

General Conditions

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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

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General Conditions

1 General Provisions

1.1 Definitions

In the Conditions of Contract ("these Conditions"), which include Particular Conditions and these General Conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.

1.1.1 The Contract

1.1.1.1 "**Contract**" means the Contract Agreement, these Conditions, the Employer's Requirements, the Tender, and the further documents (if any) which are listed in the Contract Agreement.

1.1.1.2 "**Contract Agreement**" means the contract agreement referred to in Sub-Clause 1.6 [*Contract Agreement*], including any annexed memoranda.

1.1.1.3 "**Employer's Requirements**" means the document entitled employer's requirements, as included in the Contract, and any additions and modifications to such document in accordance with the Contract. Such document specifies the purpose, scope, and/or design and/or other technical criteria, for the Works.

1.1.1.4 "**Tender**" means the Contractor's signed offer for the Works and all other documents which the Contractor submitted therewith (other than these Conditions and the Employer's Requirements, if so submitted), as included in the Contract.

1.1.1.5 "**Performance Guarantees**" and "**Schedule of Payments**" mean the documents so named (if any), as included in the Contract.

1.1.2 Parties and Persons

1.1.2.1 "**Party**" means the Employer or the Contractor, as the context requires.

1.1.2.2 "**Employer**" means the person named as employer in the Contract Agreement and the legal successors in title to this person.

1.1.2.3 "**Contractor**" means the person(s) named as contractor in the Contract Agreement and the legal successors in title to this person(s).

1.1.2.4 "**Employer's Representative**" means the person named by the Employer in the Contract or appointed from time to time by the Employer under Sub-Clause 3.1 [*The Employer's Representative*], who acts on behalf of the Employer.

1.1.2.5 "**Contractor's Representative**" means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under Sub-Clause 4.3 [*Contractor's Representative*], who acts on behalf of the Contractor.

1.1.2.6 "**Employer's Personnel**" means the Employer's Representative, the assistants referred to in Sub-Clause 3.2 [*Other Employer's Personnel*]

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and all other staff, labour and other employees of the Employer and of the Employer's Representative; and any other personnel notified to the Contractor, by the Employer or the Employer's Representative, as Employer's Personnel.

1.1.2.7 "**Contractor's Personnel**" means the Contractor's Representative and all personnel whom the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works.

1.1.2.8 "**Subcontractor**" means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.

1.1.2.9 "**DAB**" means the person or three persons so named in the Contract, or other person(s) appointed under Sub-Clause 20.2 [*Appointment of the Dispute Adjudication Board*] or Sub-Clause 20.3 [*Failure to Agree Dispute Adjudication Board*].

1.1.2.10 "**FIDIC**" means the Fédération Internationale des Ingénieurs-Conseils, the international federation of consulting engineers.

1.1.3 Dates, Tests, Periods and Completion

1.1.3.1 "**Base Date**" means the date 28 days prior to the latest date for submission of the Tender.

1.1.3.2 "**Commencement Date**" means the date notified under Sub-Clause 8.1 [*Commencement of Works*], unless otherwise defined in the Contract Agreement.

1.1.3.3 "**Time for Completion**" means the time for completing the Works or a Section (as the case may be) under Sub-Clause 8.2 [*Time for Completion*], as stated in the Particular Conditions (with any extension under Sub-Clause 8.4 [*Extension of Time for Completion*]), calculated from the Commencement Date.

1.1.3.4 "**Tests on Completion**" means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out under Clause 9 [*Tests on Completion*] before the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.5 "**Taking-Over Certificate**" means a certificate issued under Clause 10 [*Employer's Taking Over*].

1.1.3.6 "**Tests after Completion**" means the tests (if any) which are specified in the Contract and which are carried out under Clause 12 [*Tests after Completion*] after the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.7 "**Defects Notification Period**" means the period for notifying defects in the Works or a Section (as the case may be) under Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying Defects*], as stated in the Particular Conditions (with any extension under Sub-Clause 11.3 [*Extension of Defects Notification Period*]), calculated from the date on which the Works or Section is completed as certified under Sub-Clause

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10.1 [*Taking Over of the Works and Sections*]. If no such period is stated in the Particular Conditions, the period shall be one year.

1.1.3.8 "**Performance Certificate**" means the certificate issued under Sub-Clause 11.9 [*Performance Certificate*].

1.1.3.9 "**day**" means a calendar day and "**year**" means 365 days.

1.1.4 Money and Payments

1.1.4.1 "**Contract Price**" means the agreed amount stated in the Contract Agreement for the design, execution and completion of the Works and the remedying of any defects, and includes adjustments (if any) in accordance with the Contract.

1.1.4.2 "**Cost**" means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.

1.1.4.3 "**Final Statement**" means the statement defined in Sub-Clause 14.11 [*Application for Final Payment*].

1.1.4.4 "**Foreign Currency**" means a currency in which part (or all) of the Contract Price is payable, but not the Local Currency.

1.1.4.5 "**Local Currency**" means the currency of the Country.

1.1.4.6 "**Provisional Sum**" means a sum (if any) which is specified in the Contract as a provisional sum, for the execution of any part of the Works or for the supply of Plant, Materials or services under Sub-Clause 13.5 [*Provisional Sums*].

1.1.4.7 "**Retention Money**" means the accumulated retention moneys which the Employer retains under Sub-Clause 14.3 [*Application for Interim Payments*] and pays under Sub-Clause 14.9 [*Payment of Retention Money*].

1.1.4.8 "**Statement**" means a statement submitted by the Contractor as part of an application for payment under Clause 14 [*Contract Price and Payment*].

1.1.5 Works and Goods

1.1.5.1 "**Contractor's Equipment**" means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor's Equipment excludes Temporary Works, Employer's Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.

1.1.5.2 "**Goods**" means Contractor's Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.

1.1.5.3 "**Materials**" means things of all kinds (other than Plant) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.

1.1.5.4 "**Permanent Works**" means the permanent works to be designed and executed by the Contractor under the Contract.

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1.1.5.5 "**Plant**" means the apparatus, machinery and vehicles intended to form or forming part of the Permanent Works.

1.1.5.6 "**Section**" means a part of the Works specified in the Particular Conditions as a Section (if any).

1.1.5.7 "**Temporary Works**" means all temporary works of every kind (other than Contractor's Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.

1.1.5.8 "**Works**" mean the Permanent Works and the Temporary Works, or either of them as appropriate.

1.1.6 Other Definitions

1.1.6.1 "**Contractor's Documents**" means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature supplied by the Contractor under the Contract; as described in Sub-Clause 5.2 [*Contractor's Documents*].

1.1.6.2 "**Country**" means the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.

1.1.6.3 "**Employer's Equipment**" means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Employer's Requirements; but does not include Plant which has not been taken over by the Employer.

1.1.6.4 "**Force Majeure**" is defined in Clause 19 [*Force Majeure*].

1.1.6.5 "**Laws**" means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.

1.1.6.6 "**Performance Security**" means the security (or securities, if any) under Sub-Clause 4.2 [*Performance Security*].

1.1.6.7 "**Site**" means the places where the Permanent Works are to be executed and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.

1.1.6.8 "**Variation**" means any change to the Employer's Requirements or the Works, which is instructed or approved as a variation under Clause 13 [*Variations and Adjustments*].

1.2 Interpretation

In the Contract, except where the context requires otherwise:

(a) words indicating one gender include all genders;
(b) words indicating the singular also include the plural and words indicating the plural also include the singular;
(c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
(d) "written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

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The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

1.3

Communications

Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices and requests, these communications shall be:

(a) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as stated in the Particular Conditions; and
(b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract. However:

(i) if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and
(ii) if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to the address from which the request was issued.

Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed.

1.4

Law and Language

The Contract shall be governed by the law of the country (or other jurisdiction) stated in the Particular Conditions.

If there are versions of any part of the Contract which are written in more than one language, the version which is in the ruling language stated in the Particular Conditions shall prevail.

The language for communications shall be that stated in the Particular Conditions. If no language is stated there, the language for communications shall be the language in which the Contract (or most of it) is written.

1.5

Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

(a) the Contract Agreement,
(b) the Particular Conditions,
(c) these General Conditions,
(d) the Employer's Requirements,
(e) the Tender and any other documents forming part of the Contract.

1.6

Contract Agreement

The Contract shall come into full force and effect on the date stated in the Contract Agreement. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer.

1.7

Assignment

Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party:

(a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party, and

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(b) may, as security in favour of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.

1.8

Care and Supply of Documents

Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Employer six copies of each of the Contractor's Documents.

The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Employer's Requirements, the Contractor's Documents, and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.

If a Party becomes aware of an error or defect of a technical nature in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.

1.9

Confidentiality

Both Parties shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out obligations under it or to comply with applicable Laws. The Contractor shall not publish, permit to be published, or disclose any particulars of the Works in any trade or technical paper or elsewhere without the previous agreement of the Employer.

1.10

Employer's Use of Contractor's Documents

As between the Parties, the Contractor shall retain the copyright and other intellectual property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.

The Contractor shall be deemed (by signing the Contract) to give to the Employer a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:

(a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works,
(b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and
(c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor.

The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.

1.11

Contractor's Use of Employer's Documents

As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Employer's Requirements and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract.

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They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

1.12

Confidential Details

The Contractor shall not be required to disclose, to the Employer, any information which the Contractor described in the Tender as being confidential. The Contractor shall disclose any other information which the Employer may reasonably require in order to verify the Contractor's compliance with the Contract.

1.13

Compliance with Laws

The Contractor shall, in performing the Contract, comply with applicable Laws. Unless otherwise stated in the Particular Conditions:

(a) the Employer shall have obtained (or shall obtain) the planning, zoning or similar permission for the Permanent Works, and any other permissions described in the Employer's Requirements as having been (or being) obtained by the Employer; and the Employer shall indemnify and hold the Contractor harmless against and from the consequences of any failure to do so; and

(b) the Contractor shall give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the Laws in relation to the design, execution and completion of the Works and the remedying of any defects; and the Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so.

1.14

Joint and Several Liability

If the Contractor constitutes (under applicable Laws) a joint venture, consortium or other unincorporated grouping of two or more persons:

(a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;

(b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and

(c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.

2 The Employer

2.1

Right of Access to the Site

The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Particular Conditions. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Employer's Requirements. However, the Employer may withhold any such right or possession until the Performance Security has been received.

If no such time is stated in the Particular Conditions, the Employer shall give the Contractor right of access to, and possession of, the Site with effect from the Commencement Date.

If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall

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give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.

2.2

Permits, Licences or Approvals

The Employer shall (where he is in a position to do so) provide reasonable assistance to the Contractor at the request of the Contractor:

(a) by obtaining copies of the Laws of the Country which are relevant to the Contract but are not readily available, and
(b) for the Contractor's applications for any permits, licences or approvals required by the Laws of the Country:

    (i) which the Contractor is required to obtain under Sub-Clause 1.13 [*Compliance with Laws*],
    (ii) for the delivery of Goods, including clearance through customs, and
    (iii) for the export of Contractor's Equipment when it is removed from the Site.

2.3

Employer's Personnel

The Employer shall be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:

(a) co-operate with the Contractor's efforts under Sub-Clause 4.6 [*Co-operation*], and
(b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of Sub-Clause 4.8 [*Safety Procedures*] and under Sub-Clause 4.18 [*Protection of the Environment*].

2.4

Employer's Financial Arrangements

The Employer shall submit, within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price (as estimated at that time) in accordance with Clause 14 [*Contract Price and Payment*]. If the Employer intends to make any material change to his financial arrangements, the Employer shall give notice to the Contractor with detailed particulars.

2.5

Employer's Claims

If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, he shall give notice and particulars to the Contractor. However, notice is not required for payments due under Sub-Clause 4.19 [*Electricity, Water and Gas*], under Sub-Clause 4.20 [*Employer's Equipment and Free-Issue Material*], or for other services requested by the Contractor.

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The notice shall be given as soon as practicable after the Employer became aware of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.

The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Employer shall then proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defects Notification Period in accordance with Sub-Clause 11.3 [*Extension of Defects Notification Period*].

The Employer may deduct this amount from any moneys due, or to become due, to the Contractor. The Employer shall only be entitled to set off against or make any deduction from an amount due to the Contractor, or to otherwise claim against the Contractor, in accordance with this Sub-Clause or with sub-paragraph (a) and/or (b) of Sub-Clause 14.6 [*Interim Payments*].

3 The Employer's Administration

3.1 The Employer's Representative

The Employer may appoint an Employer's Representative to act on his behalf under the Contract. In this event, he shall give notice to the Contractor of the name, address, duties and authority of the Employer's Representative.

The Employer's Representative shall carry out the duties assigned to him, and shall exercise the authority delegated to him, by the Employer. Unless and until the Employer notifies the Contractor otherwise, the Employer's Representative shall be deemed to have the full authority of the Employer under the Contract, except in respect of Clause 15 [*Termination by Employer*].

If the Employer wishes to replace any person appointed as Employer's Representative, the Employer shall give the Contractor not less than 14 days' notice of the replacement's name, address, duties and authority, and of the date of appointment.

3.2 Other Employer's Personnel

The Employer or the Employer's Representative may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation or revocation shall not take effect until a copy of it has been received by the Contractor.

Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

3.3 Delegated Persons

All these persons, including the Employer's Representative and assistants, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by a delegated person, in accordance with the delegation, shall have the same effect as though the act had been an act of the Employer. However:

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(a) unless otherwise stated in the delegated person's communication relating to such act, it shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances;
(b) any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the Employer to reject the work, Plant or Materials; and
(c) if the Contractor questions any determination or instruction of a delegated person, the Contractor may refer the matter to the Employer, who shall promptly confirm, reverse or vary the determination or instruction.

3.4 Instructions

The Employer may issue to the Contractor instructions which may be necessary for the Contractor to perform his obligations under the Contract. Each instruction shall be given in writing and shall state the obligations to which it relates and the Sub-Clause (or other term of the Contract) in which the obligations are specified. If any such instruction constitutes a Variation, Clause 13 [*Variations and Adjustments*] shall apply.

The Contractor shall take instructions from the Employer, or from the Employer's Representative or an assistant to whom the appropriate authority has been delegated under this Clause.

3.5 Determinations

Whenever these Conditions provide that the Employer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Employer shall consult with the Contractor in an endeavour to reach agreement. If agreement is not achieved, the Employer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

The Employer shall give notice to the Contractor of each agreement or determination, with supporting particulars. Each Party shall give effect to each agreement or determination, unless the Contractor gives notice, to the Employer, of his dissatisfaction with a determination within 14 days of receiving it. Either Party may then refer the dispute to the DAB in accordance with Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*].

4 The Contractor

4.1 Contractor's General Obligations

The Contractor shall design, execute and complete the Works in accordance with the Contract, and shall remedy any defects in the Works. When completed, the Works shall be fit for the purposes for which the Works are intended as defined in the Contract.

The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

The Works shall include any work which is necessary to satisfy the Employer's Requirements, or is implied by the Contract, and all works which (although not mentioned in the Contract) are necessary for stability or for the completion, or safe and proper operation, of the Works.

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The Contractor shall be responsible for the adequacy, stability and safety of all Site operations, of all methods of construction and of all the Works.

The Contractor shall, whenever required by the Employer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Employer.

4.2 Performance Security

The Contractor shall obtain (at his cost) a Performance Security for proper performance, in the amount and currencies stated in the Particular Conditions. If an amount is not stated in the Particular Conditions, this Sub-Clause shall not apply.

The Contractor shall deliver the Performance Security to the Employer within 28 days after both Parties have signed the Contract Agreement. The Performance Security shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.

The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects. If the terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works have been completed and any defects have been remedied.

The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract in the event of:

(a) failure by the Contractor to extend the validity of the Performance Security as described in the preceding paragraph, in which event the Employer may claim the full amount of the Performance Security,
(b) failure by the Contractor to pay the Employer an amount due, as either agreed by the Contractor or determined under Sub-Clause 2.5 [*Employer's Claims*] or Clause 20 [*Claims, Disputes and Arbitration*], within 42 days after this agreement or determination,
(c) failure by the Contractor to remedy a default within 42 days after receiving the Employer's notice requiring the default to be remedied, or
(d) circumstances which entitle the Employer to termination under Sub-Clause 15.2 [*Termination by Employer*], irrespective of whether notice of termination has been given.

The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not entitled to make the claim.

The Employer shall return the Performance Security to the Contractor within 21 days after the Contractor has become entitled to receive the Performance Certificate.

4.3 Contractor's Representative

The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract.

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Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Employer for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked, or if the appointed person fails to act as Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.

The Contractor shall not, without the prior consent of the Employer, revoke the appointment of the Contractor's Representative or appoint a replacement.

The Contractor's Representative shall, on behalf of the Contractor, receive instructions under Sub-Clause 3.4 [*Instructions*].

The Contractor's Representative may delegate any powers, functions and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Employer has received prior notice signed by the Contractor's Representative, naming the person and specifying the powers, functions and authority being delegated or revoked.

The Contractor's Representative and all these persons shall be fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

4.4

Subcontractors

The Contractor shall not subcontract the whole of the Works.

The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as if they were the acts or defaults of the Contractor. Where specified in the Particular Conditions, the Contractor shall give the Employer not less than 28 days' notice of:

(a) the intended appointment of the Subcontractor, with detailed particulars which shall include his relevant experience,
(b) the intended commencement of the Subcontractor's work, and
(c) the intended commencement of the Subcontractor's work on the Site.

4.5

Nominated Subcontractors

In this Sub-Clause, "nominated Subcontractor" means a Subcontractor whom the Employer, under Clause 13 [*Variations and Adjustments*], instructs the Contractor to employ as a Subcontractor. The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by notice to the Employer as soon as practicable, with supporting particulars.

4.6

Co-operation

The Contractor shall, as specified in the Contract or as instructed by the Employer, allow appropriate opportunities for carrying out work to:

(a) the Employer's Personnel,
(b) any other contractors employed by the Employer, and
(c) the personnel of any legally constituted public authorities,

who may be employed in the execution on or near the Site of any work not included in the Contract.

Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to incur Cost in an amount which was not reasonably foreseeable by an

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experienced contractor by the date for submission of the Tender. Services for these personnel and other contractors may include the use of Contractor's Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.

The Contractor shall be responsible for his construction activities on the Site, and shall co-ordinate his own activities with those of other contractors to the extent (if any) specified in the Employer's Requirements.

If, under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Employer in the time and manner stated in the Employer's Requirements.

4.7 Setting Out

The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.

4.8 Safety Procedures

The Contractor shall:

(a) comply with all applicable safety regulations,
(b) take care for the safety of all persons entitled to be on the Site,
(c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,
(d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [*Employer's Taking Over*], and
(e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

4.9 Quality Assurance

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Employer shall be entitled to audit any aspect of the system.

Details of all procedures and compliance documents shall be submitted to the Employer for information before each design and execution stage is commenced. When any document of a technical nature is issued to the Employer, evidence of the prior approval by the Contractor himself shall be apparent on the document itself.

Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

4.10 Site Data

The Employer shall have made available to the Contractor for his information, prior to the Base Date, all relevant data in the Employer's possession on subsurface and hydrological conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data which come into the Employer's possession after the Base Date.

The Contractor shall be responsible for verifying and interpreting all such data. The Employer shall have no responsibility for the accuracy, sufficiency or completeness of such data, except as stated in Sub-Clause 5.1 [*General Design Responsibilities*].

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4.11 Sufficiency of the Contract Price

The Contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Contract Price.

Unless otherwise stated in the Contract, the Contract Price covers all the Contractor's obligations under the Contract (including those under Provisional Sums, if any) and all things necessary for the proper design, execution and completion of the Works and the remedying of any defects.

4.12 Unforeseeable Difficulties

Except as otherwise stated in the Contract:

(a) the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Works;
(b) by signing the Contract, the Contractor accepts total responsibility for having foreseen all difficulties and costs of successfully completing the Works; and
(c) the Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs.

4.13 Rights of Way and Facilities

The Contractor shall bear all costs and charges for special and/or temporary rights-of-way which he may require, including those for access to the Site. The Contractor shall also obtain, at his risk and cost, any additional facilities outside the Site which he may require for the purposes of the Works.

4.14 Avoidance of Interference

The Contractor shall not interfere unnecessarily or improperly with:

(a) the convenience of the public, or
(b) the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others.

The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

4.15 Access Route

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.

Except as otherwise stated in these Conditions:

(a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes;
(b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;
(c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route,
(d) the Employer does not guarantee the suitability or availability of particular access routes, and
(e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.

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4.16 Transport of Goods

Unless otherwise stated in the Particular Conditions:

(a) the Contractor shall give the Employer not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
(b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting all Goods and other things required for the Works; and
(c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.

4.17 Contractor's Equipment

The Contractor shall be responsible for all Contractor's Equipment. When brought on to the Site, Contractor's Equipment shall be deemed to be exclusively intended for the execution of the Works.

4.18 Protection of the Environment

The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values indicated in the Employer's Requirements, and shall not exceed the values prescribed by applicable Laws.

4.19 Electricity, Water and Gas

The Contractor shall, except as stated below, be responsible for the provision of all power, water and other services he may require.

The Contractor shall be entitled to use for the purposes of the Works such supplies of electricity, water, gas and other services as may be available on the Site and of which details and prices are given in the Employer's Requirements. The Contractor shall, at his risk and cost, provide any apparatus necessary for his use of these services and for measuring the quantities consumed.

The quantities consumed and the amounts due (at these prices) for such services shall be agreed or determined in accordance with Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*]. The Contractor shall pay these amounts to the Employer.

4.20 Employer's Equipment and Free-Issue Material

The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Employer's Requirements. Unless otherwise stated in the Employer's Requirements:

(a) the Employer shall be responsible for the Employer's Equipment, except that
(b) the Contractor shall be responsible for each item of Employer's Equipment whilst any of the Contractor's Personnel is operating it, driving it, directing it or in possession or control of it.

The appropriate quantities and the amounts due (at such stated prices) for the use of Employer's Equipment shall be agreed or determined in accordance with Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*]. The Contractor shall pay these amounts to the Employer.

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The Employer shall supply, free of charge, the "free-issue materials" (if any) in accordance with the details stated in the Employer's Requirements. The Employer shall, at his risk and cost, provide these materials at the time and place specified in the Contract. The Contractor shall then visually inspect them, and shall promptly give notice to the Employer of any shortage, defect or default in these materials. Unless otherwise agreed by both Parties, the Employer shall immediately rectify the notified shortage, defect or default.

After this visual inspection, the free-issue materials shall come under the care, custody and control of the Contractor. The Contractor's obligations of inspection, care, custody and control shall not relieve the Employer of liability for any shortage, defect or default not apparent from a visual inspection.

4.21

Progress Reports

Unless otherwise stated in the Particular Conditions, monthly progress reports shall be prepared by the Contractor and submitted to the Employer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates.

Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

Each report shall include:

(a) charts and detailed descriptions of progress, including each stage of design, Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection, testing, commissioning and trial operation;
(b) photographs showing the status of manufacture and of progress on the Site;
(c) for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:

  (i) commencement of manufacture,
  (ii) Contractor's inspections,
  (iii) tests, and
  (iv) shipment and arrival at the Site;

(d) the details described in Sub-Clause 6.10 [*Records of Contractor's Personnel and Equipment*];
(e) copies of quality assurance documents, test results and certificates of Materials;
(f) list of Variations, notices given under Sub-Clause 2.5 [*Employer's Claims*] and notices given under Sub-Clause 20.1 [*Contractor's Claims*];
(g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
(h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardize the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.

4.22

Security of the Site

Unless otherwise stated in the Particular Conditions:

(a) the Contractor shall be responsible for keeping unauthorised persons off the Site, and

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(b) authorised persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by (or on behalf of) the Employer, as authorised personnel of the Employer's other contractors on the Site.

4.23

Contractor's Operations on Site

The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Employer as working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.

During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.

Upon the issue of the Taking-Over Certificate for the Works, the Contractor shall clear away and remove all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave the Site and the Works in a clean and safe condition. However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfil obligations under the Contract.

4.24

Fossils

All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any of these findings.

The Contractor shall, upon discovery of any such finding, promptly give notice to the Employer, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this further notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

5 Design

5.1

General Design Obligations

The Contractor shall be deemed to have scrutinised, prior to the Base Date, the Employer's Requirements (including design criteria and calculations, if any). The Contractor shall be responsible for the design of the Works and for the accuracy of such Employer's Requirements (including design criteria and calculations), except as stated below.

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The Employer shall not be responsible for any error, inaccuracy or omission of any kind in the Employer's Requirements as originally included in the Contract and shall not be deemed to have given any representation of accuracy or completeness of any data or information, except as stated below. Any data or information received by the Contractor, from the Employer or otherwise, shall not relieve the Contractor from his responsibility for the design and execution of the Works.

However, the Employer shall be responsible for the correctness of the following portions of the Employer's Requirements and of the following data and information provided by (or on behalf of) the Employer:

(a) portions, data and information which are stated in the Contract as being immutable or the responsibility of the Employer,
(b) definitions of intended purposes of the Works or any parts thereof,
(c) criteria for the testing and performance of the completed Works, and
(d) portions, data and information which cannot be verified by the Contractor, except as otherwise stated in the Contract.

5.2 Contractor's Documents

The Contractor's Documents shall comprise the technical documents specified in the Employer's Requirements, documents required to satisfy all regulatory approvals, and the documents described in Sub-Clause 5.6 [*As-Built Documents*] and Sub-Clause 5.7 [*Operation and Maintenance Manuals*]. Unless otherwise stated in the Employer's Requirements, the Contractor's Documents shall be written in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

The Contractor shall prepare all Contractor's Documents, and shall also prepare any other documents necessary to instruct the Contractor's Personnel.

If the Employer's Requirements describe the Contractor's Documents which are to be submitted to the Employer for review, they shall be submitted accordingly, together with a notice as described below. In the following provisions of this Sub-Clause, (i) "review period" means the period required by the Employer for review, and (ii) "Contractor's Documents" exclude any documents which are not specified as being required to be submitted for review.

Unless otherwise stated in the Employer's Requirements, each review period shall not exceed 21 days, calculated from the date on which the Employer receives a Contractor's Document and the Contractor's notice. This notice shall state that the Contractor's Document is considered ready, both for review in accordance with this Sub-Clause and for use. The notice shall also state that the Contractor's Document complies with the Contract, or the extent to which it does not comply.

The Employer may, within the review period, give notice to the Contractor that a Contractor's Document fails (to the extent stated) to comply with the Contract. If a Contractor's Document so fails to comply, it shall be rectified, resubmitted and reviewed in accordance with this Sub-Clause, at the Contractor's cost.

For each part of the Works, and except to the extent that the Parties otherwise agree:

(a) execution of such part of the Works shall not commence prior to the expiry of the review periods for all the Contractor's Documents which are relevant to its design and execution;
(b) execution of such part of the Works shall be in accordance with these Contractor's Documents, as submitted for review; and

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(c) if the Contractor wishes to modify any design or document which has previously been submitted for review, the Contractor shall immediately give notice to the Employer. Thereafter, the Contractor shall submit revised documents to the Employer in accordance with the above procedure.

Any such agreement (under the preceding paragraph) or any review (under this Sub-Clause or otherwise) shall not relieve the Contractor from any obligation or responsibility.

5.3

Contractor's Undertaking

The Contractor undertakes that the design, the Contractor's Documents, the execution and the completed Works will be in accordance with:

(a) the Laws in the Country, and
(b) the documents forming the Contract, as altered or modified by Variations.

5.4

Technical Standards and Regulations

The design, the Contractor's Documents, the execution and the completed Works shall comply with the Country's technical standards, building, construction and environmental Laws, Laws applicable to the product being produced from the Works, and other standards specified in the Employer's Requirements, applicable to the Works, or defined by the applicable Laws.

All these Laws shall, in respect of the Works and each Section, be those prevailing when the Works or Section are taken over by the Employer under Clause 10 [*Employer's Taking Over*]. References in the Contract to published standards shall be understood to be references to the edition applicable on the Base Date, unless stated otherwise.

If changed or new applicable standards come into force in the Country after the Base Date, the Contractor shall give notice to the Employer and (if appropriate) submit proposals for compliance. In the event that:

(a) the Employer determines that compliance is required, and
(b) the proposals for compliance constitute a variation,

then the Employer shall initiate a Variation in accordance with Clause 13 [*Variations and Adjustments*].

5.5

Training

The Contractor shall carry out the training of Employer's Personnel in the operation and maintenance of the Works to the extent specified in the Employer's Requirements. If the Contract specifies training which is to be carried out before taking-over, the Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until this training has been completed.

5.6

As-Built Documents

The Contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the Works, showing the exact as-built locations, sizes and details of the work as executed. These records shall be kept on the Site and shall be used exclusively for the purposes of this Sub-Clause. Two copies shall be supplied to the Employer prior to the commencement of the Tests on Completion.

In addition, the Contractor shall supply to the Employer as-built drawings of the Works, showing all Works as executed, and submit them to the Employer for review

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under Sub-Clause 5.2 [*Contractor's Documents*]. The Contractor shall obtain the consent of the Employer as to their size, the referencing system, and other relevant details.

Prior to the issue of any Taking-Over Certificate, the Contractor shall supply to the Employer the specified numbers and types of copies of the relevant as-built drawings, in accordance with the Employer's Requirements. The Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until the Employer has received these documents.

5.7

Operation and Maintenance Manuals

Prior to commencement of the Tests on Completion, the Contractor shall supply to the Employer provisional operation and maintenance manuals in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair the Plant.

The Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until the Employer has received final operation and maintenance manuals in such detail, and any other manuals specified in the Employer's Requirements for these purposes.

5.8

Design Error

If errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the Contractor's Documents, they and the Works shall be corrected at the Contractor's cost, notwithstanding any consent or approval under this Clause.

6 Staff and Labour

6.1

Engagement of Staff and Labour

Except as otherwise stated in the Employer's Requirements, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, housing, feeding and transport.

6.2

Rates of Wages and Conditions of Labour

The Contractor shall pay rates of wages, and observe conditions of labour, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

6.3

Persons in the Service of Others

The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.

6.4

Labour Laws

The Contractor shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.

6.5

Working Hours

No work shall be carried out on the Site on locally recognised days of rest, or outside normal working hours, unless:

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(a) otherwise stated in the Contract,
(b) the Employer gives consent, or
(c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Employer.

6.6

Facilities for Staff and Labour

Except as otherwise stated in the Employer's Requirements, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Employer's Requirements.

The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

6.7

Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send, to the Employer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Employer may reasonably require.

6.8

Contractor's Superintendence

Throughout the design and execution of the Works, and as long thereafter as is necessary to fulfil the Contractor's obligations, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the work.

Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications (defined in Sub-Clause 1.4 [*Law and Language*]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works.

6.9

Contractor's Personnel

The Contractor's Personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. The Employer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:

(a) persists in any misconduct or lack of care,
(b) carries out duties incompetently or negligently,

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(c) fails to conform with any provisions of the Contract, or
(d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.

6.10

Records of Contractor's Personnel and Equipment

The Contractor shall submit, to the Employer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Employer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

6.11

Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.

7 Plant, Materials and Workmanship

7.1

Manner of Execution

The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:

(a) in the manner (if any) specified in the Contract,
(b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and
(c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.

7.2

Samples

The Contractor shall submit samples to the Employer, for review in accordance with the procedures for Contractor's Documents described in Sub-Clause 5.2 [*Contractor's Documents*], as specified in the Contract and at the Contractor's cost. Each sample shall be labelled as to origin and intended use in the Works.

7.3

Inspection

The Employer's Personnel shall at all reasonable times:

(a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
(b) during production, manufacture and construction (at the Site and, to the extent specified in the Contract, elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.

The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

In respect of the work which Employer's Personnel are entitled to examine, inspect, measure and/or test, the Contractor shall give notice to the Employer whenever any such work is ready and before it is covered up, put out of sight, or packaged for

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storage or transport. The Employer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Employer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Employer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.

7.4 Testing

This Sub-Clause shall apply to all tests specified in the Contract, other than the Tests after Completion (if any).

The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Employer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.

The Employer may, under Clause 13 [*Variations and Adjustments*], vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.

The Employer shall give the Contractor not less than 24 hours' notice of the Employer's intention to attend the tests. If the Employer does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Employer, and the tests shall then be deemed to have been made in the Employer's presence.

If the Contractor suffers delay and/or incurs Cost from complying with these instructions or as a result of a delay for which the Employer is responsible, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

The Contractor shall promptly forward to the Employer duly certified reports of the tests. When the specified tests have been passed, the Employer shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Employer has not attended the tests, he shall be deemed to have accepted the readings as accurate.

7.5 Rejection

If, as a result of an examination, inspection, measurement or testing, any Plant, Materials, design or workmanship is found to be defective or otherwise not in accordance with the Contract, the Employer may reject the Plant, Materials, design or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect and ensure that the rejected item complies with the Contract.

If the Employer requires this Plant, Materials, design or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and

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retesting cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer.

7.6

Remedial Work

Notwithstanding any previous test or certification, the Employer may instruct the Contractor to:

(a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract,
(b) remove and re-execute any other work which is not in accordance with the Contract, and
(c) execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

If the Contractor fails to comply with any such instruction, which complies with Sub-Clause 3.4 [*Instructions*], the Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay to the Employer all costs arising from this failure.

7.7

Ownership of Plant and Materials

Each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:

(a) when it is delivered to the Site;
(b) when the Contractor is entitled to payment of the value of the Plant and Materials under Sub-Clause 8.10 [*Payment for Plant and Materials in Event of Suspension*].

7.8

Royalties

Unless otherwise stated in the Employer's Requirements, the Contractor shall pay all royalties, rents and other payments for:

(a) natural Materials obtained from outside the Site, and
(b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.

8 Commencement, Delays and Suspension

8.1
Commencement of Works

Unless otherwise stated in the Contract Agreement:

(a) the Employer shall give the Contractor not less than 7 days' notice of the Commencement Date; and
(b) the Commencement Date shall be within 42 days after the date on which the Contract comes into full force and effect under Sub-Clause 1.6 [*Contract Agreement*].

The Contractor shall commence the design and execution of the Works as soon as is reasonably practicable after the Commencement Date, and shall then proceed with the Works with due expedition and without delay.

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8.2 Time for Completion

The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:

(a) achieving the passing of the Tests on Completion, and
(b) completing all work which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*].

8.3 Programme

The Contractor shall submit a time programme to the Employer within 28 days after the Commencement Date. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Unless otherwise stated in the Contract, each programme shall include:

(a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each major stage of the Works,
(b) the periods for reviews under Sub-Clause 5.2 [*Contractor's Documents*],
(c) the sequence and timing of inspections and tests specified in the Contract, and
(d) a supporting report which includes:

    (i) a general description of the methods which the Contractor intends to adopt for the execution of each major stage of the Works, and
    (ii) the approximate number of each class of Contractor's Personnel and of each type of Contractor's Equipment for each major stage.

Unless the Employer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.

The Contractor shall promptly give notice to the Employer of specific probable future events or circumstances which may adversely affect or delay the execution of the Works. In this event, or if the Employer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Employer in accordance with this Sub-Clause.

8.4 Extension of Time for Completion

The Contractor shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [*Taking Over of the Works and Sections*] is or will be delayed by any of the following causes:

(a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [*Variation Procedure*]),
(b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions, or
(c) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors on the Site.

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Employer in accordance with Sub-

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Clause 20.1 [*Contractor's Claims*]. When determining each extension of time under Sub-Clause 20.1, the Employer shall review previous determinations and may increase, but shall not decrease, the total extension of time.

8.5

Delays Caused by Authorities

If the following conditions apply, namely:

(a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,
(b) these authorities delay or disrupt the Contractor's work, and
(c) the delay or disruption was not reasonably foreseeable by an experienced contractor by the date for submission of the Tender,

then this delay or disruption will be considered as a cause of delay under sub-paragraph (b) of Sub-Clause 8.4 [*Extension of Time for Completion*].

8.6

Rate of Progress

If, at any time:

(a) actual progress is too slow to complete within the Time for Completion, and/or
(b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [*Programme*],

other than as a result of a cause listed in Sub-Clause 8.4 [*Extension of Time for Completion*], then the Employer may instruct the Contractor to submit, under Sub-Clause 8.3 [*Programme*], a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.

Unless the Employer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 8.7 below.

8.7

Delay Damages

If the Contractor fails to comply with Sub-Clause 8.2 [*Time for Completion*], the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Particular Conditions, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Particular Conditions.

These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [*Termination by Employer*] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.

8.8

Suspension of Work

The Employer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.

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The Employer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 8.9, 8.10 and 8.11 shall not apply.

8.9

Consequences of Suspension

If the Contractor suffers delay and/or incurs Cost from complying with the Employer's instructions under Sub-Clause 8.8 [*Suspension of Work*] and/or from resuming the work, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [*Suspension of Work*].

8.10

Payment for Plant and Materials in Event of Suspension

The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:

(a) the work on Plant or delivery of Plant and/or Materials has been suspended for more than 28 days, and
(b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Employer's instructions.

8.11

Prolonged Suspension

If the suspension under Sub-Clause 8.8 [*Suspension of Work*] has continued for more than 84 days, the Contractor may request the Employer's permission to proceed. If the Employer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Employer, treat the suspension as an omission under Clause 13 [*Variations and Adjustments*] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [*Termination by Contracto*r].

8.12

Resumption of Work

After the permission or instruction to proceed is given, the Parties shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension.

9 Tests on Completion

9.1 Contractor's Obligations

The Contractor shall carry out the Tests on Completion in accordance with this Clause and Sub-Clause 7.4, [*Testing*] after providing the documents in accordance with Sub-Clause 5.6 [*As-Built Documents*] and Sub-Clause 5.7 [*Operation and Maintenance Manuals*].

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The Contractor shall give to the Employer not less than 21 days' notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion. Unless otherwise agreed, Tests on Completion shall be carried out within 14 days after this date, on such day or days as the Employer shall instruct.

Unless otherwise stated in the Particular Conditions, the Tests on Completion shall be carried out in the following sequence:

(a) pre-commissioning tests, which shall include the appropriate inspections and ("dry" or "cold") functional tests to demonstrate that each item of Plant can safely under-take the next stage, (b);
(b) commissioning tests, which shall include the specified operational tests to demonstrate that the Works or Section can be operated safely and as specified, under all available operating conditions; and
(c) trial operation, which shall demonstrate that the Works or Section perform reliably and in accordance with the Contract.

During trial operation, when the Works are operating under stable conditions, the Contractor shall give notice to the Employer that the Works are ready for any other Tests on Completion, including performance tests to demonstrate whether the Works conform with criteria specified in the Employer's Requirements and with the Performance Guarantees.

Trial operation shall not constitute a taking-over under Clause 10 [*Employer's Taking Over*]. Unless otherwise stated in the Particular Conditions, any product produced by the Works during trial operation shall be the property of the Employer.

In considering the results of the Tests on Completion, appropriate allowances shall be made for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed each of the Tests on Completion described in sub-paragraph (a), (b) or (c), the Contractor shall submit a certified report of the results of these Tests to the Employer.

9.2 Delayed Tests

If the Tests on Completion are being unduly delayed by the Employer, Sub-Clause 7.4 [*Testing*] (fifth paragraph) and/or Sub-Clause 10.3 [*Interference with Tests on Completion*] shall be applicable.

If the Tests on Completion are being unduly delayed by the Contractor, the Employer may by notice require the Contractor to carry out the Tests within 21 days after receiving the notice. The Contractor shall carry out the Tests on such day or days within that period as the Contractor may fix and of which he shall give notice to the Employer

If the Contractor fails to carry out the Tests on Completion within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. These Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.

9.3 Retesting

If the Works, or a Section, fail to pass the Tests on Completion, Sub-Clause 7.5 [*Rejection*] shall apply, and the Employer or the Contractor may require the failed Tests, and Tests on Completion on any related work, to be repeated under the same terms and conditions.

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9.4 Failure to Pass Tests on Completion

If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 9.3 [*Retesting*], the Employer shall be entitled to:

(a) order further repetition of Tests on Completion under Sub-Clause 9.3;
(b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in sub-paragraph (c) of Sub-Clause 11.4 [*Failure to Remedy Defects*]; or
(c) issue a Taking-Over Certificate.

In the event of sub-paragraph (c), the Contractor shall proceed in accordance with all other obligations under the Contract, and the Contract Price shall be reduced by such amount as shall be appropriate to cover the reduced value to the Employer as a result of this failure. Unless the relevant reduction for this failure is stated (or its method of calculation is defined) in the Contract, the Employer may require the reduction to be (i) agreed by both Parties (in full satisfaction of this failure only) and paid before this Taking-Over Certificate is issued, or (ii) determined and paid under Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*].

10 Employer's Taking Over

10.1 Taking Over of the Works and Sections

Except as stated in Sub-Clause 9.4 [*Failure to Pass Tests on Completion*], the Works shall be taken over by the Employer when (i) the Works have been completed inaccordance with the Contract, including the matters described in Sub-Clause 8.2 [*Time for Completion*] and except as allowed in sub-paragraph (a) below, and (ii) a Taking-Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.

The Contractor may apply by notice to the Employer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.

The Employer shall, within 28 days after receiving the Contractor's application:

(a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or
(b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.

If the Employer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.

10.2 Taking Over of Parts of the Works

Parts of the Works (other than Sections) shall not be taken over or used by the Employer, except as may be stated in the Contract or as may be agreed by both Parties.

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10.3 Interference with Tests on Completion

If the Contractor is prevented, for more than 14 days, from carrying out the Tests on Completion by a cause for which the Employer is responsible, the Contractor shall carry out the Tests on Completion as soon as practicable.

If the Contractor suffers delay and/or incurs Cost as a result of this delay in carrying out the Tests on Completion, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

11 Defects Liability

11.1 Completion of Outstanding Work and Remedying Defects

In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract (fair wear and tear excepted) by the expiry date of the relevant Defects Notification Period or as soon as practicable thereafter, the Contractor shall:

(a) complete any work which is outstanding on the date stated in a Taking-Over Certificate, within such reasonable time as is instructed by the Employer, and
(b) execute all work required to remedy defects or damage, as may be notified by the Employer on or before the expiry date of the Defects Notification Period for the Works or Section (as the case may be).

If a defect appears or damage occurs, the Employer shall notify the Contractor accordingly.

11.2 Cost of Remedying Defects

All work referred to in sub-paragraph (b) of Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying Defects*] shall be executed at the risk and cost of the Contractor, if and to the extent that the work is attributable to:

(a) the design of the Works,
(b) Plant, Materials or workmanship not being in accordance with the Contract,
(c) improper operation or maintenance which was attributable to matters for which the Contractor is responsible (under Sub-Clauses 5.5 to 5.7 or otherwise), or
(d) failure by the Contractor to comply with any other obligation.

If and to the extent that such work is attributable to any other cause, the Employer shall give notice to the Contractor accordingly, and Sub-Clause 13.3 [*Variation Procedure*] shall apply.

11.3 Extension of Defects Notification Period

The Employer shall be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to an extension of the Defects Notification Period for the Works or a Section if and to the extent that the Works, Section or a major item of Plant (as the case may be, and after taking over) cannot be used for the purposes for which they are intended by reason of a defect or damage. However, a Defects Notification Period shall not be extended by more than two years.

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If delivery and/or erection of Plant and/or Materials was suspended under Sub-Clause 8.8 [*Suspension of Work*] or Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*], the Contractor's obligations under this Clause shall not apply to any defects or damage occurring more than two years after the Defects Notification Period for the Plant and/or Materials would otherwise have expired.

11.4

Failure to Remedy Defects

If the Contractor fails to remedy any defect or damage within a reasonable time, a date may be fixed by (or on behalf of) the Employer, on or by which the defect or damage is to be remedied. The Contractor shall be given reasonable notice of this date.

If the Contractor fails to remedy the defect or damage by this notified date and this remedial work was to be executed at the cost of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Employer may (at his option):

(a) carry out the work himself or by others, in a reasonable manner and at the Contractor's cost, but the Contractor shall have no responsibility for this work; and the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay to the Employer the costs reasonably incurred by the Employer in remedying the defect or damage;

(b) agree or determine a reasonable reduction in the Contract Price in accordance with Sub-Clause 3.5 [*Determinations*]; or

(c) if the defect or damage deprives the Employer of substantially the whole benefit of the Works or any major part of the Works, terminate the Contract as a whole, or in respect of such major part which cannot be put to the intended use. Without prejudice to any other rights, under the Contract or otherwise, the Employer shall then be entitled to recover all sums paid for the Works or for such part (as the case may be), plus financing costs and the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor.

11.5

Removal of Defective Work

If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.

11.6

Further Tests

If the work of remedying of any defect or damage may affect the performance of the Works, the Employer may require the repetition of any of the tests described in the Contract, including Tests on Completion and/or Tests after Completion. The requirement shall be made by notice within 28 days after the defect or damage is remedied.

These tests shall be carried out in accordance with the terms applicable to the previous tests, except that they shall be carried out at the risk and cost of the Party liable, under Sub-Clause 11.2 [*Cost of Remedying Defects*], for the cost of the remedial work.

11.7

Right of Access

Until the Performance Certificate has been issued, the Contractor shall have the right of access to all parts of the Works and to records of the operation and performance of the Works, except as may be inconsistent with the Employer's reasonable security restrictions.

11.8

Contractor to Search

The Contractor shall, if required by the Employer, search for the cause of any defect, under the direction of the Employer. Unless the defect is to be remedied at the cost

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of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Cost of the search plus reasonable profit shall be agreed or determined in accordance with Sub-Clause 3.5 [*Determinations*] and shall be added to the Contract Price.

11.9

Performance Certificate

Performance of the Contractor's obligations shall not be considered to have been completed until the Employer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.

The Employer shall issue the Performance Certificate within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects. If the Employer fails to issue the Performance Certificate accordingly:

(a) the Performance Certificate shall be deemed to have been issued on the date 28 days after the date on which it should have been issued, as required by this Sub-Clause, and
(b) Sub-Clause 11.11 [*Clearance of Site*] and sub-paragraph (a) of Sub-Clause 14.14 [*Cessation of Employer's Liability*] shall be inapplicable.

Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

11.10

Unfulfilled Obligations

After the Performance Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.

11.11

Clearance of Site

Upon receiving the Performance Certificate, the Contractor shall remove any remaining Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works from the Site.

If all these items have not been removed within 28 days after the Employer issues the Performance Certificate, the Employer may sell or otherwise dispose of any remaining items. The Employer shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site.

Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.

12 Tests after Completion

12.1

Procedure for Tests after Completion

If Tests after Completion are specified in the Contract, this Clause shall apply. Unless otherwise stated in the Particular Conditions:

(a) the Employer shall provide all electricity, fuel and materials, and make the Employer's Personnel and Plant available;
(b) the Contractor shall provide any other plant, equipment and suitably qualified

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and experienced staff, as are necessary to carry out the Tests after Completion efficiently; and

(c) the Contractor shall carry out the Tests after Completion in the presence of such Employer's and/or Contractor's Personnel as either Party may reasonably request.

The Tests after Completion shall be carried out as soon as is reasonably practicable after the Works or Section have been taken over by the Employer. The Employer shall give to the Contractor 21 days' notice of the date after which the Tests after Completion will be carried out. Unless otherwise agreed, these Tests shall be carried out within 14 days after this date, on the day or days determined by the Employer.

The results of the Tests after Completion shall be compiled and evaluated by the Contractor, who shall prepare a detailed report. Appropriate account shall be taken of the effect of the Employer's prior use of the Works.

12.2

Delayed Tests

If the Contractor incurs Cost as a result of any unreasonable delay by the Employer to the Tests after Completion, the Contractor shall (i) give notice to the Employer and (ii) be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this Cost and profit.

If, for reasons not attributable to the Contractor, a Test after Completion on the Works or any Section cannot be completed during the Defects Notification Period (or any other period agreed upon by both Parties), then the Works or Section shall be deemed to have passed this Test after Completion.

12.3

Retesting

If the Works, or a Section, fail to pass the Tests after Completion:

(a) sub-paragraph (b) of Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying of Defects*] shall apply, and

(b) either Party may then require the failed Tests, and the Tests after Completion on any related work, to be repeated under the same terms and conditions.

If and to the extent that this failure and retesting are attributable to any of the matters listed in sub-paragraphs (a) to (d) of Sub-Clause 11.2 [*Cost of Remedying Defects*] and cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer.

12.4

Failure to Pass Tests after Completion

If the following conditions apply, namely:

(a) the Works, or a Section, fail to pass any or all of the Tests after Completion,

(b) the relevant sum payable as non-performance damages for this failure is stated (or its method of calculation is defined) in the Contract, and

(c) the Contractor pays this relevant sum to the Employer during the Defects Notification Period,

then the Works or Section shall be deemed to have passed these Tests after Completion.

If the Works, or a Section, fail to pass a Test after Completion and the Contractor proposes to make adjustments or modifications to the Works or such Section, the Contractor may be instructed by (or on behalf of) the Employer that right of access to

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the Works or Section cannot be given until a time that is convenient to the Employer. The Contractor shall then remain liable to carry out the adjustments or modifications and to satisfy this Test, within a reasonable period of receiving notice by (or on behalf of) the Employer of the time that is convenient to the Employer. However, if the Contractor does not receive this notice during the relevant Defects Notification Period, the Contractor shall be relieved of this obligation and the Works or Section (as the case may be) shall be deemed to have passed this Test after Completion.

If the Contractor incurs additional Cost as a result of any unreasonable delay by the Employer in permitting access to the Works or Plant by the Contractor, either to investigate the causes of a failure to pass a Test after Completion or to carry out any adjustments or modifications, the Contractor shall (i) give notice to the Employer and (ii) be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this Cost and profit.

13 Variations and Adjustments

13.1
Right to Vary

Variations may be initiated by the Employer at any time prior to issuing the Taking-Over Certificate for the Works, either by an instruction or by a request for the Contractor to submit a proposal. A Variation shall not comprise the omission of any work which is to be carried out by others.

The Contractor shall execute and be bound by each Variation, unless the Contractor promptly gives notice to the Employer stating (with supporting particulars) that (i) the Contractor cannot readily obtain the Goods required for the Variation, (ii) it will reduce the safety or suitability of the Works, or (iii) it will have an adverse impact on the achievement of the Performance Guarantees. Upon receiving this notice, the Employer shall cancel, confirm or vary the instruction.

13.2
Value Engineering

The Contractor may, at any time, submit to the Employer a written proposal which (in the Contractor's opinion) will, if adopted, (i) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer.

The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [*Variation Procedure*].

13.3
Variation Procedure

If the Employer requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:

(a) a description of the proposed design and/or work to be performed and a programme for its execution,
(b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [*Programme*] and to the Time for Completion, and
(c) the Contractor's proposal for adjustment to the Contract Price.

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The Employer shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [*Value Engineering*] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.

Each instruction to execute a Variation, with any requirements for the recording of Costs, shall be issued by the Employer to the Contractor, who shall acknowledge receipt.

Upon instructing or approving a Variation, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine adjustments to the Contract Price and the Schedule of Payments. These adjustments shall include reasonable profit, and shall take account of the Contractor's submissions under Sub-Clause 13.2 [*Value Engineering*] if applicable.

13.4 Payment in Applicable Currencies

If the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved or determined as stated above, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.

13.5 Provisional Sums

Each Provisional Sum shall only be used, in whole or in part, in accordance with the Employer's instructions, and the Contract Price shall be adjusted accordingly. The total sum paid to the Contractor shall include only such amounts, for the work, supplies or services to which the Provisional Sum relates, as the Employer shall have instructed. For each Provisional Sum, the Employer may instruct:

(a) work to be executed (including Plant, Materials or services to be supplied) by the Contractor and valued under Sub-Clause 13.3 [*Variation Procedure*]; and/or

(b) Plant, Materials or services to be purchased by the Contractor, for which there shall be added to the Contract Price less the original Provisional Sums:

  (i) the actual amounts paid (or due to be paid) by the Contractor, and

  (ii) a sum for overhead charges and profit, calculated as a percentage of these actual amounts by applying the relevant percentage rate (if any) stated in the Contract.

The Contractor shall, when required by the Employer, produce quotations, invoices, vouchers and accounts or receipts in substantiation.

13.6 Daywork

For work of a minor or incidental nature, the Employer may instruct that a Variation shall be executed on a daywork basis. The work shall then be valued in accordance with the daywork schedule included in the Contract, and the following procedure shall apply. If a daywork schedule is not included in the Contract, this Sub-Clause shall not apply.

Before ordering Goods for the work, the Contractor shall submit quotations to the Employer. When applying for payment, the Contractor shall submit invoices, vouchers and accounts or receipts for any Goods.

Except for any items for which the daywork schedule specifies that payment is not due, the Contractor shall deliver each day to the Employer accurate statements in

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duplicate which shall include the following details of the resources used in executing the previous day's work:

(a) the names, occupations and time of Contractor's Personnel,
(b) the identification, type and time of Contractor's Equipment and Temporary Works, and
(c) the quantities and types of Plant and Materials used.

One copy of each statement will, if correct, or when agreed, be signed by the Employer and returned to the Contractor. The Contractor shall then submit priced statements of these resources to the Employer, prior to their inclusion in the next Statement under Sub-Clause 14.3 [*Application for Interim Payments*].

13.7

Adjustments for Changes in Legislation

The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.

If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 *[Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determination*s] to agree or determine these matters.

13.8

Adjustments for Changes in Costs

If the Contract Price is to be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, the adjustments shall be calculated in accordance with the provisions in the Particular Conditions.

14 Contract Price and Payment

14.1

The Contract Price

Unless otherwise stated in the Particular Conditions:

(a) payment for the Works shall be made on the basis of the lump sum Contract Price, subject to adjustments in accordance with the Contract; and
(b) the Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs, except as stated in Sub-Clause 13.7 [*Adjustments for Changes in Legislation*].

14.2

Advance Payment

The Employer shall make an advance payment, as an interest-free loan for mobilization and design, when the Contractor submits a guarantee in accordance with this Sub-Clause including the details stated in the Particular Conditions. If the Particular Conditions does not state:

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(a) the amount of the advance payment, then this Sub-Clause shall not apply;
(b) the number and timing of instalments, then there shall be only one;
(c) the applicable currencies and proportions, then they shall be those in which the Contract Price is payable; and/or
(d) the amortisation rate for repayments, then it shall be calculated by dividing the total amount of the advance payment by the Contract Price stated in the Contract Agreement less Provisional Sums.

The Employer shall pay the first instalment after receiving (i) a Statement (under Sub-Clause 14.3 [*Application for Interim Payments*]), (ii) the Performance Security in accordance with Sub-Clause 4.2 [*Performance Security*], and (iii) a guarantee in amounts and currencies equal to the advance payment. This guarantee shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer. Unless and until the Employer receives this guarantee, this Sub-Clause shall not apply.

The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount may be progressively reduced by the amount repaid by the Contractor. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.

The advance payment shall be repaid through proportional deductions in interim payments. Deductions shall be made at the amortization rate stated in the Particular Conditions (or, if not so stated, as stated in sub-paragraph (d) above), which shall be applied to the amount otherwise due (excluding the advance payment and deductions and repayments of retention), until such time as the advance payment has been repaid.

If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [*Termination by Employer*], Clause 16 [*Suspension and Termination by Contractor*] or Clause 19 [*Force Majeure*] (as the case may be), the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer.

14.3

Application for Interim Payments

The Contractor shall submit a Statement in six copies to the Employer after the end of the period of payment stated in the Contract (if not stated, after the end of each month), in a form approved by the Employer, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the relevant report on progress in accordance with Sub-Clause 4.21 [*Progress Reports*].

The Statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable, in the sequence listed:

(a) the estimated contract value of the Works executed and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (f) below);
(b) any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] and Sub-Clause 13.8 [*Adjustments for Changes in Cost*];
(c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Particular Conditions to the total of the

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above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Particular Conditions;

(d) any amounts to be added and deducted for the advance payment and repayments in accordance with Sub-Clause 14.2 [*Advance Payment*];

(e) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 20 [*Claims, Disputes and Arbitration*]; and

(f) the deduction of amounts included in previous Statements.

14.4

Schedule of Payments

If the Contract includes a Schedule of Payments specifying the instalments in which the Contract Price will be paid, then unless otherwise stated in this Schedule:

(a) the instalments quoted in the Schedule of Payments shall be the estimated contract values for the purposes of sub-paragraph (a) of Sub-Clause 14.3 [*Application for Interim Payments*], subject to Sub-Clause 14.5 [*Plant and Materials intended for the Works*]; and

(b) if these instalments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to be less than that on which the Schedule of Payments was based, then the Employer may proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine revised instalments, which shall take account of the extent to which progress is less than that on which the instalments were previously based.

If the Contract does not include a Schedule of Payments, the Contractor shall submit non-binding estimates of the payments which he expects to become due during each quarterly period. The first estimate shall be submitted within 42 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals, until the Taking-Over Certificate has been issued for the Works.

14.5

Plant and Materials intended for the Works

If the Contractor is entitled, under the Contract, to an interim payment for Plant and Materials which are not yet on the Site, the Contractor shall nevertheless not be entitled to such payment unless:

(a) the relevant Plant and Materials are in the Country and have been marked as the Employer's property in accordance with the Employer's instructions; or

(b) the Contractor has delivered, to the Employer, evidence of insurance and a bank guarantee in a form and issued by an entity approved by the Employer in amounts and currencies equal to such payment. This guarantee may be in a similar form to the form referred to in Sub-Clause 14.2 [*Advance Payment*] and shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration.

14.6

Interim Payments

No amount will be paid until the Employer has received and approved the Performance Security. Thereafter, the Employer shall within 28 days after receiving a Statement and supporting documents, give to the Contractor notice of any items in the Statement with which the Employer disagrees, with supporting particulars. Payments due shall not be withheld, except that:

(a) if any thing supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or

(b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Employer, the

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value of this work or obligation may be withheld until the work or obligation has been performed.

The Employer may, by any payment, make any correction or modification that should properly be made to any amount previously considered due. Payment shall not be deemed to indicate the Employer's acceptance, approval, consent or satisfaction.

14.7

Timing of Payments

Except as otherwise stated in Sub-Clause 2.5 [*Employer's Claims*], the Employer shall pay to the Contractor:

(a) the first instalment of the advance payment within 42 days after the date on which the Contract came into full force and effect or within 21 days after the Employer receives the documents in accordance with Sub-Clause 4.2 [*Performance Security*] and Sub-Clause 14.2 [*Advance Payment*], whichever is later;

(b) the amount which is due in respect of each Statement, other than the Final Statement, within 56 days after receiving the Statement and supporting documents; and

(c) the final amount due, within 42 days after receiving the Final Statement and written discharge in accordance with Sub-Clause 14.11 [*Application for Final Payment*] and Sub-Clause 14.12 [*Discharge*].

Payment of the amount due in each currency shall be made into the bank account, nominated by the Contractor, in the payment country (for this currency) specified in the Contract.

14.8

Delayed Payment

If the Contractor does not receive payment in accordance with Sub-Clause 14.7 [*Timing of Payments*], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay.

Unless otherwise stated in the Particular Conditions, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency of payment, and shall be paid in such currency.

The Contractor shall be entitled to this payment without formal notice, and without prejudice to any other right or remedy.

14.9

Payment of Retention Money

When the Taking-Over Certificate has been issued for the Works, and the Works have passed all specified tests (including the Tests after Completion, if any), the first half of the Retention Money shall be paid to the Contractor. If a Taking-Over Certificate is issued for a Section, the relevant percentage of the first half of the Retention Money shall be paid when the Section passes all tests.

Promptly after the latest of the expiry dates of the Defects Notification Periods, the outstanding balance of the Retention Money shall be paid to the Contractor. If a Taking-Over Certificate was issued for a Section, the relevant percentage of the second half of the Retention Money shall be paid promptly after the expiry date of the Defects Notification Period for the Section.

However, if any work remains to be executed under Clause 11 [*Defects Liability*] or Clause 12 [*Tests after Completion*], the Employer shall be entitled to withhold the estimated cost of this work until it has been executed.

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The relevant percentage for each Section shall be the percentage value of the Section as stated in the Contract. If the percentage value of a Section is not stated in the Contract, no percentage of either half of the Retention Money shall be released under this Sub-Clause in respect of such Section.

14.10

Statement at Completion

Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Employer six copies of a Statement at completion with supporting documents, in accordance with Sub-Clause 14.3 [*Application for Interim Payments*], showing:

(a) the value of all work done in accordance with the Contract up to the date stated in the Taking-Over Certificate for the Works,
(b) any further sums which the Contractor considers to be due, and
(c) an estimate of any other amounts which the Contractor considers will become due to him under the Contract. Estimated amounts shall be shown separately in this Statement at completion.

The Employer shall then give notice to the Contractor in accordance with Sub-Clause 14.6 [*Interim Payments*] and make payment in accordance with Sub-Clause 14.7 [*Timing of Payments*].

14.11

Application for Final Payment

Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Employer, six copies of a draft final statement with supporting documents showing in detail in a form approved by the Employer:

(a) the value of all work done in accordance with the Contract, and
(b) any further sums which the Contractor considers to be due to him under the Contract or otherwise.

If the Employer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Employer may reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Employer the final statement as agreed. This agreed statement is referred to in these Conditions as the "Final Statement".

However if, following discussions between the Parties and any changes to the draft final statement which are agreed, it becomes evident that a dispute exists, the Employer shall pay the agreed parts of the draft final statement in accordance with Sub-Clause 14.6 [*Interim Payments*] and Sub-Clause 14.7 [*Timing of Payments*]. Thereafter, if the dispute is finally resolved under Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] or Sub-Clause 20.5 [*Amicable Settlement*], the Contractor shall then prepare and submit to the Employer a Final Statement.

14.12

Discharge

When submitting the Final Statement, the Contractor shall submit a written discharge which confirms that the total of the Final Statement represents full and final settlement of all moneys due to the Contractor under or in connection with the Contract. This discharge may state that it becomes effective when the Contractor has received the Performance Security and the out-standing balance of this total, in which event the discharge shall be effective on such date.

14.13

Final Payment

In accordance with sub-paragraph (c) of Sub-Clause 14.7 [*Timing of Payments*], the Employer shall pay to the Contractor the amount which is finally due, less all amounts

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previously paid by the Employer and any deductions in accordance with Sub-Clause 2.5 [*Employer's Claims*].

14.14

Cessation of Employer's Liability

The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it:

(a) in the Final Statement and also
(b) (except for matters or things arising after the issue of the Taking-Over Certificatefor the Works) in the Statement at completion described in Sub-Clause 14.10 [*Statement at Completion*].

However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default or reckless misconduct by the Employer.

14.15

Currencies of Payment

The Contract Price shall be paid in the currency or currencies named in the Contract Agreement. Unless otherwise stated in the Particular Conditions, if more than one currency is so named, payments shall be made as follows:

(a) if the Contract Price was expressed in Local Currency only:

  (i) the proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Contract Agreement, except as otherwise agreed by both Parties;
  (ii) payments and deductions under Sub-Clause 13.5 [*Provisional Sums*] and Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] shall be made in the applicable currencies and proportions; and
  (iii) other payments and deductions under sub-paragraphs (a) to (d) of Sub-Clause 14.3 [*Application for Interim Payments*] shall be made in the currencies and proportions specified in sub-paragraph (a)(i) above;

(b) payment of the damages specified in the Particular Conditions shall be made in the currencies and proportions specified in the Particular Conditions;
(c) other payments to the Employer by the Contractor shall be made in the currency in which the sum was expended by the Employer, or in such currency as may be agreed by both Parties;
(d) if any amount payable by the Contractor to the Employer in a particular currency exceeds the sum payable by the Employer to the Contractor in that currency, the Employer may recover the balance of this amount from the sums otherwise payable to the Contractor in other currencies; and
(e) if no rates of exchange are stated in the Contract, they shall be those prevailing on the Base Date and determined by the central bank of the Country.

15 Termination by Employer

15.1

Notice to Correct

If the Contractor fails to carry out any obligation under the Contract, the Employer may by notice require the Contractor to make good the failure and to remedy it within a specified reasonable time.

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15.2
Termination by Employer

The Employer shall be entitled to terminate the Contract if the Contractor:

(a) fails to comply with Sub-Clause 4.2 [*Performance Security*] or with a notice under Sub-Clause 15.1 [*Notice to Correct*],
(b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract,
(c) without reasonable excuse fails to proceed with the Works in accordance with Clause 8 [*Commencement, Delays and Suspension*],
(d) subcontracts the whole of the Works or assigns the Contract without the required agreement,
(e) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events, or
(f) gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward:

    (i) for doing or forbearing to do any action in relation to the Contract, or
    (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract,

    or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.

In any of these events or circumstances, the Employer may, upon giving 14 days' notice to the Contractor, terminate the Contract and expel the Contractor from the Site. However, in the case of sub-paragraph (e) or (f), the Employer may by notice terminate the Contract immediately.

The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.

The Contractor shall then leave the Site and deliver any required Goods, all Contractor's Documents, and other design documents made by or for him, to the Employer. However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the notice (i) for the assignment of any sub-contract, and (ii) for the protection of life or property or for the safety of the Works.

After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor.

The Employer shall then give notice that the Contractor's Equipment and Temporary Works will be released to the Contractor at or near the Site. The Contractor shall promptly arrange their removal, at the risk and cost of the Contractor. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall then be paid to the Contractor.

15.3
Valuation at Date of Termination

As soon as practicable after a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine the value of the Works,

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Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.

15.4

Payment after Termination

After a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Employer may:

(a) proceed in accordance with Sub-Clause 2.5 [*Employer's Claims*],
(b) with-hold further payments to the Contractor until the costs of design, execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the Employer, have been established, and/or
(c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the Works, after allowing for any sum due to the Contractor under Sub-Clause 15.3 [*Valuation at Date of Termination*]. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.

15.5

Employer's Entitlement to Termination

The Employer shall be entitled to terminate the Contract, at any time for the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after the later of the dates on which the Contractor receives this notice or the Employer returns the Performance Security. The Employer shall not terminate the Contract under this Sub-Clause in order to execute the Works himself or to arrange for the Works to be executed by another contractor.

After this termination, the Contractor shall proceed in accordance with Sub-Clause 16.3 [*Cessation of Work and Removal of Contractor's Equipment*] and shall be paid in accordance with Sub-Clause 19.6 [*Optional Termination, Payment and Release*].

16 Suspension and Termination by Contractor

16.1

Contractor's Entitlement to Suspend Work

If the Employer fails to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*] or Sub-Clause 14.7 [*Timing of Payments*], the Contractor may, after giving not less than 21 days' notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the reasonable evidence or payment, as the case may be and as described in the notice.

The Contractor's action shall not prejudice his entitlements to financing charges under Sub-Clause 14.8 [*Delayed Payment*] and to termination under Sub-Clause 16.2 [*Termination by Contractor*].

If the Contractor subsequently receives such evidence or payment (as described in the relevant Sub-Clause and in the above notice) before giving a notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.

If the Contractor suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and

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(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

16.2

Termination by Contractor

The Contractor shall be entitled to terminate the Contract if:

(a) the Contractor does not receive the reasonable evidence within 42 days after giving notice under Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*] in respect of a failure to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*],
(b) the Contractor does not receive the amount due within 42 days after the expiry of the time stated in Sub-Clause 14.7 [*Timing of Payments*] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.5 [*Employer's Claims*]),
(c) the Employer substantially fails to perform his obligations under the Contract,
(d) the Employer fails to comply with Sub-Clause 1.7 [*Assignment*],
(e) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.11 [*Prolonged Suspension*], or
(f) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events.

In any of these events or circumstances, the Contractor may, upon giving 14 days' notice to the Employer, terminate the Contract. However, in the case of sub-paragraph (e) or (f), the Contractor may by notice terminate the Contract immediately.

The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.

16.3

Cessation of Work and Removal of Contractor's Equipment

After a notice of termination under Sub-Clause 15.5 [*Employer's Entitlement to Termination*], Sub-Clause 16.2 [*Termination by Contractor*] or Sub-Clause 19.6 [*Optional Termination, Payment and Release*] has taken effect, the Contractor shall promptly:

(a) cease all further work, except for such work as may have been instructed by the Employer for the protection of life or property or for the safety of the Works,
(b) hand over Contractor's Documents, Plant, Materials and other work, for which the Contractor has received payment, and
(c) remove all other Goods from the Site, except as necessary for safety, and leave the Site.

16.4

Payment on Termination

After a notice of termination under Sub-Clause 16.2 [*Termination by Contractor*] has taken effect, the Employer shall promptly:

(a) return the Performance Security to the Contractor,
(b) pay the Contractor in accordance with Sub-Clause 19.6 [*Optional Termination, Payment and Release*], and
(c) pay to the Contractor the amount of any loss of profit or other loss or damage sustained by the Contractor as a result of this termination.

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17 Risk and Responsibility

17.1
Indemnities

The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:

(a) bodily injury, sickness, disease or death, of any person whatsoever arising out of or in the course of or by reason of the design, execution and completion of the Works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and

(b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss:

  (i) arises out of or in the course of or by reason of the design, execution and completion of the Works and the remedying of any defects, and

  (ii) is not attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, their respective agents, or anyone directly or indirectly employed by any of them.

The Employer shall indemnify and hold harmless the Contractor, the Contractor's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of (1) bodily injury, sickness, disease or death, which is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (2) the matters for which liability may be excluded from insurance cover, as described in sub-paragraphs (d)(i), (ii) and (iii) of Sub-Clause 18.3 [*Insurance Against Injury to Persons and Damage to Property*].

17.2
Contractor's Care of the Works

The Contractor shall take full responsibility for the care of the Works and Goods from the Commencement Date until the Taking-Over Certificate is issued (or is deemed to be issued under Sub-Clause 10.1 [*Taking Over of the Works and Sections*]) for the Works, when responsibility for the care of the Works shall pass to the Employer. If a Taking-Over Certificate is issued (or is so deemed to be issued) for any Section of the Works, responsibility for the care of the Section shall then pass to the Employer.

After responsibility has accordingly passed to the Employer, the Contractor shall take responsibility for the care of any work which is outstanding on the date stated in a Taking-Over Certificate, until this outstanding work has been completed.

If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 17.3 [*Employer's Risks*], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that the Works, Goods and Contractor's Documents conform with the Contract.

The Contractor shall be liable for any loss or damage caused by any actions performed by the Contractor after a Taking-Over Certificate has been issued. The Contractor shall also be liable for any loss or damage which occurs after a Taking-Over Certificate has been issued and which arose from a previous event for which the Contractor was liable.

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17.3 Employer's Risks

The risks referred to in Sub-Clause 17.4 below are:

(a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
(b) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country,
(c) riot, commotion or disorder within the Country by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors,
(d) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and
(e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds.

17.4 Consequences of Employer's Risks

If and to the extent that any of the risks listed in Sub-Clause 17.3 above results in loss or damage to the Works, Goods or Contractor's Documents, the Contractor shall promptly give notice to the Employer and shall rectify this loss or damage to the extent required by the Employer.

If the Contractor suffers delay and/or incurs Cost from rectifying this loss or damage, the Contractor shall give a further notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this further notice, the Employer shall proceed in accordance with Sub Clause 3.5 [*Determinations*] to agree or determine these matters.

17.5 Intellectual and Industrial Property Rights

In this Sub-Clause, "infringement" means an infringement (or alleged infringement) of any patent, registered design, copyright, trade mark, trade name, trade secret or other intellectual or industrial property right relating to the Works; and "claim" means a claim (or proceedings pursuing a claim) alleging an infringement.

Whenever a Party does not give notice to the other Party of any claim within 28 days of receiving the claim, the first Party shall be deemed to have waived any right to indemnity under this Sub-Clause.

The Employer shall indemnify and hold the Contractor harmless against and from any claim alleging an infringement which is or was:

(a) an unavoidable result of the Contractor's compliance with the Employer's Requirements, or
(b) a result of any Works being used by the Employer:

    (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or
    (ii) in conjunction with any thing not supplied by the Contractor, unless such use was disclosed to the Contractor prior to the Base Date or is stated in the Contract.

The Contractor shall indemnify and hold the Employer harmless against and from any other claim which arises out of or in relation to (i) the Contractor's design,

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manufacture, construction or execution of the Works, (ii) the use of Contractor's Equipment, or (iii) the proper use of the Works.

If a Party is entitled to be indemnified under this Sub-Clause, the indemnifying Party may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it. The other Party shall, at the request and cost of the indemnifying Party, assist in contesting the claim. This other Party (and its Personnel) shall not make any admission which might be prejudicial to the indemnifying Party, unless the indemnifying Party failed to take over the conduct of any negotiations, litigation or arbitration upon being requested to do so by such other Party.

17.6 Limitation of Liability

Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than under Sub-Clause 16.4 [*Payment on Termination*] and Sub-Clause 17.1 [*Indemnities*].

The total liability of the Contractor to the Employer, under or in connection with the Contract other than under Sub-Clause 4.19 [*Electricity, Water and Gas*], Sub-Clause 4.20 [*Employer's Equipment and Free-Issue Material*], Sub-Clause 17.1 [*Indemnities*] and Sub-Clause 17.5 [*Intellectual and Industrial Property Rights*], shall not exceed the sum stated in the Particular Conditions or (if a sum is not so stated) the Contract Price stated in the Contract Agreement.

This Sub-Clause shall not limit liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

18 Insurance

18.1 General Requirements for Insurances

In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause.

Wherever the Contractor is the insuring Party, each insurance shall be effected with insurers and in terms approved by the Employer. These terms shall be consistent with any terms agreed by both Parties before they signed the Contract Agreement. This agreement of terms shall take precedence over the provisions of this Clause.

Wherever the Employer is the insuring Party, each insurance shall be effected with insurers and in terms consistent with the details annexed to the Particular Conditions.

If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause, (i) the Contractor shall act under the policy on behalf of these additional joint insured except that the Employer shall act for Employer's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.

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The relevant insuring Party shall, within the respective periods stated in the Particular Conditions (calculated from the Commencement Date), submit to the other Party:

(a) evidence that the insurances described in this Clause have been effected, and
(b) copies of the policies for the insurances described in Sub-Clause 18.2 [*Insurance of Works and Contractor's Equipment*] and Sub-Clause 18.3 [*Insurance against Injury to Persons and Damage to Property*].

When each premium is paid, the insuring Party shall submit evidence of payment to the other Party.

Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Works and ensure that insurance is maintained in accordance with this Clause.

Neither Party shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.

If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.

Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring Party.

Payments by one Party to the other Party shall be subject to Sub-Clause 2.5 [*Employer's Claims*] or Sub-Clause 20.1 [*Contractor's Claims*], as applicable.

18.2 Insurance for Works and Contractor's Equipment

The insuring Party shall insure the Works, Plant, Materials and Contractor's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 18.1 [*General Requirements for Insurances*], until the date of issue of the Taking-Over Certificate for the Works.

The insuring Party shall maintain this insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable arising from a cause occurring prior to the issue of the Taking-Over Certificate, and for loss or damage caused by the Contractor or Subcontractors in the course of any other operations (including those under Clause 11 [*Defects Liability*] and Clause 12 [*Tests after Completion*]).

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The insuring Party shall insure the Contractor's Equipment for not less than the full replacement value, including delivery to Site. For each item of Contractor's Equipment, the insurance shall be effective while it is being transported to the Site and until it is no longer required as Contractor's Equipment.

Unless otherwise stated in the Particular Conditions, insurances under this Sub-Clause:

(a) shall be effected and maintained by the Contractor as insuring Party,
(b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated between the Parties for the sole purpose of rectifying the loss or damage,
(c) shall cover all loss and damage from any cause not listed in Sub-Clause 17.3 [*Employer's Risks*],
(d) shall also cover loss or damage from the risks listed in sub-paragraph (c) of Sub-Clause 17.3 [*Employer's Risks*], with deductibles per occurrence of not more than the amount stated in the Particular Conditions (if an amount is not so stated, this sub-paragraph (d) shall not apply), and
(e) may however exclude loss of, damage to, and reinstatement of:

    (i) a part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below),
    (ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship,
    (iii) a part of the Works which has been taken over by the Employer, except to the extent that the Contractor is liable for the loss or damage, and
    (iv) Goods while they are not in the Country, subject to Sub-Clause 14.5 [*Plant and Materials intended for the Works*].

If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Contractor shall (as insuring Party) give notice to the Employer, with supporting particulars. The Employer shall then (i) be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to payment of an amount equivalent to such commercially reasonable terms as the Contractor should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 18.1 [*General Requirements for Insurances*].

18.3 Insurance against Injury to Persons and Damage to Property

The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 18.2 [*Insurance for Works and Contractor's Equipment*]) or to any person (except persons insured under Sub-Clause 18.4 [*Insurance for Contractor's Personnel*]), which may arise out of the Contractor's performance of the Contract and occurring before the issue of the Performance Certificate.

This insurance shall be for a limit per occurrence of not less than the amount stated in the Particular Conditions, with no limit on the number of occurrences. If an amount is not stated in the Contract, this Sub-Clause shall not apply.

Unless otherwise stated in the Particular Conditions, the insurances specified in this Sub-Clause:

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(a) shall be effected and maintained by the Contractor as insuring Party,
(b) shall be in the joint names of the Parties,
(c) shall be extended to cover liability for all loss and damage to the Employer's property (except things insured under Sub-Clause 18.2) arising out of the Contractor's performance of the Contract, and
(d) may however exclude liability to the extent that it arises from:

(i) the Employer's right to have the Permanent Works executed on, over, under, in or through any land, and to occupy this land for the Permanent Works,
(ii) damage which is an unavoidable result of the Contractor's obligations to execute the Works and remedy any defects, and
(iii) a cause listed in Sub-Clause 17.3 [*Employer's Risks*], except to the extent that cover is available at commercially reasonable terms.

18.4

Insurance for Contractor's Personnel

The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.

The Employer shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.

The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.

19 Force Majeure

19.1
Definition of Force Majeure

In this Clause, "Force Majeure" means an exceptional event or circumstance:

(a) which is beyond a Party's control,
(b) which such Party could not reasonably have provided against before entering into the Contract,
(c) which, having arisen, such Party could not reasonably have avoided or overcome, and
(d) which is not substantially attributable to the other Party.

Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:

(i) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
(ii) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war,
(iii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel and other employees of the Contractor and Sub-contractors,
(iv) munitions of war, explosive materials, ionising radiation or contamination

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by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and

(v) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.

19.2

Notice of Force Majeure

If a Party is or will be prevented from performing any of its obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.

The Party shall, having given notice, be excused performance of such obligations for so long as such Force Majeure prevents it from performing them.

Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.

19.3

Duty to Minimise Delay

Each Party shall at all times use all reasonable endeavours to minimise any delay in the performance of the Contract as a result of Force Majeure.

A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

19.4

Consequences of Force Majeure

If the Contractor is prevented from performing any of his obligations under the Contract by Force Majeure of which notice has been given under Sub-Clause 19.2 [*Notice of Force Majeure*], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and

(b) if the event or circumstance is of the kind described in sub-paragraphs (i) to (iv) of Sub-Clause 19.1 [*Definition of Force Majeure*] and, in the case of sub-paragraphs (ii) to (iv), occurs in the Country, payment of any such Cost.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

19.5

Force Majeure Affecting Subcontractor

If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's non-performance or entitle him to relief under this Clause.

19.6

Optional Termination, Payment and Release

If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under Sub-Clause 19.2 [*Notice of Force Majeure*], or for multiple periods which total more than 140 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with Sub-Clause 16.3 [*Cessation of Work and Removal of Contractor's Equipment*].

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Upon such termination, the Employer shall pay to the Contractor:

(a) the amounts payable for any work carried out for which a price is stated in the Contract;
(b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
(c) any other Cost or liability which in the circumstances was reasonably incurred by the Contractor in the expectation of completing the Works;
(d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and
(e) the Cost of repatriation of the Contractor's staff and labour employed wholly in connection with the Works at the date of termination.

19.7

Release from Performance under the Law

Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises which makes it impossible or unlawful for either or both Parties to fulfil its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance:

(a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract, and
(b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under Sub-Clause 19.6 [*Optional Termination, Payment and Release*] if the Contract had been terminated under Sub-Clause 19.6.

20 Claims, Disputes and Arbitration

20.1

Contractor's Claims

If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Employer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Employer. Without admitting liability, the Employer may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to

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keep further contemporary records. The Contractor shall permit the Employer to inspect all these records, and shall (if instructed) submit copies to the Employer.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Employer, the Contractor shall send to the Employer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

(a) this fully detailed claim shall be considered as interim;
(b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Employer may reasonably require; and
(c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Employer.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Employer and approved by the Contractor, the Employer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such time.

Each interim payment shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

The Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [*Extension of Time for Completion*], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

20.2 Appointment of the Dispute Adjudication Board

Disputes shall be adjudicated by a DAB in accordance with Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*]. The Parties shall jointly appoint a DAB by the date 28 days after a Party gives notice to the other Party of its intention to refer a dispute to a DAB in accordance with Sub-Clause 20.4.

The DAB shall comprise, as stated in the Particular Conditions, either one or three suitably qualified persons ("the members"). If the number is not so stated and the Parties do not agree otherwise, the DAB shall comprise three persons.

If the DAB is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The Parties shall consult both these members and shall agree upon the third member, who shall be appointed to act as chairman.

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However, if a list of potential members is included in the Contract, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DAB.

The agreement between the Parties and either the sole member ("adjudicator") or each of the three members shall incorporate by reference the General Conditions of Dispute Adjudication Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed between them.

The terms of the remuneration of either the sole member or each of the three members, shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

If at any time the Parties so agree, they may appoint a suitably qualified person or persons to replace any one or more members of the DAB. Unless the Parties agree otherwise, the appointment will come into effect if a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment. The replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DAB (including each member) shall expire when the DAB has given its decision on the dispute referred to it under Sub-Clause 20.4, [*Obtaining Dispute Adjudication Board Decision*], unless other disputes have been referred to the DAB by that time under Sub-Clause 20.4, in which event the relevant date shall be when the DAB has also given decisions on those disputes.

20.3

Failure to Agree Dispute Adjudication Board

If any of the following conditions apply, namely:

(a) the Parties fail to agree upon the appointment of the sole member of the DAB by the date stated in the first paragraph of Sub-Clause 20.2,
(b) either Party fails to nominate a member (for approval by the other Party) of a DAB of three persons by such date,
(c) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DAB by such date, or
(d) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation or termination of appointment,

then the appointing entity or official named in the Particular Conditions shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DAB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

20.4

Obtaining Dispute Adjudication Board's Decision

If a dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Employer, then after a DAB has been appointed pursuant to Sub-Clauses 20.2 [*Appointment of the Dispute Adjudication Board*] and 20.3 [*Failure to Agree Dispute Adjudication Board*], either Party may refer the dispute in writing to the DAB for its decision, with a copy to the other Party. Such reference shall state that it is given under this Sub-Clause.

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For a DAB of three persons, the DAB shall be deemed to have received such reference on the date when it is received by the chairman of the DAB.

Both Parties shall promptly make available to the DAB all information, access to the Site, and appropriate facilities, as the DAB may require for the purposes of making a decision on such dispute. The DAB shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or the advance payment referred to in Clause 6 of the Appendix - General Conditions of Dispute Adjudication Agreement, whichever date is later, or within such other period as may be proposed by the DAB and approved by both Parties, the DAB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. However, if neither of the Parties has paid in full the invoices submitted by each member pursuant to Clause 6 of the Appendix, the DAB shall not be obliged to give its decision until such invoices have been paid in full. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the Works in accordance with the Contract.

If either Party is dissatisfied with the DAB's decision, then either Party may, within 28 days after receiving the decision, give notice to the other Party of its dissatisfaction. If the DAB fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference or such payment, then either Party may, within 28 days after this period has expired, give notice to the other Party of its dissatisfaction.

In either event, this notice of dissatisfaction shall state that it is given under this Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in Sub-Clause 20.7 [*Failure to Comply with Dispute Adjudication Board's Decision*] and Sub-Clause 20.8 [*Expiry of Dispute Adjudication Board's Appointment*], neither Party shall be entitled to commence arbitration of a dispute unless a notice of dissatisfaction has been given in accordance with this Sub-Clause.

If the DAB has given its decision as to a matter in dispute to both Parties, and no notice of dissatisfaction has been given by either Party within 28 days after it received the DAB's decision, then the decision shall become final and binding upon both Parties.

20.5

Amicable Settlement

Where notice of dissatisfaction has been given under Sub-Clause 20.4 above, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of dissatisfaction was given, even if no attempt at amicable settlement has been made.

20.6

Arbitration

Unless settled amicably, any dispute in respect of which the DAB's decision (if any) has not become final and binding shall be finally settled by international arbitration. Unless otherwise agreed by both Parties:

(a) the dispute shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce,

(b) the dispute shall be settled by three arbitrators appointed in accordance with these Rules, and

(c) the arbitration shall be conducted in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

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The arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of (or on behalf of) the Employer, and any decision of the DAB, relevant to the dispute.

Neither Party shall be limited in the proceedings before the arbitrator(s) to the evidence or arguments previously put before the DAB to obtain its decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction. Any decision of the DAB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties and the DAB shall not be altered by reason of any arbitration being conducted during the progress of the Works.

20.7

Failure to Comply with Dispute Adjudication Board's Decision

In the event that:

(a) neither Party has given notice of dissatisfaction within the period stated in Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*],
(b) the DAB's related decision (if any) has become final and binding, and
(c) a Party fails to comply with this decision,

then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [*Arbitration*]. Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] and Sub-Clause 20.5 [*Amicable Settlement*] shall not apply to this reference.

20.8

Expiry of Dispute Adjudication Board's Appointment

If a dispute arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works and there is no DAB in place, whether by reason of the expiry of the DAB's appointment or otherwise:

(a) Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] and Sub-Clause 20.5 [Amicable Settlement] shall not apply, and
(b) the dispute may be referred directly to arbitration under Sub-Clause 20.6 [*Arbitration*].

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APPENDIX

General Conditions of Dispute Adjudication Agreement

1
Definitions

Each "Dispute Adjudication Agreement" is a tripartite agreement by and between:

(a) the "Employer";
(b) the "Contractor"; and
(c) the "Member" who is defined in the Dispute Adjudication Agreement as being:
  (i) the sole member of the "DAB" (or "adjudicator") and, where this is the case, all references to the "Other Members" do not apply,
  or
  (ii) one of the three persons who are jointly called the "DAB" (or "dispute adjudication board") and, where this is the case, the other two persons are called the "Other Members".

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Adjudication Agreement, which incorporates this Appendix. In the Dispute Adjudication Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

2
General Provisions

The Dispute Adjudication Agreement shall take effect when the Employer, the Contractor and each of the Members (or Member) have respectively each signed a dispute adjudication agreement.

When the Dispute Adjudication Agreement has taken effect, the Employer and the Contractor shall each give notice to the Member accordingly. If the Member does not receive either notice within six months after entering into the Dispute Adjudication Agreement, it shall be void and ineffective.

This employment of the Member is a personal appointment. No assignment or subcontracting of the Dispute Adjudication Agreement is permitted without the prior written agreement of all the parties to it and of the Other Members (if any).

3
Warranties

The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Employer's Representative. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is:

(a) experienced in the work which the Contractor is to carry out under the Contract,
(b) experienced in the interpretation of contract documentation, and
(c) fluent in the the language for communications defined in the Contract.

4
General Obligations of the Member

The Member shall:

(a) have no interest financial or otherwise in the Employer or the Contractor, nor any financial interest in the Contract except for payment under the Dispute Adjudication Agreement;

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(b) not previously have been employed as a consultant or otherwise by the Employer or the Contractor, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Adjudication Agreement;
(c) have disclosed in writing to the Employer, the Contractor and the Other Members (if any), before entering into the Dispute Adjudication Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer or employee of the Employer or the Contractor, and any previous involvement in the overall project of which the Contract forms part;
(d) not, for the duration of the Dispute Adjudication Agreement, be employed as a consultant or otherwise by the Employer or the Contractor, except as may be agreed in writing by the Employer, the Contractor and the Other Members (if any);
(e) comply with the annexed procedural rules and with Sub-Clause 20.4 of the Conditions of Contract;
(f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
(g) not while a Member enter into discussions or make any agreement with the Employer or the Contractor regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Adjudication Agreement;
(h) ensure his/her availability for any site visit and hearings as are necessary; and
(i) treat the details of the Contract and all the DAB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members (if any).

5

General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DAB's activities under the Contract and the Dispute Adjudication Agreement, and except to the extent that prior agreement is given by the Employer, the Contractor and the Other Members (if any). The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any):
(a) be appointed as an arbitrator in any arbitration under the Contract;
(b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
(c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he/she is relieved from liability under the preceding paragraph.

6

Payment

The Member shall be paid as follows, in the currency named in the Dispute Adjudication Agreement:
(a) a daily fee which shall be considered as payment in full for:

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(i) each working day spent reading submissions, attending hearings (if any), preparing decisions, or making site visits (if any); and

(ii) each day or part of a day up to maximum of two days travel time in each direction for the journey (if any) between the Member's home and site or an other location of a meeting with Other Members (if any) and/or the Employer and the Contractor;

(b) all reasonable expenses incurred in connection with the Member's duties, including the cost of secretarial services, telephone calls, courier charges, faxes and telexes, travel expenses, hotel and subsistence costs; a receipt shall be required for each item in excess of five percent of the daily fee referred to in sub-paragraph (a) of this Clause; and

(c) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The daily fee shall be as specified in the Dispute Adjudication Agreement.

Immediately after the Dispute Adjudication Agreement takes effect, the Member shall, before engaging in any activities under the Dispute Adjudication Agreement, submit to the Contractor, with a copy to the Employer, an invoice for (a) an advance of twenty-five (25) percent of the estimated total amount of daily fees to which he/she will be entitled and (b) an advance equal to the estimated total expenses that he/she shall incur in connection with his/her duties. Payment of such invoice shall be made by the Contractor upon his receipt of the invoice. The Member shall not be obliged to engage in activities under the Dispute Adjudication Agreement until each of the Members has been paid in full for invoices submitted under this paragraph.

Thereafter the Member shall submit to the Contractor, with a copy to the Employer, invoices for the balance of his/her daily fees and expenses, less the amounts advanced. The DAB shall not be obliged to render its decision until invoices for all daily fees and expenses of each Member for making a decision shall have been paid in full.

Unless paid earlier in accordance with the above, the Contractor shall pay each of the Member's invoices in full within 28 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Adjudication Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the DAB; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Sub-Clause 14.8 of the Conditions of Contract.

If the Member does not receive payment of the amount due within 28 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice to to the Employer and the Contractor. The notice shall take effect when received by them both. Any such notice shall be final and binding on the Employer, the Contractor and the Member.

7 Default of the Member

If the Member fails to comply with any obligation under Clause 4, he/she shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other

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rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the DAB which are rendered void or ineffective.

8

Default of the Member

Any dispute or claim arising out of or in connection with this Dispute Adjudication Agreement, or the breach, termination or invalidity thereof, shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

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Annex PROCEDURAL RULES

1 The Employer and the Contractor shall furnish to the DAB one copy of all documents which the DAB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the matter in dispute. All communications between the DAB and the Employer or the Contractor shall be copied to the other Party. If the DAB comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.

2 The DAB shall proceed in accordance with Sub-Clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DAB shall:

(a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
(b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.

3 The DAB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.

4 Except as otherwise agreed in writing by the Employer and the Contractor, the DAB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer and the Contractor, and to proceed in the absence of any party who the DAB is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.

5 The Employer and the Contractor empower the DAB, among other things, to:

(a) establish the procedure to be applied in deciding a dispute,
(b) decide upon the DAB's own jurisdiction, and as to the scope of any dispute referred to it,
(c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules,
(d) take the initiative in ascertaining the facts and matters required for a decision,
(e) make use of its own specialist knowledge, if any,
(f) decide upon the payment of financing charges in accordance with the Contract,
(g) decide upon any provisional relief such as interim or conservatory measures, and
(h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Employer, relevant to the dispute.

6 The DAB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DAB shall make and give its decision in accordance with Sub-Clause 20.4, or as otherwise agreed by the Employer and the Contractor in writing. If the DAB comprises three persons:

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(a) it shall convene in private after a hearing, if any, in order to have discussions and prepare its decision;

(b) it shall endeavour to reach a unanimous decision: if this proves impossible, the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and

(c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:

(i) either the Employer or Contractor does nor agree that they do so, or

(ii) the absent Member is the chairman, and he/she instructs the other Members to not make a decision.

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GENERAL CONDITIONS

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

FORMS OF LETTER OF TENDER, CONTRACT AGREEMENT AND DISPUTE ADJUDICATION AGREEMENT

Conditions of Contract for **EPC/Turnkey Projects**

Guidance for the Preparation of Particular Conditions

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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

Guidance
for the Preparation of Particular Conditions

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Guidance for the Preparation of Particular Conditions

INTRODUCTION

The terms of the Conditions of Contract for EPC/Turnkey Projects have been prepared by the Fédération Internationale des Ingénieurs-Conseils (FIDIC) and are recommended where one entity takes total responsibility for an engineering project, including design, manufacture, delivery and installation of plant, and the design and execution of building or engineering works, tenders having been invited on an international basis. Modifications to the Conditions may be required in some legal jurisdictions, particularly if they are to be used on domestic contracts.

Major turnkey projects may require some negotiation between the parties. Having studied the variety of options offered by tenderers, the Employer may consider it essential to meet and discuss with them the technical options which the Employer considers preferable. Under the usual arrangements for this type of contract, the Contractor carries out the Engineering, Procurement and Construction, and provides a fully-equipped facility, ready for operation (at the "turn of the key").

The guidance hereafter is intended to assist writers of the Particular Conditions by giving options for various sub-clauses where appropriate. As far as possible, example wording is included, between lines. In some cases, however, only an aide-memoire is given.

Before incorporating any example wording, it must be checked to ensure that it is wholly suitable for the particular circumstances. Unless it is considered suitable, example wording should be amended before use.

Where example wording is amended, and in all cases where other amendments or additions are made, care must be taken to ensure that no ambiguity is created, either with the General Conditions or between the clauses in the Particular Conditions.

In the preparation of the Conditions of Contract to be included in the tender documents for a contract, the following text can be used:

> The Conditions of Contract comprise the "General Conditions", which form part of the "Conditions of Contract for EPC/Turnkey Projects" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following "Particular Conditions", which include amendments and additions to such General Conditions.

The following Sub-Clauses of the General Conditions require data to be included in the Particular Conditions:

1.1.3.3 & 8.2	Time for Completion
1.1.3.7 & 11.1	Defects Notification Period
1.1.5.6	Definition of each Section, if any
1.3	Electronic systems for communications
1.4	Laws and languages
2.1	Time for possession of the Site
4.2	Performance Security

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4.4	Notice of Subcontractors
8.7/12.4 & 14.15(d)	Delay/performance damages
13.8	Adjustments for changes in Cost
14.2	Advance payment(s)
14.3(c)	Retention
17.6	Limitation of liability
18.1	Employer's insurance (if any). Evidence of insurances
18.2(d)	Insurance of Employer's risks
18.3	Insurance against injury to persons and damage to property
20.2	Number of members of the dispute adjudication board
20.3	Appointing entity for the dispute adjudication board

Notes on the Preparation of Tender Documents

The tender documents should be prepared by suitably-qualified engineers who are familiar with the technical aspects of the required works, and a review by suitably-qualified lawyers may be advisable. The tender documents issued to tenderers will consist of the Conditions of Contract and the Employer's Requirements, and (possibly) the preferred form for the Letter of Tender. In addition, each of the Tenderers should receive the data referred to in Sub-Clause 4.10, and the Instructions to Tenderers to advise them of any matters which the Employer wishes them to include in their Tender but which do not form part of the Employer's Requirements for the Works.

When the Contract Agreement is signed by the Employer and the Contractor, the Contract (which then comes into full force and effect) includes the Tender and any memoranda annexed to the Contract Agreement.

The Employer's Requirements should specify the particular requirements for the completed Works on a functional basis, including detailed requirements on quality and scope, and may require the Contractor to supply items such as consumables. The matters referred to in some or all of the following Sub-Clauses might be included:

1.8	Number of copies of Contractor's Documents
1.13	Permissions obtained by the Employer
2.1	Phased possession of foundations, structures, plant or means of access
4.1	Intended purposes for which the Works are required
4.6	Other contractors (and others) on the Site
4.7	Setting-out points, lines and levels of reference
4.18	Environmental constraints
4.19	Electricity, water, gas and other services available on the Site
4.20	Employer's Equipment and free-issue material
5.1	Requirements, data and information for which the Employer is responsible
5.2	Contractor's Documents required for review
5.4	Technical standards and building regulations
5.5	Operational training for the Employer's Personnel
5.6	As-built drawings and other records of the Works
5.7	Operation and maintenance manuals
6.6	Facilities for Personnel
7.2	Samples
7.3	Off-Site inspection requirements
7.4	Testing during manufacture and/or construction
9.1	Tests on Completion
9.4	Damages for failure to pass Tests on Completion
12.1	Tests after Completion
12.4	Damages for failure to pass Tests after Completion

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Many Sub-Clauses in the General Conditions make reference to the Particular Conditions for such data as would typically be specified by the Employer, or to the Tender for such data as would typically be specified by the tenderer.

The Instructions to Tenderers may need to specify any constraints on the data proposed in the Tender, and/or specify the extent of other information which each Tenderer is to include with his Tender. If each Tenderer is to produce a parent company guarantee and/or a tender security, these requirements (which apply prior to the Contract becoming effective) should be included in the Instructions to Tenderers: example forms are annexed to this document as Annexes A and B. The Instructions may include matters referred to in some or all of the following Sub-Clauses:

4.3	Contractor's Representative (name and curriculum vitae)
4.9	Quality Assurance system
9.1	Tests on Completion
12.1	Tests after Completion
18	Insurances
20	Resolution of disputes

Turnkey contracts typically include design, construction, fixtures, fittings and equipment (f.f.e.), the scope of which should be defined in the Employer's Requirements. Full consideration should be given to detailed requirements, such as the extent to which the Works are to be fully equipped, ready for operation, with spare parts and consumables provided for operation for a specified period. In addition, the Contractor may be required to operate the Works, either for a few months' trial operation period under Sub-Clause 9.1(c), or for some years' operation.

Understandably, tenderers are often reluctant, in the face of intense competition, to incur great expense in the preparation of tender designs. When preparing the Instructions to Tenderers, thought should be given as to the extent of detail which tenderers can realistically be expected to prepare and include in their Tenders. The extent of detail required should be described in the Instructions to Tenderers. Note that there can be no description in the documents which will constitute the Contract, which only comes into full force and effect when the Agreement is signed.

Consideration may be given to offering some remuneration to tenderers if, in order to provide a responsive Tender, they have to undertake studies or carry out design work of a conceptual nature.

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Clause 1 General Provisions

Sub-Clause 1.1 Definitions

The Particular Conditions should specify the Time for Completion for the Works, and the Defects Notification Period.

If the Works are to be taken-over in stages, which is unusual under a turnkey contract, the Particular Conditions should specify each stage as a Section, and should define its scope, geographical extent and Time for Completion.

It may be necessary to amend some of the definitions. For example:

1.1.3.1 the Base Date could be defined as a particular calendar date
1.1.4.4 one particular Foreign Currency may be required by the financing institution
1.1.4.5 a different currency may be required to be the contract Local Currency
1.1.6.2 the references to "Country" may be inappropriate for a cross-border Site

Sub-Clause 1.2 Interpretation

If the references to "profit" are to be more precisely specified, this Sub-Clause may be varied:

EXAMPLE

At the end of Sub-Clause 1.2, insert:

In these Conditions, provisions including the expression "Cost plus reasonable profit" require this profit to be one-twentieth (5%) of this Cost.

Sub-Clause 1.3 Communications

The Particular Conditions should specify the systems of electronic communications (if any), and may also specify the address for the Contractor's notices to the Employer.

Sub-Clause 1.4 Laws and Language

The Particular Conditions should specify:

(a) the law which will govern the Contract,

(b) (if any part of the Contract has been written in one language and then translated) the ruling language, and

(c) (if communications are not to be written in the same language as that in which the Contract is written) the language for communications.

Sub-Clause 1.5 Priority of Documents

An order of precedence is usually necessary, in case a conflict is subsequently found among the contract documents. If no order of precedence is to be prescribed, this Sub-Clause may be varied:

EXAMPLE

Delete Sub-Clause 1.5 and substitute:

The documents forming the Contract are to be taken as mutually explanatory of one another. If an ambiguity or discrepancy is found, the priority shall be such as may be accorded by the governing law.

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Sub-Clause 1.6 Contract Agreement

The Contract Agreement is the document which brings the Contract into effect, and is usually preceded by negotiation. The Contract Agreement should therefore be drawn up with care. The form of Agreement should be included in the tender documents as an annex to the Particular Conditions: an example form is included at the end of this publication.

The Contract Agreement must state the name of each Party, the Contract Price, the currencies of payment, the amount due in each currency, and any pre-conditions which are to be satisfied before the Contract comes into full force and effect: all as agreed by the Parties. If lengthy tender negotiations were necessary, it may be considered advisable for the Contract Agreement to record the Base Date and/or Commencement Date also.

If the Employer wished to anticipate the possibility of issuing a letter of acceptance, the Sub-Clause may be amended by deleting the first sentence, which states that the Contract comes into full force and effect when the Parties sign the Contract Agreement. The Letter of Tender should then include the following paragraph:

> "Unless and until a formal Agreement is prepared and executed this Letter of Tender, together with your written acceptance thereof, shall constitute a binding contract between us."

Sub-Clause 1.10 Employer's Use of Contractor's Document

Additional provisions may be required, if all rights to particular items of computer software (for example) are to be assigned to the Employer. The provisions should take account of the applicable Laws.

Sub-Clause 1.13 Compliance with Laws

If the Employer is to arrange import permits and the like, alternative provisions may be appropriate:

EXAMPLE SUB-CLAUSE FOR A PLANT CONTRACT

Insert at the end of Sub-Clause 1.13:

However, the Contractor shall submit, in good time, the details of Goods to the Employer, who shall then promptly obtain all import permits or licences required for these Goods

The Employer shall also obtain or grant all consents including permits-to-work, wayleaves and approvals required for the Works.

Sub-Clause 1.14 Joint and Several Liability

For a major contract, detailed requirements for the joint venture may need to be specified. For example, it may be desirable for each member to produce a parent company guarantee: an example form is annexed to this document as Annex A.

These requirements, which apply prior to the Contract becoming effective, should be included in the Instructions to Tenderers. The Employer will wish the leader of the joint venture to be appointed at an early stage, providing a single point of contact thereafter, and will not wish to be involved in a dispute between the members of a joint venture. The Employer should scrutinise the joint venture agreement carefully, and it may have to be approved by the project's financing institutions.

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Clause 2 The Employer

Sub-Clause 2.1 Right of Access to the Site

The Particular Conditions should specify the time(s) by which the Employer will give the Contractor right of access to the Site, if after the Commencement Date. It may be essential for the Contractor to have early access to the Site for the purposes of survey and sub-surface investigations. If the Employer is arranging for work to be carried out on the Site before right of access is granted, details should be given in the Employer's Requirements.

Sub-Clause 2.3 Employer's Personnel

These provisions should be reflected in the Employer's contracts with any other contractors on the Site.

Clause 3 The Employer's Administration

Sub-Clause 3.1 The Employer's Representative

Although the Employer is not required to appoint a representative, such an appointment may assist the Employer's administration. If the Employer wishes to appoint an independent consulting engineer as the Employer's Representative, he may be named in the Particular Conditions.

Clause 4 The Contractor

Sub-Clause 4.2 Performance Security

The Particular Conditions should specify the amount and currencies of the Performance Security, unless it is not required.

EXAMPLE	The amount of the Performance Security shall be ten percent (10%) of the Contract Price stated in the Contract Agreement, and shall be expressed in the currencies and proportions in which the Contract Price is payable.

The acceptable form(s) of Performance Security should be included in the tender documents, annexed to the Particular Conditions. Example forms are annexed to this document as Annex C and Annex D. They incorporate two sets of Uniform Rules published by the International Chamber of Commerce (the "ICC", which is based at 38 Cours Albert 1er, 75008 Paris, France), which also publishes guides to these Uniform Rules. These example forms and the wording of the Sub-Clause may have to be amended to comply with applicable law.

EXAMPLE	At the end of the second paragraph of Sub-Clause 4.2, insert: If the Performance Security is in the form of a bank guarantee, it shall be issued either (a) by a bank located in the Country, or (b) directly by a foreign bank acceptable to the Employer. If the Performance Security is not in the form of a bank guarantee, it shall be furnished by a financial entity registered, or licensed to do business, in the Country.

Sub-Clause 4.3 Contractor's Representative

If the Representative is known at the time of submission of the Tender, the Tenderer may propose

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the Representative. The Tenderer may wish to propose alternatives, especially if the contract award seems likely to be delayed. If the ruling language is not the same as the language for day to day communications (under Sub-Clause 1.4), or if for any other reason it is necessary to stipulate that the Contractor's Representative shall be fluent in a particular language, one of the following sentences may be added.

EXAMPLE

At the end of Sub-Clause 4.3, add:

The Contractor's Representative and all these persons shall also be fluent in _____ (*insert name of language*)

EXAMPLE

At the end of Sub-Clause 4.3, add:

If the Contractor's Representative, or these persons, is not fluent in _____ (*insert name of language*), the Contractor shall make a competent interpreter available during all working hours.

Sub-Clause 4.4 Subcontractor

If the Employer wishes to receive the notices under this Sub-Clause, his requirements should be specified in the Particular Conditions:

EXAMPLE

The Contractor shall give the notices described in sub-paragraphs (a), (b) and (c) of Sub-Clauses 4.4 in respect of the following Subcontractors:

(list the relevant activities and/or parts of the Works)

Sub-Clause 4.12 Unforeseeable Difficulties

If the Works include tunnelling or other substantial sub-surface construction, it is usually preferable for the risk of unforeseen ground conditions to be allocated to the Employer. Responsible contractors will be reluctant to take the risks of unknown ground conditions which are difficult or impossible to estimate in advance. The Conditions of Contract for Plant and Design-Build should be used in these circumstances for works designed by (or on behalf of) the Contract.

Sub-Clause 4.19 Electricity, Water and Gas

If services are to be available for the Contractor to use, the Employer's Requirements should give details, including locations and prices.

Sub-Clause 4.20 Employer's Equipment and Free-Issue Material

For this Sub-Clause to apply, the Employer's Requirements should describe each item which the Employer will provide and/or operate and should specify all necessary details. With some types of facilities, further provisions may be necessary, in order to clarify aspects such as liability and insurance.

Sub-Clause 4.22 Security of the Site

If the Contractor is sharing occupation of the Site with others, Sub-Clauses 4.8 and/or 4.22 may require amendment, and the Employer's obligations should be specified.

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Clause 5 Design

Sub-Clause 5.1 General Design Obligations

If the Employer's Requirements include an outline design, in order (for example) to establish the feasibility of the project, tenderers should be advised of the extent to which the outline design is a suggestion or a requirement. If this Sub-Clause is considered inappropriate, the provisions in FIDIC's Conditions of Contract for Plant and Design-Build may be preferred.

Sub-Clause 5.2 Contractor's Documents

The "Contractor's Documents" are defined as the documents which the Contractor must submit to the Employer, as specified elsewhere in the Contract, which typically may not include all the technical documents which the Contractor's Personnel will need in order to execute the Works. For example, it may be appropriate for the Employer's Requirements for a plant contract to specify that the Contractor's Documents shall include drawings showing how the Plant is to be affixed and any other information required for:

(a) preparing suitable foundations or other means of support,

(b) providing suitable access on the Site, for the Plant and any necessary equipment, to the place where the Plant is to be erected, and/or

(c) making necessary connections to the Plant.

Different "review periods" may be specified, taking account of the time necessary to review the different types of drawing, and/or of the possibility of substantial submissions at particular stages of the design process.

Clause 6 Staff and Labour

Sub-Clause 6.6 Facilities for Staff and Labour

If the Employer will make some accommodation available, his obligations to do so should be specified.

Sub-Clause 6.8 Contractor's Superintendence

If the ruling language is not the same as the language for day to day communications (under Sub-Clause 1.4), or if for any other reason it is necessary to stipulate that the Contractor's superintending staff shall be fluent in a particular language, the following sentence may be added.

EXAMPLE

Insert at the end of Sub-Clause 6.8:

A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of

(*insert name of language*)

or the Contractor shall have a sufficient number of competent interpreters available on Site during all working hours.

Additional Sub-Clauses

It may be necessary to add a few sub-clauses to take account of the circumstances and locality of the Site:

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EXAMPLE SUB-CLAUSE

Foreign Staff and Labour

The Contractor may import any personnel who are necessary for the execution of the Works. The Contractor must ensure that these personnel are provided with the required residence visas and work permits. The Contractor shall be responsible for the return to the place where they were recruited or to their domicile of imported Contractor's Personnel. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

EXAMPLE SUB-CLAUSE

Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal by Contractor's Personnel.

EXAMPLE SUB-CLAUSE

Arms and Ammunition

The Contractor shall not give, barter or otherwise dispose of to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

EXAMPLE SUB-CLAUSE

Festivals and Religious Customs

The Contractor shall respect the Country's recognised festivals, days of rest and religious or other customs.

Clause 7 Plant, Materials and Workmanship

Additional Sub-Clause

If the Contract is being financed by an institution whose rules or policies require a restriction on the use of its funds, a further sub-clause may be added:

EXAMPLE SUB-CLAUSE

All Goods shall have their origin in eligible source countries as defined in

(insert name of published guidelines for procurement).

Goods shall be transported by carriers from these eligible source countries, unless exempted by the Employer in writing on the basis of potential excessive costs or delays. Surety, insurance and banking services shall be provided by insurers and bankers from the eligible source countries.

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Clause 8 Commencement, Delays and Suspension

Sub-Clause 8.7 Delay Damages

Under many legal systems, the amount of these pre-defined damages must represent a reasonable pre-estimate of the Employer's probable loss in the event of delay. The Particular Conditions should specify the daily sum, for the Works and for each Section, expressed either as an amount or as a percentage: see also Sub-Clause 14.15(b).

EXAMPLE

In Sub-Clause 8.7, the sum referred to in the second sentence shall be 0.02% of the Contract Price as delay damages in respect of the Works, payable (per day) in the proportions of currencies in which the Contract Price is payable. For each Section, such daily sum shall be 0.02% of the final contract value of such Section, payable (per day) in such currencies. The maximum amount of delay damages shall be ten percent (10%) of the Contract Price stated in the Contract Agreement.

Additional Sub-Clause

Incentives for early completion may be included in the tender documents (although Sub-Clause 13.2 refers to accelerated completion):

EXAMPLE SUB-CLAUSE

Sections are required to be completed by the dates given in the Employer's Requirements in order that these Sections may be occupied and used by the Employer in advance of the completion of the whole of the Works. Details of the work required to be executed to entitle the Contractor to bonus payments and the amount of the bonuses are stated in the Employer's Requirements.

For the purposes of calculating bonus payments, these dates for completion of Sections are fixed. No adjustments of the dates by reason of granting an extension of the Time for Completion will be allowed.

Clause 9 Tests on Completion

Sub-Clause 9.1 Contractor's Obligations

The Employer's Requirements should describe the tests which the Contractor is to carry out before being entitled to a Taking-Over Certificate. It may also be appropriate for the Tender to include detailed arrangements, instrumentation, etc. If the Works are to be tested and taken-over in stages, the tests requirements may have to take account of the effect of some parts of the Works being incomplete.

The wording in the sub-paragraphs includes the conditions which are typically applicable for a plant contract, but otherwise may require amendment. In particular, sub-paragraph (c) refers to trial operation, during which any product produced by the Works becomes the property of the Employer. He thus becomes responsible for disposing of it, and entitled to retain the proceeds from selling it. If the product is to be retained by the Contractor, the Sub-Clause should be amended accordingly.

Sub-Clause 9.4 Failure to Pass Tests on Completion

If the reduction referred to in the final paragraph, based on the extent of the failure, is to be defined in the Particular Conditions or in the Employer's Requirements, minimum acceptable performance criteria should also be specified.

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Clause 10 Employer's Taking Over

Sub-Clause 10.1 Taking-Over Certificate

If the Works are to be taken-over in stages, which is unusual under a turnkey contract, these stages should to be defined as Sections, in Clause 1 of the Particular Conditions. Precise geographical definitions are advisable.

Clause 11 Defects Liability

Sub-Clause 11.10 Unfulfilled Obligations

It may be necessary to review this Sub-Clause in relation to the period of liability under the applicable law.

Clause 12 Tests after Completion

Sub-Clause 12.1 Procedure for Tests after Completion

In an EPC turnkey project, the Contractor is typically required to prove the reliability and performance of the Plant during the Tests on Completion, and the Works are only taken over after successful completion of these tests. Exceptionally, it may be considered necessary for Tests after Completion to be carried out, after the Employer has taken over and operated the Works, so that the guaranteed performance can be demonstrated under normal operating conditions: for example, after operational fouling of the plant.

The Employer's Requirements should describe the tests he requires, after taking-over, to verify that the Works fulfil the Performance Guarantees promised in the Tender. For some types of Works, these Tests may be the most difficult to specify well, although they are critical to a successful outcome. It may be appropriate for the Tender to include detailed arrangements, and/or to define any instrumentation required, in addition to that included in the Plant.

The provisions in the General Conditions are based upon the Tests after Completion being carried out by the Contractor, with the assistance of the Employer as regards personnel, consumables, etc. These details may need to be specified in the Employer's Requirements. If other arrangements are envisaged, they should be specified in the Employer's Requirements, and the Sub-Clause should be amended accordingly. For example, the provisions in FIDIC's Conditions of Contract for Plant and Design-Build are based upon these Tests being carried out by the Employer and his operating personnel, with guidance from the Contractor's staff.

Sub-Clause 12.4 Failure to Pass Tests after Completion

If the first part of this Sub-Clause is to apply, the method of calculating the non-performance damages (based on the extent of the failure) should be defined in the Particular Conditions or in the Employer's Requirements, and the minimum acceptable performance criteria should also be specified.

Clause 13 Variations and Adjustments

Variations can be initiated by any of three ways:

(a) the Employer may instruct the variation under Sub-Clause 13.1, without prior agreement as to feasibility or price;

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(b) the Contractor may initiate his own proposals under Sub-Clause 13.2, which are intended to benefit both Parties; or
(c) the Employer may request a proposal under Sub-Clause 13.3, seeking prior agreement so as to minimise dispute.

Sub-Clause 13.5 Provisional Sums

Although generally inappropriate for this type of contract, a Provisional Sum may be required for parts of the Works which are not required to be priced at the risk of the Contractor. For example, a Provisional Sum may be necessary to cover goods which the Employer wants to select. It is essential to define the scope of each Provisional Sum, since the defined scope will then be excluded from the other elements of the Contract Price. If a Provisional Sum is to be valued under Sub-Clause 13.5(b), the percentage should be quoted in the Tender.

Sub-Clause 13.8 Adjustments for Changes in Cost

Provisions for adjustments may be required if it would be unreasonable for the Contractor to bear the risk of escalating costs due to inflation. Wording for provisions based on cost indices have been published in FIDIC's Conditions of Contract for Plant and Design-Build, which may be considered appropriate. Particular care should be taken in the calculation of weightings/coefficients ("a", "b", "c", ..., the total of which must not exceed unity) and in the selection and verification of cost indices. Expert advice may be appropriate.

Clause 14 Contract Price and Payment

Sub-Clause 14.1 The Contract Price

When writing the Particular Conditions, consideration should be given to the amount and timing of payment(s) to the Contractor. A positive cash flow is clearly of benefit to the Contractor, and tenderers will take account of the interim payment procedures when preparing their tenders.

Normally, this type of contract is based on a lump sum price. The Contractor thus takes the risk of changes in cost arising from his design. The lump sum price may consist of two or more amounts, quoted in the currencies of payment (which may, but need not, include the Local Currency).

In order to value Variations, Tenders may be required to be accompanied by detailed price breakdowns, including quantities, unit rates and other pricing information. This information can also be useful for the assessment of interim payments. However, the information may not have been priced competitively. When the tender documents are being prepared, the Employer must therefore decide whether he will accept being bound by the tenderer's breakdowns. If not, he should have ensured that his representative has the necessary expertise to value any Variations which may be required.

Additional Sub-Clauses may be required to cover any exceptions to the options set out in Sub-Clause 14.1, and any other matters relating to payment.

If Sub-Clause 14.1(b) is not to apply, additional Sub-Clause(s) should be added.

EXAMPLE SUB-CLAUSE ON EXEMPTION FROM DUTIES

All Goods imported by the Contractor into the Country shall be exempt from customs and other import duties, if the Employer's prior written approval is obtained for import. The Employer shall endorse the necessary exemption documents prepared by the Contractor for presentation in order to clear the Goods through Customs, and shall also provide the following exemption documents:

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(describe the necessary documents, which the Contractor will be unable to prepare)

If exemption is not then granted, the customs duties payable and paid shall be reimbursed by the Employer.

All imported Goods, which are not incorporated in or expended in connection with the Works, shall be exported on completion of the Contract. If not exported, the Goods will be assessed for duties as applicable to the Goods involved in accordance with the Laws of the Country.

However, exemption may not available for:

(a) Goods which are similar to those locally produced, unless they are not available in sufficient quantities or are of a different standard to that which is necessary for the Works; and

(b) any element of duty or tax inherent in the price of goods or services procured in the Country, which shall be deemed to be included in the Contract Price.

Port dues, quay dues and, except as set out above, any element of tax or duty inherent in the price of goods or services shall be deemed to be included in the Contract Price.

EXAMPLE SUB-CLAUSE ON EXEMPTION FROM TAXES

Expatriate (foreign) personnel shall not be liable for income tax levied in the Country on earnings paid in any foreign currency, or for income tax levied on subsistence, rentals and similar services directly furnished by the Contractor to Contractor's Personnel, or for allowances in lieu. If any Contractor's Personnel have part of their earnings paid in the Country in a foreign currency, they may export (after the conclusion of their term of service on the Works) any balance remaining of their earnings paid in foreign currencies.

The Employer shall seek exemption for the purposes of this Sub-Clause. If it is not granted, the relevant taxes paid shall be reimbursed by the Employer.

Sub-Clause 14.2 Advance Payment

When writing the Particular Conditions, consideration should be given to the benefits of advance payment(s). Unless this Sub-Clause is not to apply, the matters described in sub-paragraphs (a) to (d) of this Sub-Clause should be specified in the Particular Conditions, and the acceptable form(s) of guarantee should be included in the tender documents, annexed to the Particular Conditions: an example form is annexed to this document, as Annex E.

If the Contractor is to provide major items of Plant, consideration should be given to the benefits of stage payments during manufacture. The Employer may consider it advisable to have some form of security, since these payments would not relate to anything in his possession. If the Contractor is to be entitled to stage payments prior to shipment, the tender documents may include:

(a) provisions in the Particular Conditions linking the timing of advance payment instalments (under this Sub-Clause) to the stages of manufacture; or

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(b) in the Schedule of Payments or other document to be used to determine the contract value under Sub-Clause 14.3(a), a price for each of these stages (the Schedule should refer to the Contractor providing the security specified in Sub-Clause 14.5).

Sub-Clause 14.3 Application for Interim Payments

The Particular Conditions should specify the percentage of retention for sub-paragraph (c), and may also specify a limit of Retention Money.

Sub-Clause 14.4 Schedule of Payments

The General Conditions contains provisions for interim payments to the Contractor, which may be based on a Schedule of Payments. If another basis is to be used for determining interim valuations, details should be added in the Particular Conditions. If payments are to be specified in a Schedule of Payments, it could be in one of the following forms:

(a) an amount (or percentage of the estimated final Contract Price) could be entered for each three-month (or other) period during the Time for Completion, which can prove unreasonable if the Contractor's progress differs significantly from the expectation on which the Schedule was based; or

(b) the Schedule could be based on actual progress achieved in executing the Works, which necessitates careful definition of the payment milestones. Disagreements may arise when the work required for a payment milestone is nearly achieved but the balance cannot be completed until some months later.

Sub-Clause 14.7 Timing of Payments

If a different period for payment is to apply, the Sub-Clause may be amended:

EXAMPLE	In sub-paragraph (b) of Sub-Clause 14.7, delete "56" and substitute "42".

If the country/countries of payment need to be specified, details may be included in the Tender.

Sub-Clause 14.8 Delayed Payment

If the discount rate of the central bank in the country of the currency of payment is not a reasonable basis for assessing the Contractor's financing costs, a new rate may have to be defined. Alternatively, the actual financing Costs could be paid, taking account of local financing arrangements.

Sub-Clause 14.9 Payment of Retention Money

If part of the Retention Money is to be released and substituted by an appropriate guarantee, an additional Sub-Clause may be added. The acceptable form(s) of guarantee should be included in the tender documents, annexed to the Particular Conditions: an example form is annexed to this document, as Annex F.

EXAMPLE SUB-CLAUSE FOR RELEASE OF RETENTION

When the Retention Money has reached _____, the Employer shall make payment of _____% of the Retention Money to the Contractor if he obtains a guarantee, in a form and provided by an entity approved by the Employer, in amounts and currencies equal to the payment.

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The Contractor shall ensure that the guarantee is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security in Sub-Clause 4.2, and shall be returned to the Contractor accordingly. This release of retention shall be in lieu of the release of the second half of the Retention Money under the second paragraph of Sub-Clause 14.9.

Sub-Clause 14.15 Currencies of Payment

If all payments are to be made in Local Currency, it must be named in the Contract Agreement, and only the first sentence of this Sub-Clause will apply. Alternatively, the Sub-Clause may then be replaced:

EXAMPLE SUB-CLAUSE FOR A SINGLE-CURRENCY CONTRACT

The currency of account shall be the Local Currency and all payments made in accordance with the Contract shall be in Local Currency. The Local Currency payments shall be fully convertible, except those for local costs. The percentage attributed to local costs shall be as stated in the Tender.

Financing Arrangements

For major contracts in some markets, there may be a need to secure finance from entities such as aid agencies, development banks, export credit agencies, or other international financing institutions. If financing is to be procured from any of these sources, the Particular Conditions may need to incorporate its special requirements. The exact wording will depend on the relevant institution, so reference will need to be made to them to ascertain their requirements, and to seek approval of the draft tender documents.

These requirements may include tendering procedures which need to be adopted in order to render the eventual contract eligible for financing, and/or special Sub-Clauses which may need to be incorporated into the Particular Conditions. The following examples indicate some of the topics which the institution's requirements may cover:

(a) prohibition from discrimination against the shipping companies of any one country;

(b) ensuring that the Contract is subject to a widely-accepted neutral law;

(c) provision for arbitration under recognised international rules and at a neutral location;

(d) giving the Contractor the right to suspend/terminate in the event of default under the financing arrangements;

(e) restricting the right to reject Plant;

(f) specifying the payments due in the event of termination;

(g) specifying that the Contract does not become effective until certain conditions precedent have been satisfied, including pre-disbursement conditions for the financing arrangements; and

(h) obliging the Employer to make payments from his own resources if, for any reason, the funds under the financing arrangements are insufficient to meet the payments due to the Contractor, whether due to a default under the financing arrangements or otherwise.

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In addition, the financing institution or bank may wish the Contract to include references to the financing arrangements, especially if funding from more than one source is to be arranged to finance different elements of supply. It is not unusual for the Particular Conditions to include special provisions identifying different categories of Plant and specifying the documents to be presented to the relevant financing institution to obtain payment. If the financing institution's requirements are not met, it may be difficult (or even impossible) to secure suitable financing for the project, and/or the institution may decline to provide finance for part or all of the Contract.

However, where the financing is not tied to the export of goods and services from any particular country but is simply provided by commercial banks lending to the Employer, those banks may be concerned to ensure that the Contractor's rights are very restricted. These banks may wish the Contract to exclude any reference to the financing arrangements, and/or to restrict the Contractor's rights under Clause 16.

FORM OF SUB-CLAUSE WHICH A FINANCING INSTITUTION MAY REQUIRE

The Contract Price is made up as follows:

(breakdown into items and/or into supply/delivery/etc)

and shall be payable by the Employer to the Contractor as set out below.

(a) _____% of the Contract Price shall be payable by a direct payment from the Employer to the Contractor within 28 days of receipt by the Employer of the following documents:

(i) commercial invoice addressed to the Employer specifying the amount of the payment now due,
(ii) advance payment security guarantee issued by _____ Bank in the form annexed,
(iii) performance security guarantee issued by _____ Bank in the form annexed, and
(iv) an interim payment certificate confirming the payment due and specifying the amount.

(b) _____% of the contract price for the supply of Plant shall be payable as follows:

(i) _____% of the estimated contract value of the Plant supplied, by direct payment from the Employer to the Contractor on shipment of each item, against the following documents:
(original) commercial invoice,
(original) shipping documents,
(original) certificate of origin,
(original) insurance certificate, and
(original) interim payment certificate confirming the payment due and specifying the amount.

(ii) _____% of the estimated contract value of the Plant supplied, by disbursement from the Loan Agreement to the Contractor on shipment of each item, on presentation of a Qualifying Certificate in the form annexed and copies of the documents listed in sub-paragraph (b)(i) above.

(c) the balance of the Contract Price shall be payable as follows:

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(i) _____% of the estimated contract value of the services rendered, by direct payment from the Employer to the Contractor on execution of the relevant service, against the following documents:
(original) commercial invoice, and
(original) interim payment certificate confirming the payment due and specifying the amount.

(ii) _____% of the estimated contract value of the services rendered, by disbursement from the Loan Agreement to the Contractor, on presentation of a Qualifying Certificate in the form annexed and copies of the documents listed in sub-paragraph (c)(i) above.

(d) The direct payments by the Employer specified in sub-paragraph (b) shall be made by an irrevocable letter of credit established by the Employer in favour of the Contractor and confirmed by a bank acceptable to the Contractor.

The above arrangements (involving financing institution(s), Employer and Contractor) may be initiated by the Employer; or by the Contractor, before submitting the Tender. Alternatively, the Contractor may be prepared to initiate financing arrangements and retain responsibility for them, although he would probably be unable or unwilling to provide finance from his own resources. His financing bank's requirements would then affect his attitude in contract negotiations. They might well require the Employer to make interim payments, although a large proportion of the Contract Price might be withheld until the Works are complete.

This payment arrangement can be achieved either by a high Percentage of Retention; or by a suitably completed Schedule of Payments, with the Instructions to Tenderers specifying the criteria with which the Tenderer should comply. Since the Contractor would then have to arrange his own financing to cover the shortfall between the payments and his outgoings, he (and his financing bank) would probably require some form of security, guaranteeing payment when due.

It may be appropriate for the Employer, when preparing the tender documents, to anticipate the latter requirement by undertaking to provide a guarantee for the element of payment which the Contractor is to receive when the Works are complete. The acceptable form(s) of guarantee should be included in the tender documents, annexed to the Particular Conditions: an example form is annexed to this document, as Annex G. The following Sub-Clause may be added.

EXAMPLE PROVISIONS FOR CONTRACTOR FINANCE

The Employer shall obtain (at his cost) a payment guarantee in the amount and currencies, and provided by an entity, as stated in _____. The Employer shall deliver the guarantee to the Contractor within 28 days after both Parties have signed the Contract Agreement. The guarantee shall be in the form annexed to these Particular Conditions, or in another form acceptable to the Contractor. Unless and until the Contractor receives the guarantee, the Employer shall not give the notice under Sub-Clause 8.1.

The guarantee shall be returned to the Employer at the earliest of the following dates:

a) when the Contractor has been paid the Contract Price stated in the Contract Agreement;

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(b) when obligations under the guarantee expire or have been discharged; or

(c) when the Employer has performed all obligations under the Contract.

Clause 15 Termination by Employer

Sub-Clause 15.2 Termination by Employer

Before inviting tenders, the Employer should verify that the wording of this Sub-Clause, and each anticipated ground for termination, is consistent with the law governing the Contract.

Sub-Clause 15.5 Employer's Entitlement to Termination

Unless inconsistent with the requirements of the Employer and/or financing institutions, a further sentence may be added.

EXAMPLE

Insert at the end of Sub-Clause 15.5:

The Employer shall also pay to the Contractor the amount of any other loss or damage resulting from this termination.

Clause 16 Suspension and Termination by Contractor

Sub-Clause 16.2 Termination by Contractor

Before inviting tenders, the Employer should verify that the wording of this Sub-Clause is consistent with the law governing the Contract. The Contractor should verify that each anticipated ground for termination is consistent with such law.

Clause 17 Risk and Responsability

Sub-Clause 17.6 Limitation of Liability

EXAMPLE

In Sub-Clause 17.6, the sum referred to in the penultimate sentence shall be _____

Additional Sub-Clause Use of Employer's Accommodation/Facilities

If the Contractor is to occupy the Employer's facilities temporarily, an additional sub-clause may be added:

EXAMPLE SUB-CLAUSE

The Contractor shall take full responsibility for the care of the items detailed below, from the respective dates of use or occupation by the Contractor, up to the respective dates of hand-over or cessation of occupation (where hand-over or cessation of occupation may take place after the date stated in the Taking-Over Certificate for the Works):

(insert details)

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If any loss or damage happens to any of the above items while the Contractor is responsible for their care, arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at his own cost, rectify the loss or damage to the satisfaction of the Employer.

Clause 18 Insurance

The wording in the General Conditions describes the insurances which are to be arranged by the "insuring Party", who is to be the Contractor unless otherwise stated in the Particular Conditions. Insurances so provided by the Contractor are to be consistent with the general terms agreed with the Employer. The Instructions to Tenderers may therefore require tenderers to provide details of the proposed terms. The Particular Conditions should specify the minimum amount of deductibles for sub-paragraph (d) of Sub-Clause 18.2 and the minimum amount of third party insurance for Sub-Clause 18.3.

If the Employer is to arrange any of the insurances under this Clause, the tender documents should include details as an annex to the Particular Conditions (so that tenderers can estimate what other insurances they wish to have for their own protection), including the conditions, limits, exceptions and deductibles; preferably in the form of a copy of each policy. The Employer may find it difficult to effect the insurances described in the third paragraph of Sub-Clause 18.2 (for Contractor's Equipment, which includes Sub-contractor's equipment), because the Employer may not know the amount or value of these items of equipment. The following sentence may be included in the Particular Conditions:

EXAMPLE

Delete the final paragraph of Sub-Clause 18.2 and substitute:

However, the insurances described in the first two paragraphs of Sub-Clause 18.2 shall be effected and maintained by the Employer as insuring Party, and not by the Contractor.

Clause 19 Force Majeure

Before inviting tenders, the Employer should verify that the wording of this Clause is compatible with the law governing the Contract.

Clause 20 Claims, Disputes and Arbitration

Sub-Clause 20.2 Appointment of the Dispute Adjudication Board

The Contract should include provisions which, whilst not discouraging the Parties from reaching agreement on disputes as the works proceed, allow them to refer contentious matters to an impartial dispute adjudication board ("DAB").

The adjudication procedure depends for its success on, amongst other things, the Parties' confidence in the agreed individual(s) who will serve on the DAB. Therefore, it is essential that candidates for this position are not imposed by either Party on the other Party; and that, if the individual is selected under Sub-Clause 20.3, the selection is made by a wholly impartial entity. FIDIC is prepared to perform this role, if this authority has been delegated in accordance with the example wording suggested below, for Sub-Clause 20.3.

Sub-Clause 20.2 envisages appointment of the DAB after a Party gives notice of its intention to

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refer a dispute to a DAB. However, for certain types of project, particularly those involving extensive work on Site, where it would be appropriate for the DAB to visit the Site on a regular basis, it may be decided to retain the services of a permanent DAB. In this case, Sub-Clause 20.2 and 20.4 together with the Appendix and Annex to the General Conditions, and the Dispute Adjudication Agreement, should be amended to comply with the corresponding wording contained in FIDIC's Conditions of Contract for Construction.

Sub-Clause 20.2 provides for two alternative arrangements for the DAB:

(a) one person, who acts as the sole member of the DAB, having entered into a tripartite agreement with both Parties; or
(b) a DAB of three persons, each of whom has entered into a tripartite agreement with both Parties.

The form of this tripartite agreement could be one of the two alternatives shown at the end of this publication, as appropriate to the arrangement adopted. Both of these forms incorporate (by reference) the General Conditions of Dispute Adjudication Agreement, which are included as the Appendix to the General Conditions because they are also referred to in Sub-Clause 20.2. Under either of these alternative forms of Dispute Adjudication Agreement, each individual person is referred to as a Member.

Before the Contract is entered into, consideration should be given as to whether a one-person or three-person DAB is preferable for a particular project, taking account of its size, duration and the fields of expertise which will be involved.

The appointment of the DAB may be facilitated by including an agreed list of potential members in the Contract.

Sub-Clause 20.3	**Failure to Agree Dispute Adjudication Board**
EXAMPLE	The appointing entity or official shall be the President of FIDIC or a person appointed by its President.

Sub-Clause 20.5 Amicable Settlement

The provisions of this Sub-Clause are intended to encourage the parties to settle a dispute amicably, without the need for arbitration: for example, by direct negotiation, conciliation, mediation or other forms of alternative dispute resolution. Amicable settlement procedures often depend, for their success, on confidentiality and on both Parties' acceptance of the procedure. Therefore, neither Party should seek to impose the procedure on the other Party.

Sub-Clause 20.6 Arbitration

The Contract should include provisions for the resolution by international arbitration of any disputes which are not resolved amicably. In international construction contracts, international commercial arbitration has numerous advantages over litigation in national courts, and may be more acceptable to the Parties.

Careful consideration should be given to ensuring that the international arbitration rules chosen are compatible with the provisions of Clause 20 and with the other elements to be specified in the Contract. The Rules of Arbitration of the International Chamber of Commerce (the "ICC", which is based at 38 Cours Albert 1er, 75008 Paris, France) are frequently included in international contracts. In the absence of specific stipulations as to the number of arbitrators and the place of arbitration, the International Court of Arbitration of the ICC will decide on the number of arbitrators (typically three in any substantial construction dispute) and on the place of arbitration.

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If the UNCITRAL (or other non-ICC) arbitration rules are preferred, it may be necessary to designate, in the Particular Conditions, an institution to appoint the arbitrators or to administer the arbitration, unless the institution is named (and their role specified) in the arbitration rules. It may also be necessary to ensure, before so designating an institution, that it is prepared to appoint or administer.

For major projects tendered internationally, it is desirable that the place of arbitration be situated in a country other than that of the Employer or Contractor. This country should have a modern and liberal arbitration law and should have ratified a bilateral or multilateral convention (such as the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards), or both, that would facilitate the enforcement of an arbitral award in the states of the Parties.

It may be considered desirable in some cases for other Parties to be joined into any arbitration between the Parties, thereby creating a multi-party arbitration. While this may be feasible, multi-party arbitration clauses require skilful drafting, and usually need to be prepared on a case-by-case basis. No satisfactory standard form of multi-party arbitration clause for international use has yet been developed.

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Annexes FORMS OF SECURITIES

Acceptable form(s) of security should be included in the tender documents: for Annex A and/or B, in the Instructions to Tenderers; and for Annexes C to G, annexed to the Particular Conditions. The following example forms, which (except for Annex A) incorporate Uniform Rules published by the International Chamber of Commerce (the "ICC", which is based at 38 Cours Albert 1er, 75008 Paris, France), may have to be amended to comply with the applicable law. Although the ICC publishes guides to these Uniform Rules, legal advice should be taken before the securities are written. Note that the guaranteed amounts should be quoted in all the currencies, as specified in the Contract, in which the guarantor pays the beneficiary.

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Annex A EXAMPLE FORM OF PARENT COMPANY GUARANTEE

[*See page 4, and the comments on Sub-Clause 1.14*]

Brief description of Contract _____

Name and address of Employer _____

_____ (together with successors and assigns).

We have been informed that _____ (hereinafter called the "Contractor") is submitting an offer for such Contract in response to your invitation, and that the conditions of your invitation require his offer to be supported by a parent company guarantee.

In consideration of you, the Employer, awarding the Contract to the Contractor, we (*name of parent company*) _____ irrevocably and unconditionally guarantee to you, as a primary obligation, the due performance of all the Contractor's obligations and liabilities under the Contract, including the Contractor's compliance with all its terms and conditions according to their true intent and meaning.

If the Contractor fails to so perform his obligations and liabilities and comply with the Contract, we will indemnify the Employer against and from all damages, losses and expenses (including legal fees and expenses) which arise from any such failure for which the Contractor is liable to the Employer under the Contract.

This guarantee shall come into full force and effect when the Contract comes into full force and effect. If the Contract does not come into full force and effect within a year of the date of this guarantee, or if you demonstrate that you do not intend to enter into the Contract with the Contractor, this guarantee shall be void and ineffective. This guarantee shall continue in full force and effect until all the Contractor's obligations and liabilities under the Contract have been discharged, when this guarantee shall expire and shall be returned to us, and our liability hereunder shall be discharged absolutely.

This guarantee shall apply and be supplemental to the Contract as amended or varied by the Employer and the Contractor from time to time. We hereby authorise them to agree any such amendment or variation, the due performance of which and compliance with which by the Contractor are likewise guaranteed hereunder. Our obligations and liabilities under this guarantee shall not be discharged by any allowance of time or other indulgence whatsoever by the Employer to the Contractor, or by any variation or suspension of the works to be executed under the Contract, or by any amendments to the Contract or to the constitution of the Contractor or the Employer, or by any other matters, whether with or without our knowledge or consent.

This guarantee shall be governed by the law of the same country (or other jurisdiction) as that which governs the Contract and any dispute under this guarantee shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with such Rules. We confirm that the benefit of this guarantee may be assigned subject only to the provisions for assignment of the Contract.

Date _____ Signature(s) _____

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Annex B EXAMPLE FORM OF TENDER SECURITY

[*See page 4*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the tender documents define as the Employer).

We have been informed that _____ (hereinafter called the "Principal") is submitting an offer for such Contract in response to your invitation, and that the conditions of your invitation (the "conditions of invitation", which are set out in a document entitled Instructions to Tenderers) require his offer to be supported by a tender security.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (say: _____) upon receipt by us of your demand in writing and your written statement (in the demand) stating that:

(a) the Principal has, without your agreement, withdrawn his offer after the latest time specified for its submission and before the expiry of its period of validity, or

(b) the Principal has refused to accept the correction of errors in his offer in accordance with such conditions of invitation, or

(c) you entered into the Contract with the Principal and he has failed to deliver a performance security complying with sub-clause 4.2 of the conditions of the Contract.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 35 days after the expiry of the validity of the Letter of Tender*) _____, when this guarantee shall expire and shall be returned to us.

This guarantee is subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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Annex C EXAMPLE FORM OF PERFORMANCE SECURITY - DEMAND GUARANTEE

[*See comments on Sub-Clause 4.2*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Employer)

We have been informed that _____ (hereinafter called the "Principal") is your contractor under such Contract, which requires him to obtain a performance security.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (the "guaranteed amount", say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that the Principal is in breach of his obligation(s) under the Contract, and

(a) the respect in which the Principal is in breach.

[Following the receipt by us of an authenticated copy of the taking-over certificate for the whole of the works under clause 10 of the conditions of the Contract, such guaranteed amount shall be reduced by _____ % and we shall promptly notify you that we have received such certificate and have reduced the guaranteed amount accordingly.] (1)

Any demand for payment must contain your [minister's/directors'] (1) signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 70 days after the expected expiry of the Defects Notification Period for the Works*) _____ (the "expiry date"), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the performance certificate under the Contract has not been issued by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written statement that the performance certificate has not been issued, for reasons attributable to the Principal, and that this guarantee has not been extended.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

When writing the tender documents, the writer should ascertain whether to include the optional text, shown in parentheses [ ]

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Annex D EXAMPLE FORM OF PERFORMANCE SECURITY - SURETY BOND

[*See comments on Sub-Clause 4.2*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (together with successors and assigns, all as defined in the Contract as the Employer).

By this Bond, (*name and address of contractor*) _____ (who is the contractor under such Contract) as Principal and (*name and address of guarantor*) _____ as Guarantor are irrevocably held and firmly bound to the Beneficiary in the total amount of _____ (the "Bond Amount", say: _____) for the due performance of all such Principal's obligations and liabilities under the Contract. [Such Bond Amount shall be reduced by _____ % upon the issue of the taking-over certificate for the whole of the works under clause 10 of the conditions of the Contract.][(1)]

This Bond shall become effective on the Commencement Date defined in the Contract.

Upon Default by the Principal to perform any Contractual Obligation, or upon the occurrence of any of the events and circumstances listed in sub-clause 15.2 of the conditions of the Contract, the Guarantor shall satisfy and discharge the damages sustained by the Beneficiary due to such Default, event or circumstances,[(2)] However, the total liability of the Guarantor shall not exceed the Bond Amount.

The obligations and liabilities of the Guarantor shall not be discharged by any allowance of time or other indulgence whatsoever by the Beneficiary to the Principal, or by any variation or suspension of the works to be executed under the Contract, or by any amendments to the Contract or to the constitution of the Principal or the Beneficiary, or by any other matters, whether with or without the knowledge or consent of the Guarantor.

Any claim under this Bond must be received by the Guarantor on or before (*the date six months after the expected expiry of the Defects Notification Period for the Works*) _____ (the "Expiry Date"), when this Bond shall expire and shall be returned to the Guarantor.

The benefit of this Bond may be assigned subject to the provisions for assignment of the Contract, and subject to the receipt by the Guarantor of evidence of full compliance with such provisions.

This Bond shall be governed by the law of the same country (or other jurisdiction) as that which governs the Contract. This Bond incorporates and shall be subject to the Uniform Rules for Contract Bonds, published as number 524 by the International Chamber of Commerce, and words used in this Bond shall bear the meanings set out in such Rules.

Wherefore this Bond has been issued by the Principal and the Guarantor on (*date*) _____

Signature(s) for and on behalf of the Principal _____

Signature(s) for and on behalf of the Guarantor _____

(1) *When writing the tender documents, the writer should ascertain whether to include the optional text, shown in parentheses* [ ]

(2) *Insert:* [and shall not be entitled to perform the Principal's obligations under the Contract.]
Or: [or at the option of the Guarantor (to be exercised in writing within 42 days of receiving the claim specifying such Default) perform the Principal's obligations under the Contract.]

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Annex E EXAMPLE FORM OF ADVANCE PAYMENT GUARANTEE

[*See comments on Sub-Clause 14.2*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Employer).

We have been informed that _____ (hereinafter called the "Principal") is your contractor under such Contract and wishes to receive an advance payment, for which the Contract requires him to obtain a guarantee.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (the "guaranteed amount", say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that the Principal has failed to repay the advance payment in accordance with the conditions of the Contract, and

(b) the amount which the Principal has failed to repay.

This guarantee shall become effective upon receipt [of the first instalment] of the advance payment by the Principal. Such guaranteed amount shall be reduced by the amounts of the advance payment repaid to you, as evidenced by your notices issued under sub-clause 14.6 of the conditions of the Contract. Following receipt (from the Principal) of a copy of each purported notice, we shall promptly notify you of the revised guaranteed amount accordingly.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 70 days after the expected expiry of the Time for Completion*) _____ (the "expiry date"), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the advance payment has not been repaid by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written statement that the advance payment has not been repaid and that this guarantee has not been extended.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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Annex F EXAMPLE FORM OF RETENTION MONEY GUARANTEE

[*See comments on Sub-Clause 14.9*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Employer).

We have been informed that _____ (hereinafter called the "Principal") is your contractor under such Contract and wishes to receive early payment of [part of] the retention money, for which the Contract requires him to obtain a guarantee.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (the "guaranteed amount", say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that the Principal has failed to carry out his obligation(s) to rectify certain defect(s) for which he is responsible under the Contract, and

(b) the nature of such defect(s).

At any time, our liability under this guarantee shall not exceed the total amount of retention money released to the Principal by you, as evidenced by your notices issued under sub-clause 14.6 of the conditions of the Contract with a copy being passed to us.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 70 days after the expected expiry of the Defects Notification Period for the Works*) _____ (the "expiry date"), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the performance certificate under the Contract has not been issued by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written statement that the performance certificate has not been issued, for reasons attributable to the Principal, and that this guarantee has not been extended.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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Annex G EXAMPLE FORM OF PAYMENT GUARANTEE BY EMPLOYER

[*See page 18: Contractor Finance*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Contractor).

We have been informed that _____ (whom the Contract defines as the Employer and who is hereinafter called the "Principal") is required to obtain a bank guarantee.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Contractor, any sum or sums not exceeding in total the amount of _____ (say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that, in respect of a payment due under the Contract, the Principal has failed to make payment in full by the date fourteen days after the expiry of the period specified in the Contract as that within which such payment should have been made, and

(b) the amount(s) which the Principal has failed to pay.

Any demand for payment must be accompanied by a copy of [*list of documents evidencing entitlement to payment*] _____ , in respect of which the Principal has failed to make payment in full.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date six months after the expected expiry of the Defects Notification Period for the Works*) _____, when this guarantee shall expire and shall be returned to us.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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GENERAL CONDITIONS

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

FORMS OF LETTER OF TENDER, CONTRACT AGREEMENT AND DISPUTE ADJUDICATION AGREEMENT

Conditions of Contract for **EPC/Turnkey Projects**

Forms of Letter of Tender, Contract Agreement and Dispute Adjudication Agreement

FOR EXCLUSIVE USE BY FICHTNER GMBH. & CO. KG, GERMANY UNTIL END MAY 2012

FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

LETTER OF TENDER

NAME OF CONTRACT:

TO:

We have examined the Conditions of Contract, Employer's Requirements and Addenda Nos _____ for the above-named Works. We have examined, understood and checked these documents and have ascertained that they contain no errors or other defects. We accordingly offer to design, execute and complete the Works and remedy any defects therein, in conformity with such documents and our enclosed Tender (including this letter) for the prices set out in our Tender.

We accept your suggestions for the appointment of the DAB, as set out in _____

[*We have included our suggestions for the other Member of the DAB in part _____ of our Tender, entitled List of Potential Members of the DAB.*]. *

We agree to abide by this Tender until _____ and it shall remain binding upon us and may be accepted at any time before that date.

If this offer is accepted, we will provide the specified Performance Security, commence the Works as soon as is reasonably practicable after the Commencement Date, and complete the Works in accordance with the above-named documents within the Time for Completion. We guarantee that the Works will then conform with the Performance Guarantees included in this Tender.

We understand that you are not bound to accept the lowest or any tender you may receive.

Signature _____ in the capacity of _____

duly authorised to sign tenders for and on behalf of _____

_____

Address: _____

_____

Date: _____

* If the Tenderer does not accept, this paragraph may be deleted and replaced by:

We do not accept your suggestions for the appointment of the DAB. We have included our suggestions in our Tender, in the list of potential members of the DAB. If these suggestions are not acceptable to you, we propose that the DAB be jointly appointed in accordance with Sub-Clause 20.2 of the Conditions of Contract, [*after a Party gives notice of its intention to refer a dispute to the DAB*]

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CONTRACT AGREEMENT

This Agreement made the _____ day of _____ 20 _____

Between _____ of _____ (hereinafter called "the Employer") of the one part, and _____ of _____ (hereinafter called "the Contractor") of the other part

Whereas the Employer desires that the Works known as _____ should be executed by the Contractor, and has accepted a Tender by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement:

   (a) The memoranda annexed hereto (which includes a breakdown of the Contract Price)
   (b) The Addenda nos _____
   (c) The Conditions of Contract
   (d) The Employer's Requirements, and
   (e) The Contractor's Tender.

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to design, execute and complete the Works and remedy any defects therein in conformity with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor, in consideration of the design, execution and completion of the Works and the remedying of defects therein, the final Contract Price at the times and in the manner prescribed by the Contract.

[5. The Contract shall come into full force and effect on the date when the following conditions are satisfied:
[List of pre-conditions]
The Employer shall promptly confirm to the Contractor the date on which all these conditions have been satisfied. If any of these conditions has not been satisfied within _____ days of the above-mentioned date on which this Agreement is made, this Agreement shall be void and ineffective and any securities issued in relation to the above Works shall be returned. *optional*]

[5. The Commencement Date shall be _____ *optional*]

In Witness whereof the parties hereto have caused this Agreement to be executed the day and year first before written in accordance with their respective laws.

SIGNED by: _____	SIGNED by: _____
for and on behalf of the Employer in the presence of	for and on behalf of the Contractor in the presence of
Witness: _____	Witness: _____
Name: _____	Name: _____
Address: _____	Address: _____
Date: _____	Date: _____

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DISPUTE ADJUDICATION AGREEMENT

[for a one-person DAB]

Name and details of Contract _____
Name and address of Employer _____
Name and address of Contractor _____
Name and address of Member _____

Whereas the Employer and the Contractor have entered into the Contract and desire jointly to appoint the Member to act as sole adjudicator who is also called the "DAB" to adjudicate a dispute which has arisen in relation to _____ *

The Employer, Contractor and Member jointly agree as follows:

1. The conditions of this Dispute Adjudication Agreement comprise the "General Conditions of Dispute Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for EPC/Turnkey Projects" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following provisions. In these provisions, which include amendments and additions to the General Conditions of Dispute Adjudication Agreement, words and expressions shall have the same meanings as are assigned to them in the General Conditions of Dispute Adjudication Agreement.

2. [*Details of amendments to the General Conditions of Dispute Adjudication Agreement, if any.]*

3. In accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member shall be paid a daily fee of _____ per day.

4. In consideration of these fees and other payments to be made by the Employer and the Contractor in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member undertakes to act as the DAB (as adjudicator) in accordance with this Dispute Adjudication Agreement.

5. The Employer and the Contractor jointly and severally undertake to pay the Member, in consideration of the carrying out of these services, in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement.

6. This Dispute Adjudication Agreement shall be governed by the law of _____

SIGNED by: _____	SIGNED by: _____	SIGNED by: _____
for and on behalf of the Employer in the presence of	for and on behalf of the Contractor in the presence of	the Member in the presence of:
Witness: _____	Witness: _____	Witness _____
Name: _____	Name: _____	Name: _____
Address: _____	Address: _____	Address: _____
Date: _____	Date: _____	Date: _____

[A brief description or name of dispute to be added*]

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DISPUTE ADJUDICATION AGREEMENT

[for each member of a three-person DAB]

Name and details of Contract _____
Name and address of Employer _____
Name and address of Contractor _____
Name and address of Member _____

Whereas the Employer and the Contractor have entered into the Contract and desire jointly to appoint the Member to act as one of the three persons who are jointly called the "DAB" [*and desire the Member to act as chairman of the DAB*] to adjudicate a dispute which has arisen in relation to _____*

The Employer, Contractor and Member jointly agree as follows:

1. The conditions of this Dispute Adjudication Agreement comprise the "General Conditions of Dispute Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for EPC/Turnkey Projects" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following provisions. In these provisions, which include amendments and additions to the General Conditions of Dispute Adjudication Agreement, words and expressions shall have the same meanings as are assigned to them in the General Conditions of Dispute Adjudication Agreement.

2. [*Details of amendments to the General Conditions of Dispute Adjudication Agreement, if any.]*

3. In accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member shall be paid a daily fee of _____ per day.

4. In consideration of these fees and other payments to be made by the Employer and the Contractor in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member undertakes to serve, as described in this Dispute Adjudication Agreement, as one of the three persons who are jointly to act as the DAB.

5. The Employer and the Contractor jointly and severally undertake to pay the Member, in consideration of the carrying out of these services, in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement.

6. This Dispute Adjudication Agreement shall be governed by the law of _____

SIGNED by: _____	SIGNED by: _____	SIGNED by: _____
for and on behalf of the Employer in the presence of	for and on behalf of the Contractor in the presence of	the Member in the presence of
Witness: _____	Witness: _____	Witness _____
Name: _____	Name: _____	Name: _____
Address: _____	Address: _____	Address: _____
Date: _____	Date: _____	Date: _____

*[*A brief description or name of dispute to be added.]*

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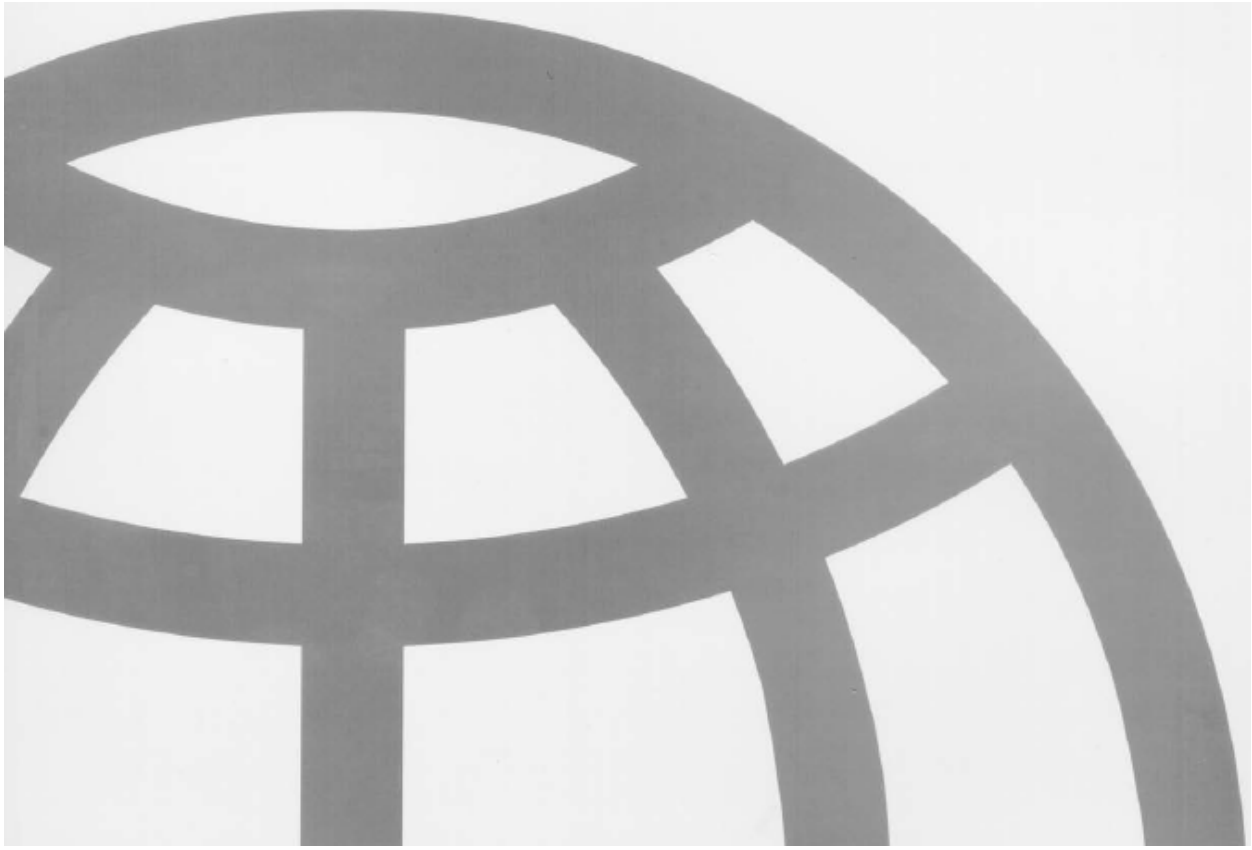
Međunarodna Federacija Konsalting Inženjera

Uslovi ugovaranja za PNI/ključ u ruke projekte

Opšti uslovi

Savjeti za pripremu posebnih uslova

Obrasci ponuda, ugovora i sporazuma o rješavanju sporova



ISBN 2-88432-021-0 **PRVO IZDANJE 1999**

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Obrasci ponuda, ugovora i

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Prvo izdanje 1999

ISBN 2-88432-021-0

Međunarodna Federacija Konsalting Inženjera

GREŠKE u prvom izdanju, 1999.

Sledeće značajne greške su ispravljenje u Prvom izdanju PNI/Ključ u ruke projekte, koje je ponovno štampano. Nekoliko manjih grešaka u kucanju i nepravilnosti u izgledu dokumenta su takođe ispravljene.

OPŠTE ODREDBE

Strana 36.

U naslovu podklauzule 14.2, izbrisati "Avans" i zamijeniti sa "Avansno"

Strana 54.

U petom redu, petog stava, poslije "Klauzule 20.4", dodati u kurzivu naslov "Donošenje odluke Komisije za rješavanje sporova". Podklauzula 20.4; peti red, izbrisati skraćenicu "KRS" koja je napisana u kurzivu i zamijeniti je sa "Komisija za rješavanje sporova" u kurzivu.

Strana 55.

U trećem stavu: drugi red, izbrisati riječ "the" u rečenici ("Opšti uslovi sporazuma o rješavanju sporova"-"General Conditions of the Dispute Adjudication Agreement"); i u šestom redu, izbrisati "Član" i zamijeniti sa "član"

Strana 59.

U podstavu (ii), drugi red, izbrisati riječ "dana" i zamijeniti sa "dani", a u trećem redu izbrisati "drugi" i zamijeniti sa "još jedan".

Na sredini stranice, izbrisati "Sporazum dok svi članovi ne budu isplaćeni" i zamijeniti sa "Sporazum dok svako od članova ne bude plaćen"

Na kraju sledećeg stava, nakon "odluka", dodati "treba da"

U posljednoj rečenici klauzule 6, izbrisati zarez nakon rečenice "svako takvo obavještenje"

Strana 68.

U trećem redu Klauzule 6., izbrisati riječ "obavještenje"

Uputstvo za izradu posebnih uslova

Aneksi - izbrisati "FIDIC"

UVODNA NAPOMENA U PRVOM IZDANJU

Crvene i žute knjige Međunarodne federacije inžinjera konsultanata (FIDIC) (tj, standardni oblici ugovora za radove u oblasti građevinskih i elektro ili mašinskih radova) se u širokoj upotrebi nekoliko decenija i prepoznati su, između ostalog, zbog njihovih principa uravnoteženog rizika, koji dijele investitor i izvođač. Ovi principi koji podrazumijevaju podjelu rizika su bili dobri za obije strane, za investitora koji potpisuje ugovor po nižoj cijeni i koji ima dodatne troškove kada se određeni rizici postanu stvarnost i izvođač, koji izbjegava određivanje cijene takvih rizika, koji nisu jednostavni za procjenu. Principi dijeljenja uravnoteženog rizika su nastavljeni u novim knjigama ""Građevina" i "Postrojenje i projektovanje-izgradnja".

Tokom posljednjih godina je uočeno da je značajnom dijelu građevinskog tržišta potreban obrazac ugovora, gdje postoji izvjesnost kada je u pitanju završna cijena i često i datum završetka od izuzetnog značaja. Investitori u takvim projektima po principu "ključ u ruke", su spremni da plate više, ponekad i značajno više, za njihov projekat, ukoliko mogu biti sigurniji da se dogovorena završna cijena, neće povećavati. Među takvim projektima se mogu naći mnogi projekti, koji su finansirani iz privatnih fondova, gdje zajmodavci traže od investitora veću sigurnost, kada je riječ o troškovima projekta, nego što je to dozvoljeno u pogledu raspodjele rizika koji su predviđeni tradicionalnim obrascima ugovora FIDIC-a. Često građevinski projekat (PNI) je samo jedan dio komplikovane komercijalnog poduhvata i finansijski ili drugi neuspjeh ovog građevinskog projekta će ugroziti cijeli poduhvat.

Kada je riječ o ovakvim projektima, potrebno je da izvođač preuzme odgovornost za širi dijapazon rizika, nago u okviru tradicionalnih crvenih i žutih knjiga. Kako bi dobio povećanu sigurnost završne cijene, od izvođača se često traži da pokrije te rizike zbog loših ili neočekivanih uslova na terenu i da je ono što je definisano u zahtjevima, a što je pripremljeno od strane investitora, dovesti do željenog cilja. Ukoliko izvođač treba da se nosi sa takvim rizicima, investitor mora da mu da vrijeme i mogućnost da dobijei razmotri sve relevantne informacije, prije nego što je izvođač upitan da potpiše fiksnu ugovornu cijenu. Investitor mora, takođe, da shvati da će doći do rasta troškova izgradnje ukoliko odgovorni izvođači budu određivali cijenu rizika, što će dovesti da neki projekti ne budu komercijalno održivi.

Čak i u okviru takvih ugovora, investitor snosi određene rizike, kao što su rizik rata, terorizam i sl. i drugi rizici koji spadaju u višu silu i uvijek je moguće, a ponekad is advisable, za strane da razgovaraju o drugim načinima na koje će dijeliti rizik, prije potpisivanja ugovora. Kada je riječ o projektima *Build-Operate-Transfer*, oko kojih se obično pregovara u paketu, raspodjela rizika predviđena u ugovoru o izgradnji po principu "ključ u ruke", o čemu se u početku pregovaralo između sponzora i PNI (nadzorni organ, nabavka, izgradnja-ugovor) izvođača, će možda biti prilagođen, kako bi uzeo u obzir završnu raspodjelu svih rizika između raznih ugovora koji čine cijeli paket.

Osim nedavnog i ubrzanog razvoja projekata koji se finansiraju iz privatnih iyvora, koji zahtijevaju uslove u ugovoru, koji obezbjeđuju povećanu sigurnost u pogledu cijene, roka i karakteristika,već duže vrrijeme je očigledno da mnogi investitori naročito u javnom sektoru, u velikom broju zemalja, tražili slične uslove u ugovoru, makar kada je riječ o projektima ključ u ruke. Oni su često, bez poštovanja, uzimali FIDIC crvene i žute knjige i mijenjali su uslove, tako da rizici koje je snosio investitor u knjigama FIDIC-a, su sada bili premješteni na izvođača i na taj način su izbrisali tradicionalne principe FIDIC-a koji podrazumijevaju uravnoteženu podjelu

rizika. Ova potreba investitora nije prošla neopaženo i FIDIC je smatrao da je najbolje za sve strane da se ovako nešto prepozna i reguliše. Obezbjeđivanjem standardnog FIDIC obrasca koji se koristi u takvim ugovorima, zahtjevi investitora za preuzimanje više rizika od strane izvođača su jasno navedeni. Shodno tome, investitor ne mora da pokušava da mijenja standardni obrazac, koji je namijenjen za drugačiji podjelu rizika i izvođač je u potpunosti svjestan povećanog rizika koji će preuzeti. Jasno je da će izvođač s pravom povećati njegovu cijenu u ponudi zbog dodatnih rizika.

Ovaj obrazac PNI/Projekti ključ u ruke je namijenjen da odgovara, ne samo PNI ugovorima u okviru BOT ili kompaniji sličnog tipa, već i za veliki broj projekata, kako malih tako i velikih, naročito one koji uključuju elektro ili mašinske radove i druge projekte sa postrojenjima, koji se izvode širom svijeta od strane svih vrsta investitora, veoma često u sredini gdje vladina odjeljenja ili privatnici žele da implementiraju njihov projekat po principu "ključ u ruke", sa fiksnom cijenom i sa učešćem dvije strane.

Investitori koji koriste ovaj obrazac treba da shvate da "Zahtjevi investitora" koje oni pripremaju treba da opišu princip i osnovni projekat postrojenja na funkcionalnoj osnovi. Ponuđaču treba biti dozvoljeno i on će morati da provjeri sve relevantne informacije i podatke i da napravi neophodne izmjene. On treba da izradi projekat i da obezbijedi detaljne informacije određene opreme i postrojenja koje on nudi i na taj način mu se omogućava da ponudi rješenja koja odgovaraju njjegovoj opremi i iskustvu. Shodno tome, tenderska procedura treba da omogući razgovore između ponuđača i investitora o tehničkim pitanjima i komercijalnim uslovima. Sva ta pitanja, nakon dogovora treba da čine dio potpisanog ugovora.

Nakon toga, izvođaču treba dati slobodu da izvrši posao na način koji on izabere, pod uslovom da se krajnji rezultat poklapa sa kriterijumima koje je naveo investitor. Investitor treba da vrši samo ograničen nadzor, uopšteno govoreći, ne treba da se miješa u rad izvođača. Svakako će investitor htjeti da zna da je kvalitet radova onakav kako je on naveo, da se treće strane ne ometaju, da su urađena ispitivanja o učinku. i da se postupa po "Zahtjevima investitora".

Karakteristika ovakve vrste ugovora je da izvođač treba da dokaže pouzdanost i učinak njegovog postrojenja i opreme. Shodno tome, posebna pažnja je posvećena "Ispitivanjima po završetku", koji obično traju duži vremenski period i prijem će se izvršiti tek nakon uspješnog završetka ovih ispitivanja.

F9IDIC uočava da projekti koji se finansiraju iz privatnih sredstava su predmet više pregovora od onih koji se finansiraju iz javih izvora i da zbog toga potrebno napraviti izmjene u svakom obrascu ugovora, koji je predložen za projekte u okviru BOT ili kompanije sličnog tipa. Između ostalog, takav obrazac bi možda trebalo prilagoditi, kako bi se uzele u obzir, ako ne jedinstvene, onda posebne karakteristike svakog projekta, kao i zahtjeve zajmodavaca i ostalih koji obezbjeđuju novac. Međutim, takve promjene ne umanju potrebu za standardnim obrascem

Ovi uslovi ugovora za PNI/Projekte ključ u ruke nisu pogodni za korišćenje u sledećim okolnostima:

- Ukoliko nema dovoljno vremena ili informacija za za ponuđače da prouče i provjere zahtjeve investitora ili da izrade projekte, studije o procjeni rizika i procjenu (naročito imajući u vidu podklauzulu 4.12 i 5.1)

- Ukoliko će građevina podrazumijevati i značajan rad ispod zemlje ili u oblastima, koje ponuđači ne mogu da ispitaju.
- Ukoliko investitor namjerava da vrši detaljniji monitoring ili da kontroliše rad izvođača ili da pregleda većinu građevinskih crteža.
- Ukoliko iznos svakog privremenog plaćanja treba da definiše zvaničnik ili drugi posrednik.

FIDIC preporučuje da se uslovi ugovora za postrojenje i projektovanje-izgradnju koriste u gore navedenim situacijama za radove koje je izradio izvođač (ili u ime izvođača).

PRIZNANJA

Međunarodna federacija inžinjera konsultanata (FIDIC) izražava posebnu zahvalnost sledećim članovima: Christopher Wade (Group Leader), SWECO-VBB, Sweden; Peter L Booen (Principal Drafter), GIBB Ltd, UK; Hermann Bayerlein, Fichter, Germany; Christopher R Seppala (Legal Adviser), White & Case, France; and José F Speziale, IATASA, Argentina.

Priprema je izvedena pod rukovodstvom FIDIC-ovog Komiteta za Ugovore koji čine John B Bowcock, Consulting Engineer, UK (Chairman); Michael Mortimer-Hawkins, SwedPower, Sweden; and Axel-Volkmar Jaeger, Schmidt Reuter Partner, Germany; together with K B (Tony) Norris as Special Adviser.

Nactri su pregledani od strane mnogih lica i organizacija, uključujući dolje navedene. Njihovi komentari su pažljivo prostudirani od strane Radne grupe, i uticali su na formulisanje klauzula, kada su ocijenjeni adekvatnim. Mushtaq Ahmad, NESPAK, Pakistan; Peter Batty, Post Buckley International, USA; Roeland Bertrams, Clifford Chance, Netherlands; Charles G Borthwick, SwedPower, Sweden; Manfred Breege, Lahmeyer International, Germany; Pablo Bueno, TYPSA, Spain; Nael G Bunni, Consulting Engineer, Ireland; Ian Fraser, Beca Carter Hollings & Ferner, New Zealand; Roy Goode, Oxford University, UK; Geoffrey F Hawker, Consulting Engineer, UK; Tonny Jensen (Chairman of FIDIC Quality Management Committee), COWI, Denmark; Martin Klapper, Hopgood and Ganim, Australia; Philip Loots & Associates, South Africa; Neil McCole, Merz and McLellan, UK; Matthew Needham-Laing, Victoria Russell & Paul J Taylor, Berrymans Lace Mawer, UK; J Gordon Rees, Binnie Black & Veatch, UK; Tim Reynolds, Constant & Constant, UK; David R Wightman & Gerlando Butera, Nabbarro Nathanson, UK; the Association of Japanese Consluting Engineers; the Construction Industry Authority of the Philippines; the Dutch Vereniging voor Bouwercht; the European International Contractors (EIC); ORGAnisme de Liaison Industries Métalliques Européennes (ORGALIME); the International Association of Dredging Contractors; the International Bar Association; the Asian Development Bank; and the World Bank.

Priznavanje sugestija ne znači da su osobe ili organizacije odobrile formulaciju svih klauzula. Konkretno, EIC i ORGALIME su izrazili određene reserve u odnosu na neke klauzule EPC Ugovora.

FIDIC želi da naglasi svoju zahvalnost na vremenu i trudu svim navedenim.

Konačnu odluku o obliku i sadržaju dokumenta donosi FIDIC.

PREDGOVOR

Međunarodna federacija inžinjera konsultanata (FIDIC) objavila je 1999. godine prva izdanja četri nova standardna obrasca Ugovora.

Uslovi ugovaranja za građevinske radove, koji se preporučuju za građevinske i tehničke radove po projektu Investitora, ili njegovog predstavnika, Nadzornog organa (Enigeer). Po uobičajenim aranžmanima za ovakvu vrstu ugovora, Izvođač izvodi radove u skladu sa projektima obezbijeđenim od plana Investitora. Međutim, u radovima se mogu naći i neki elementi iz oblasti niskogradnje, mašinstva, elektrotehnike i/ili visokogradnje po projektima Izvođača.

Uslovi ugovaranja za postrojenja i projektovanje-izgradnju, koji se preporučuju za obezbjeđenje elektrotehničkih i/ili mašinskih postrojenja i za projektovanje i izvođenje građevinskih ili tehničkih radova. Po uobičajenim aranžmanima za ovakvu vrstu ugovora Izvođač projektuje i obezbjeđuje, u skladu sa uslovima Investitora, postrojenje i/ili druge radove koji mogu predstavljati kombinaciju radova iz oblasti niskogradnje, mašinstva, elektrotehnike i/ili visokogradjnje.

Uslovi ugovaranja za PNI/ključ u ruke projekte, koji mogu biti prikladni za obezbjeđenje tehnoloških postrojenja ili elektrana, fabrika ili sličnih objekata ili infrastrukturnih objekata ili nekih drugih postrojenja, gdje (i) je potrebna veća izvjesnost u pogledu konačne cijene i potrebnog vremena, i (ii) Izvođač preuzima obavezu projektovanja i izvođenja radova uz malo učešće investitora. Po uobičajenim aranžmanima za projekte ključ u ruke, Izvođač na sebe preuzima u cjelini projektovanje, nabavke i izgradnju (PNI) i obezbjeđuje potpuno opremljeni objekat koji je spreman za pogon (po predaji "ključa u ruke").

Kratka forma ugovora, koja se preporučuje za građevinske ili tehničke radove relativno male kapitalne vrijednosti. Zavisno od vrste radova i okolnosti, ova forma takođe može da bude prikladna i za ugovore većih vrijednosti, naročito u slučaju relativno jednostavnih i ponavljajućih radova ili kratkotrajnih radova. Po uobičajenim aranžmanima za ovu vrstu ugovora, Izvođač izvodi radove po projektima Investitora ili njegovog predstavnika (eventualnog), s tim što ova forma takođe može da bude prikladna za ugovor koji obuhvata djelimično ili u cjelini radove iz oblasti niskogradnje, mašinstva, elektrotehnike i/ili visokogradnje.

Ove forme se preporučuju za opštu primjenu u ponudama na međunarodnoj osnovi. Izmjene mogu biti potrebne u nekim jurisdikcijama, i to naročito ako se uslovi primjenjuju na domaće ugovore. FIDIC smatra zvaničnim i autentičnim tekstove napisane na engleskom jeziku.

U pripremi ovih uslova Ugovora za postrojenja i projektovanje-izgradnju, autori su imali u vidu činjenicu da pored mnogih opšte primjenjivih klauzula, postoje neke koje iziskuju izmjene radi usklađivanja sa okolnostima relevantnim za dotični ugovor. Klauzule koje se smatraju primjenjivim na mnoge (ali ne i na sve) ugovore unijete su u Opšte uslove da bi se olakšalo njihovo unošenje u svaki ugovor.

Opšti uslovi i Posebni uslovi skupa sačinjavaju Ugovorne uslove koji regulišu prava i obaveze ugovornih strana. Potrebno je da se pripreme Posebni uslovi za svaki ugovor pojedinačno i da se uzmu u obzir klauzule iz Opštih uslova u kojima se poziva na Posebne uslove.

Za potrebe ove publikacije Opšti uslovi su pripremljeni na bazi sledećeg:

(i) privremena plaćanja u odnosu na paušalnu ugovornu cijenu vrše se napredovanjem radova i to obično u ratama predviđenim cjenovnikom;

(ii) ako tekst Opštih uslova iziskuje dalje podatke, koji će biti propisani od strane Investitora, tada se u klauzuli navodi da se ovi podaci nalaze u Posebnim uslovima ili u Zahtjevima Investitora;

(iii) kada podklauzula Opštih uslova reguliše neko pitanje na koje se vjerovatno mogu primijeniti različite odredbe kod različitih ugovora, principi kojim su se autori rukovodili pri sastavljanju te podklauzule bili su:

(a) za korisnike bi bilo pogodnije ako bi se neke odredbe koje ne žele da primijene mogle jednostavno izbrisati ili ne primijeniti, nego da se piše dodatni tekst (u Posebnim uslovima), jer Opšti uslovi nisu predvidjeli njihove zahtjeve; ili

(b) u ostalim slučajevima kada se primjena (a) smatra neprikladnom, podklauzula sadrži odredbe koje se smatraju primjenjivim na većinu ugovora.

Na primjer, podklauzula 14.2 (Avansno plaćanje) uključena je zbog pogodnosti, a ne zbog politike FIDIC-a, u vezi avansnog plaćanja. Ova podklauzula je neprimjenjiva (ako nije izbrisana) ako bude zanemarena time što nije preciziran iznos avansnog plaćanja. S toga bi valjalo voditi računa o tome da neke odredbe Opštih uslova možda nisu prikladne za naizgled tipične ugovore.

Dalji podaci o ovim aspektima, primjer teksta za ostale aranžmane, ostala objašnjenja i primjer teksta za pomoć u pripremi Posebnih uslova, kao i ostala dokumentacija ponuda, dati su u ovoj publikaciji u Savjetima za pripremu Posebnih uslova. Prije unošenja bilo kakvog uzornog teksta, potrebno je da se on provjeri da bi se utvrdilo da li je on u cjelini prikladan pod konkretnim okolnostima. Ako nije, onda se moraju vršiti izmjene.

U slučaju izmjena uzornog teksta i u svim slučajevima vršenja drugih izmjena i dopuna, mora se voditi računa o tome da ne dođe do bilo kakve dvosmislenosti, kako u Opštim uslovima, tako i između klauzula Posebnih uslova. Neophodno je da se svi ovi zadaci vezani za pripremu i cjelokupna priprema dokumentacije ponude, povjere licima koja su stručno osposobljenja sa aspekta ugovaranja, tehnike i nabavke.

Ova publikacija se završava uzornim obrascima ponuda, priloga ponude, ugovora i alternative sporazuma o rješavanju sporova. Ovaj sporazum o rješavanju sporova daje formulaciju teksta sporazumima između Investitora, Izvođača i lica koje je imenovano za isključivog arbitra ili za člana tročlanog arbitražnog vijeća, i sadrži poziv na odredbe Priloga Opštih uslova.

FIDIC namjerava da objavi Vodič za primjenu uslova ugovora za izgradnju, postrojenja i projektovanje-izgradnju i projekte ključ u ruke.

Radi razjašnjenja redosleda ugovornih aktivnosti korisnike upućujemo na grafikone na sledeće stranice i na niže navedene podklauzule (neki brojevi podklauzula navedeni su i na grafikonima). Grafikoni su ilustrativni i ne mogu se uzimati u obzir pri tumačenju ugovornih uslova.

1.1.3.1 & 13.7 Osnovni datum

1.1.3.2 & 8.1 Datum početka

1.1.6.6 & 4.2 Garancija za dobro izvršenje posla

1.1.4.7 & 8. Rok za završetka (sa produženjem iz 8.4)

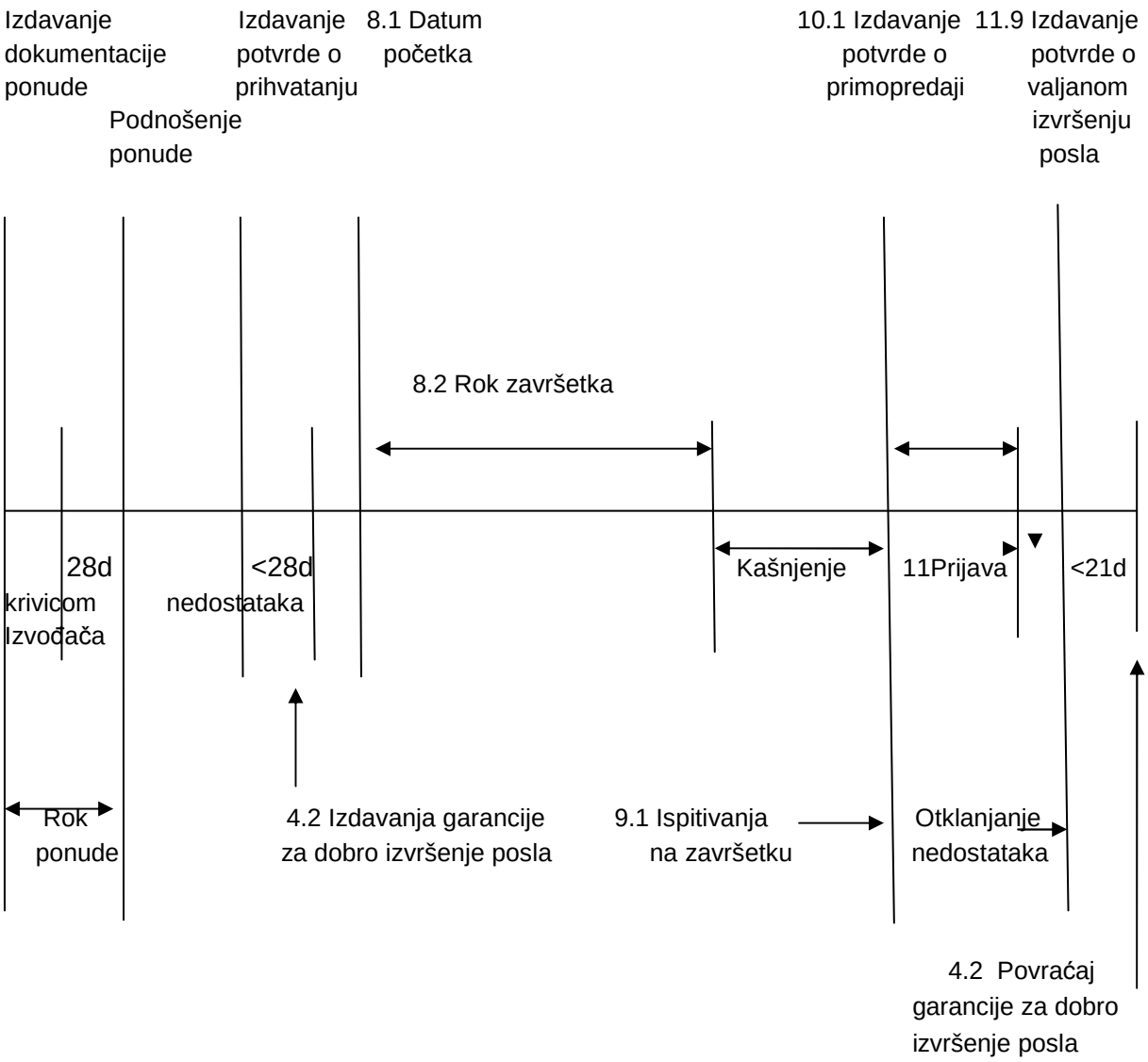
1.1.3.4 & 9.1 Ispitivanje na završetku

1.1.3.5 & 10.1 Potvrda o primopredaji

1.1.3.6 & 12.1 Ispitivanje posle završetka (eventualno)

1.1.3.7 & 11.1 Rok za prijavu nedostataka (sa produženjem iz 11.3)

1.1.3.8 & 11.9 Potvrda o valjano izvršenom poslu



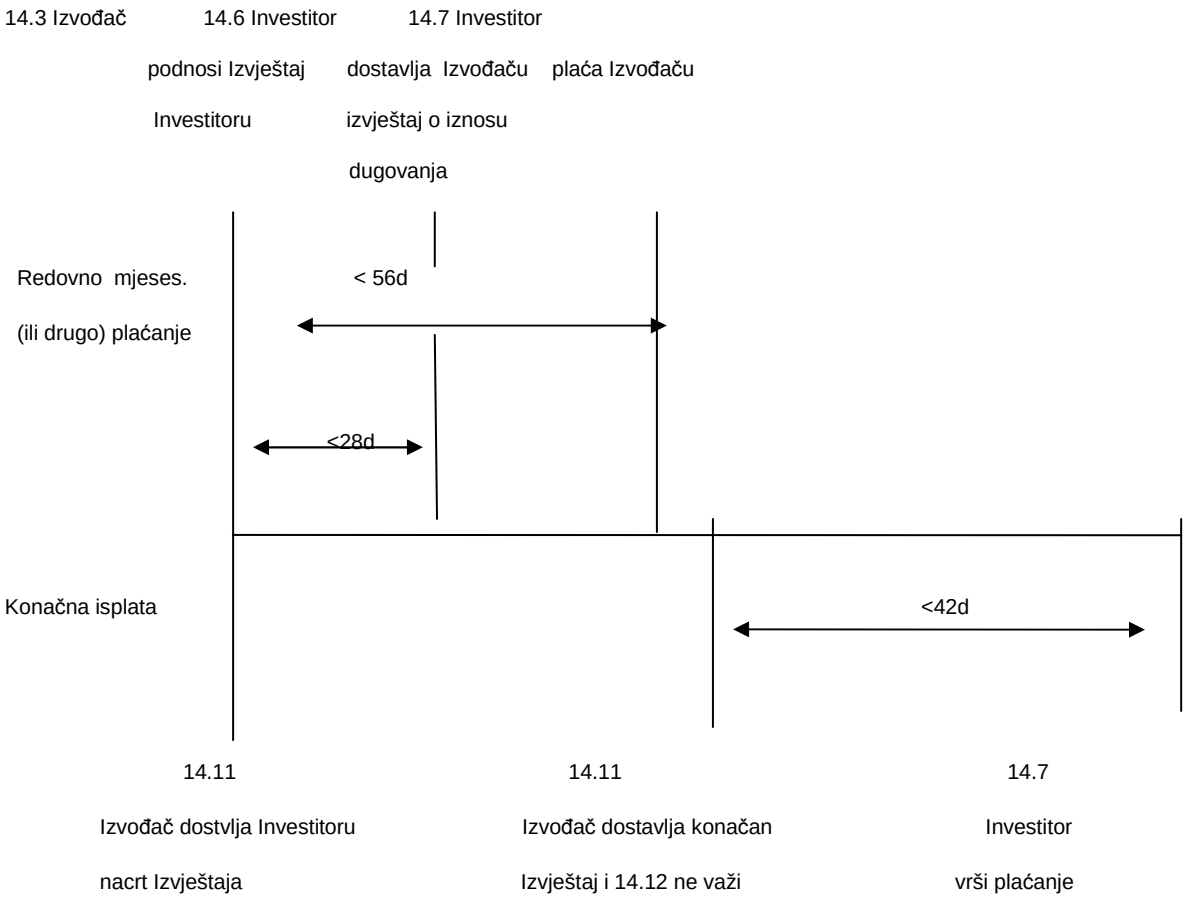
Tipični redosled glavnih događaja u vezi Ugovora za postrojenje i projektovanje-izgradnju

1. Rok završetka navodi se (u Posebnim uslovima) kao broj dana, kojem se dodaju eventualni produžeci u skladu sa podklauzulom 8.4.

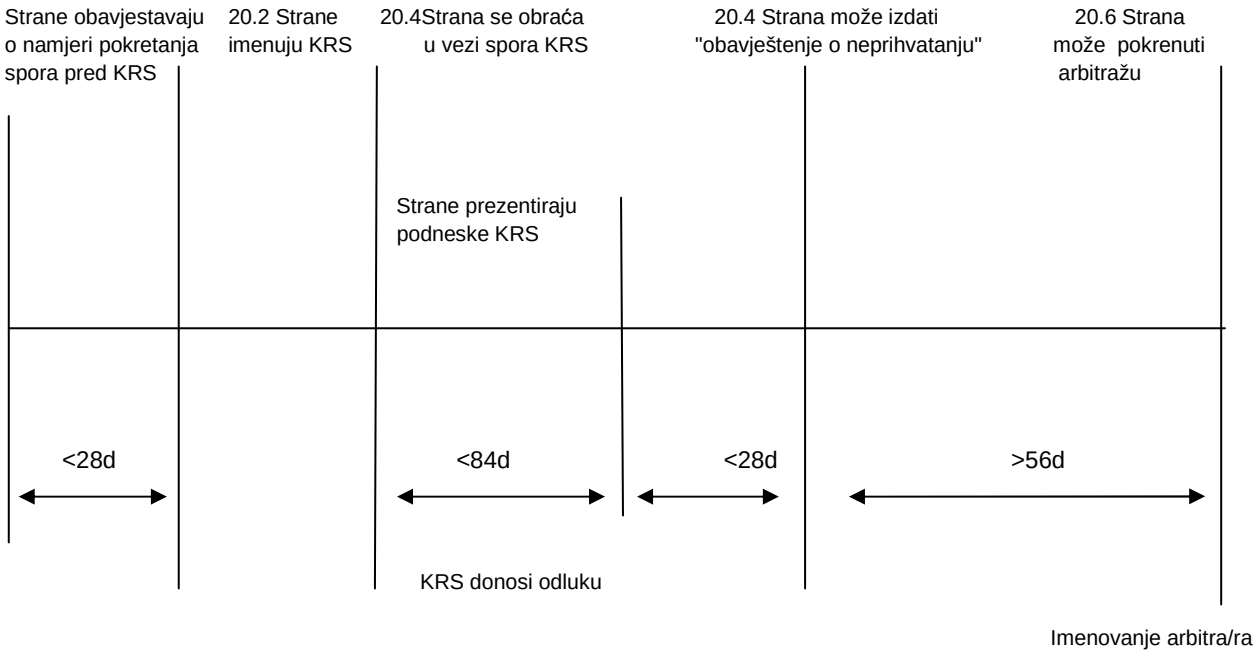
2. Radi isticanja redosleda događaja grafikon je zasnovan na primjeru Izvođača koji ne postupa u skladu sa podklauzulom 8.2.

3. Rok za prijavu nedostataka navodi se (u Prilogu ponude), kao broj dana, kojem se dodaju eventualni produžeci u skladu sa podklauzulom 11.3.

4. Zavisno od vrste radova, mogu takođe biti potrebne i probe posle završetka.



Tipična dinamika plaćanja predviđena klauzulom 14.



Tipičan redoslijed događaja u slučaju spora u skladu sa klauzulom 20

Opšti uslovi

Savjeti za pripremu

posebnih uslova

Uslovi ugovaranja za PNI/ključ u ruke projekte

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

Opšti uslovi

Međunarodna Federacija Konsalting Inženjera

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1.1.3.9 Dan

1.1.3.7 Period za obavještavanje o nedostacima

1.1.2.2 Poslodavac

1.1.6.3 Oprema Poslodavca

1.1.2.6 Personel Poslodavca

1.1.2.4 Predstavnik Poslodavca

1.1.1.3 Zahtjevi Poslodavca

1.1.2.10 FIDIC

1.1.4.3 Završni račun

1.1.6.4 Viša sila

1.1.4.4 Strana valuta

1.1.5.2 Robe

1.1.6.5 Zakoni

1.1.4.5 Lokalna valuta

1.1.5.3 Materijali

1.1.2.1 Strana

1.1.3.8 Sertifikat o performansi

1.1.1.5 Činidbene garancije

1.1.6.6 Sigurnost izvršavanja

1.1.5.4 Stalni radovi

1.1.5.5 Postrojenje

1.1.4.6 Provizorni iznos

1.1.4.7 Zadržani Novac

1.1.1.5 Dinamika isplate

1.1.5.6 Dio

1.1.6.7 Gradiliste

1.1.4.8 Izjava

1.1.2.8 Podizvođač

1.1.3.5 Potvrda o prijemu

1.1.5.7 Privremeni radovi

1.1.1.4 Tender

1.1.3.6 Testovi nakon završetka

1.1.3.4 Testovi po završetku

1.1.3.3 Rok za završetak radova

1.1.6.8 Varijacija

1.1.5.8 Radovi

1.1.3.9 Godine

OPŠTI USLOVI

1. Opšte odredbe

1.1 Definicije

U Uslovima ugovora (“ovim uslovima”), koji obuhvataju Posebne uslove i Opšte uslove, sledeće riječi imaju datu značenje. Rijeci koje ukazuju na lica ili strane obuhvataju privredna društva i ostala pravna lica, ukoliko kontekst ne ukazuje na nešto drugo.

1.1.1 Ugovor

1.1.1.1 “Ugovor” predstavlja Ugovorni sporazum, ove uslove, zahtjeve Investitora, tender i ostala dokumenta (ukoliko postoje), koji su navedeni u Ugovoru.

1.1.1.2 “Ugovorni sporazum” prestavlja Ugovorni sporazum koji se pominje u podklauzoli 1.6 *(Ugovorni sporazum).*

1.1.1.3 “Zahtjevi investitora” predstavljaju dokument koji je naslovljen kao Zahtjevi investitora, kako stoji u Ugovoru, i sadrži sve dopune i izmjene takvog dokumenta u skladu sa ugovorom. Takav dokument precizira svrhu, obim i/ili projektne i/ili ostale tehničke kriterijume za radove.

1.1.1.4 “Tender” predstavlja potpisanu ponudu Izvođaca za izvođenje radova i sva ostala dokumenta koja Izvođač podnosi sa njima (osim ovih uslova i zahtjeva Investitora, ukoliko ih je podnio), koja su dio Ugovora.

1.1.1.5 “Činidbene garancije” i “Spisak plaćanja” predstavljaju dokumente koji su tako naslovljeni (ako postoje), koja su dio Ugovora.

1.1.2 Strane i lica

1.1.2.1 “Strana” predstavlja Investitora ili Izvođača, zavisno od konteksta.

1.1.2.2 “Investitora” predstavlja lice koje je naslovljeno kao Investitor u Ugovoru i njegove pravne sledbenike.

1.1.2.3 “Izvođač” predstavlja lice(a) koje je naslovljeno kao Izvođač u ugovoru i njegove pravne sledbenike.

1.1.2.4 “Predstavnik Investitora” predstavlja lice imenovano od strane Investitora u Ugovoru, ili angažovanog po potrebi od strane Investitora u podklauzoli 3.1 (*Predstavnik Investitora)*, koji djeluje u ime Investitora.

1.1.2.5 “Predstavnik Izvođača” predstavlja lice koje je Izvođač imenovao u Ugovoru ili koje on bude odredio s vremena na vrijeme u skladu sa podklauzolom 4.3 *(Predstavnik Izvođača*), i koje djeluje u ime Izvođača.

1.1.2.6 “Personal Investitora” predstavlja predstavnik Investitora, asistent iz podklauzole 3.2 (*Ostali personal Investitora*) i svo ostalo osoblje, radnici i ostali zaposleni od strane Investitora ili Predstavnika Investitora; kao i svo ostalo osoblje predočeno Izvođaču od strane Investotra ili predstavnika Investora, kao personala Investitora.

1.1.2.7 “Personal Izvođača” predstavlja predstavnika Izvođača i svo osoblje koje Izvođač koristi na gradilištu, koje uključuje osoblje, radnike i ostale zaposlene Izvođača i svih podizvođaca, kao i svo ostalo osoblje koje pomaže Izvođaču u izvođenu radova.

1.1.2.8 “Podizvođač” predstavlja lice koje je u Ugovoru imenovano kao Podizvođač za dio radova i njegove pravne sledbenike.

1.1.2.9 “Komisija za rješavaje sporova” predstavlja lice ili tri lica koja su tako naimenovana u Ugovoru ili neko drugo lice ili lica koja su imenovana u skladu sa podklauzolom 20.2 (*Imenovanje Komisije za rješavanje sporo*va) ili podklauzolom 20.3 (*Nesaglasnost oko imenovanja Komisije za rješavanje sporova*).

1.1.2.10 “FIDIC” predstavlja Međunarodnu federaciju inženjera konsultanata.

1.1.3 Datumi, ispitivanja, rokovi i završetak

1.1.3.1 “Osnovni datum” predstavlja 28 dana prije poslednjeg datuma za podnošenje ponude.

1.1.3.2 “Datum početka” predstavlja datum koji je saopšten u skladu sa podklauzolom 8.1 (*Početak radova*), osim ukoliko nije drugačije definisan u Ugovoru.

1.1.3.3 “Rok završetka” predstavlja rok za završetak radova ili neke sekcije (zavisno od slučaja) u skladu sa podklauzolom 8.2 (*Rok završetka radova*), kao je navedeno u Posebnim uslovima (sa eventualnim produženjima u skladu sa podklauzolom 8.4 (*Produžetak roka za završetak radova*)), računato od datuma početka.

1.1.3.4 “Ispitivanja na završetku” predstavljaju ispitivanja predviđena Ugovorom ili koja su dogovorena između strana ili naložena kao izmjena, a koja se vrše u skladu sa klauzulom 9 (*Ispitivanja na završetku radova*) prije preuzimanja radova ili sekcije (zavisno od slučaja) od strane Investitora.

1.1.3.5 “Potvrda o prijemu” predstavlja potvrdu koja se izdaje u skladu sa klauzulom 10 (*Prijem od strane Investitora*).

1.1.3.6 “Provjere nakon završetka” predstavljaju (eventualna) ispitivanja predviđena ugovorom koja se vrše u skladu sa klauzulom 12 (*Provjera nakon završetka*) posle prijema radova ili selekcije (zavisno od slučaja) od strane Investitora.

1.1.3.7 “Period obavještenja o nedostacima” predstavlja rok za prijavu nedostataka radova ili neke sekcije (zavisno od slučaja) u skladu sa podklauzulom 11.1 (*Završetak tekućih radova i otklanjanje nedostataka)*, kako je navedeno u posebnim uslovima (sa eventualnom produženjem u skladu sa podklauzulom 11.3 (*Produženje perioda za obavještenja o nedostacima*)), računato od datuma završetka radova ili sekcije sa ovjerom u skladu sa podklauzulom 10.1 (*Preuzimanje Radova i sekcija*). Ukoliko taj period nije predviđen u posebnim uslovima, period treba biti u trajanju je godinu dana.

1.1.3.8 “Potvrda o dobrom izvršenju posla” predstavlja potvrdu izdatu u skladu sa podklauzulom 11.9 (*Potvrda o dobrom izvršenju posla*).

1.1.3.9 “Dan” predstavlja kalendarski dan, a “godina” predstavlja 365 dana.

1.1.4 Novac i plaćanja

1.1.4.1 “Ugovorena cijena” predstavlja dogovoreni iznos iskazan u ugovoru za projektovanje, izvođenje i završetak radova i otklanjanje svih nedostataka, što uključuje i podešavanje (ukoliko ih ima) u skladu sa ugovorom.

1.1.4.2 “Troškovi” predstavljaju sve troškove koje je Izvođač opravdano imao (ili ce imati), bilo na ili van gradilišta, uključujući i režije i slične troškove, ali ne uključuju i dobit.

1.1.4.3 “Završni izvještaj” predstavlja izvještaj definisan podklauzolom 14.11 (*Zahtjev za izdavanje okončane situacije*).

1.1.4.4 “Strana valuta” predstavlja valutu koja nije lokalna, a u kojoj se plaća dio ugovorene cijene (ili u cjelini).

1.1.4.5 “Lokalna valuta” predstavlja valutu zemlje.

1.1.4.6 “Provizorni iznos” prestavlja (eventualni) iznos koji je ugovorom predviđen kao provizorni iznos za izvođenje bilo kod dijela radova ili za isporuku opreme, materijala ili usluga u skladu sa podklauzolom 13.5 (*Provizorni iznos*).

1.1.4.7 “Garantni depozit” predstavlja kumulativne iznose koje Investitor zadržava u skladu sa podklauzolom 14.3 (*Zahtjev za izdavanje privremenih situacija*) I isplaćuje u skladu sa podklauzolom 14.9 (*Plaćanje garantnog depozita*).

1.1.4.8 “Izvještaj” prestavlja izvještaj koji Izvođac podnosi kao dio zahtjeva u skladu sa klauzulom 14 (*Ugovorena cijena I plaćanje*).

1.1.5 Radovi i dobra

1.1.5.1 “Oprema Izvođača predstavlja sve aparate, mašine, vozila i ostale stvari koje su potrebne za izvođenje i završetak radova i otklanjanje nedostataka. Međutim, oprema Izvođača ne obuhvata privremene radove, opremu investitora (ako postoji), postrojenja, materijalne i bilo koje druge stvari koje su predviđene da budu ili već jesu sastavni djelovi osnovnih radova.

1.1.5.2 “Dobra” predstavljaju opremu Izvođača, materijale, postrojenja i privremene radove ili svaki od ovih pojmova pojedinačno, po potrebi.

1.1.5.3 “Materijali” predstavljaju predmete svih vrsta (isključujući postrojenja) koji su previđeni da budu ili već jesu sastavni djelovi trajnih radova, uključujući i potrošne materijale (ako ih ima) koje isporučuje Izvođač po ugovoru.

1.1.5.4 “Trajni radovi” predstavljaju trajne radove koje Izvođač izvodi u skladu sa ugovorom.

1.1.5.5 “Postrojenje” predstavlja aparate, masine i vozila koji su predviđeni da budu dio trajnih radova.

1.1.5.6 “Sekcija” predstavlja dio radova koji je naveden kao takav u prilogu ponude (ukoliko ih ima).

1.1.5.7 “Privremeni radovi” predstavljaju privremene radove bilo koje vrste (osim opreme Izvođača) koji su potrebni na gradilištu radi izvođenja i završavanja trajnih radova i otklanjanje eventualnih nedostataka.

1.1.5.8 “Radovi” predstavljaju trajne radove i privremene radove ili svaki od ovih radova pojedinačno, po potrebi.

1.1.6 Ostale definicije

1.1.6.1 “Dokumentacija izvođača” predstavlja proračune, računarske programe i ostali softver, crteže, priručnike i ostalu dokumentaciju tehničke prirode, koju Izvođač obezbeđuje po ugovoru, po opisu iz podklauzole 5.2 (*Dokumentacija Izvođača*).

1.1.6.2 “Država” predstavlja državu u kojoj se gradilište odnosno njegov dio nalazi i na kome se izvode trajni radovi.

1.1.6.3 “Oprema investitora” predstavlja aparate, mašne ivozila (ako postoje) koja Investitor stavlja izvođaču na raspolaganje radi korišćenja u Izvođenju radova, kako je navedeno u zahtjevima investitora, ali bez postrojenja koje investitor nije primio.

1.1.6.4 “Viša sila” je definisana u klauzuli 19 (*Viša sila*).

1.1.6.5 “Zakoni” predstavljaju sve nacionalne (ili državne) zakone, statute, uredbe i ostale zakone i propise i podzakonska akta organa vlasti.

1.1.6.6 “Garancija za dobro izvršenje posla” predstavlja garanciju (ili garancije) iz podklauzule 4.2 (*Garancije za dobro izvršenje posla*).

1.1.6.7 “Gradilište” predstavlja mjesto na kojem se izvode radovi i na kojem se isporučuju postrojenje i materijali ili bilo koje drugo mjesto koje na osnovu ugovora predstavlja dio gradilišta.

1.1.6.8 “Izmjena” predstavlja bilo kakvu izmjenu zahtjeva Investitora ili Radova, koja je naložena ili odobrena kao izmjena iz klauzule 13 (*Izmjene i korekcije).*

1.2 Tumačenja

Ukoliko kontekst ne upućuje na nešto drugo, u ovom ugovoru:

a) Riječi koje ukazuju na jedan rod obuhvataju sve rodove;
b) Riječi koje ukazuju na jedninu takodje obuhvataju množinu, a riječi koje ukazuju na množinu takodje obuhvataju jedninu;
c) Odredbe koje sadrže riječi “dogovoriti”, “dogovoreno” i “dogovor” iziskuju da dogovor bude u pisanoj formi, i
d) “U pisanoj formi” znaci rukom napisano, otkucano, odštampano ili elektronskim putem sačinjeno tako da predstavlja trajni dokument.

Riječi na marginama i ostali naslovi ne uzimaju se u obzir prilikom tumačenja ovih uslova.

1.3 Komunikacije

Gdje god ovi uslovi iziskuju davanje ili izdavanje odobrenja, potvrda, saglasnosti, rješenja, saopštenja i zahtjeva, takve komunikacije:

a) su pisanoj formi i dostavljaju se na ruke (sa potvrdom prijema), šalju se poštom ili po kuriru ili se prenose pomoću dogovorenih sistema elektronskog prenosa, kako je navedeno u posebnim uslovima; i
b) se dostavljaju, šalju ili prenose na adresu primaoca navedenu u ugovoru. Međutim,

    a. ako primalac saopšti neku drugu adresu, dalje komunikacije se upućuju na tu adresu; i

b. ukoliko primalac nije drukčije naznačio u zahtjevu za izdavanje odobrenja ili saglasnosti, odobrenje ili saglasnost se može poslati na adresu sa koje je poslat zahtjev.

Odobrenja, potvrde, saglasnosti i rješenja ne mogu se neopravdano uskratiti ili odugovlačiti.

1.4 Mjerodavno pravo i jezik

Na ugovor se primjenjuje pravo zemlje koja je navedena u posebnim uslovima.

Ako postoje verzije bilo kog dijela ugovora na nekoliko jezika, prednost se daje verziji koja je napisana na mjerodavnom jeziku, definisanom u posebnim uslovima.

Jezik za komunikacije navodi se u posebnim uslovima. Ako tamo nije naveden nikakav jezik, jezik za komunikacije je onaj na kojem je ugovor (ili većim dijelom) napisan.

1.5 Prioritet dokumenata

Dokumenta koja sačinjavanju Ugovor smatraju se uzajamno objašnjivim. Za potrebe tumačenja, prioritet dokumenata je kako slijedi:

a) Ugovorni sporazum,
b) Posebni uslovi,
c) Opšti uslovi,
d) Zahtjevi Investitora,
e) Tenderska dokumentacija ili bilo koja druga dokumentacija koja predstavlja dio Ugovora.

1.6 Ugovorni sporazum

Ugovor stupa na snagu na dan naveden u Ugovoru. Troškovi taksi i slični troškovi (ukoliko ih ima) koje nameće zakon, a u vezi stupanja na snagu Ugovora, snosi Investitor.

1.7 Prenos

Nijedna strana nema pravo da izvrši prenos Ugovora u cjelini ili nekog njegovog dijela ili neku korist ili interes koji proizilazi iz Ugovora. Međutim, bilo koja strana može:

a) da izvrši prenos ugovora u cjelini ili nekog njegovog dijela uz prethodnu saglasnost druge strane, i
b) da kao obezbjeđenje prenese u korist neke banke ili finansijske institucije bilo koji iznos novca koji mu je plativ ili ce biti plativ na osnovu Ugovora.

1.8 Čuvanje dokumentacije i njeno obezbjeđivanje

Izvođač drži u svom posjedu svu svoju dokumentaciju i vodi računa o njoj sve do njenog preuzimanja od strane Investitora. Ukoliko Ugovor nije drugačije predviđeno, Izvođač se obavezuje da Investitoru podnese svaki svoj dokument u šest primjeraka.

Izvođac se obavezuje da na gradilištu drži jedan primjerak Ugovora, publikacije navedene u zahtjevima Investitora, dokumentaciju Izvođača i izmjene i druge komunikacije izdane na osnovu Ugovora. Osoblje Investitora ima pravo pristupa ovoj dokumentaciji u svako razumno doba.

Ukoliko strana postane svjesna greške ili nedostatka tehničke prirode u dokumentu koji je pripremljen kako bi se iskoristio prilikom vršenja radova, strana odmah obavijestiti drugu stranu o toj grešci ili nedostatku.

1.9 Povjerljivost

Obije strane trebaju da tretiraju detalje Ugovora kao privatne i povjerljive, osim u mjeri koja je neophodna kako bi se izvršile obaveze iz njega ili kako bi se postupalo u skladu sa relevantnim zakonima. Izvođač ne smije da objavljuje, da dozvoli da bude objavljen, ili da otkrije bilo kakve pojedinosti radova u bilo kom obliku ili tehnikom radu ili bilo gdje drugo, bez prethodne saglasnosti od strane Investitora.

1.10 Korišćenje dokumentacije Izvođača od strane Investitora

Izvođač zadržava autorska i ostala prava intelektualne svojine na dokumentaciju izvođača i na ostalu projektnu dokumentaciju pripremljenu od strane izvođača (ili u njegovo ime).

Smatra se da je (potpisivanjem Ugovora) Izvođač dao Investitoru vremenski neograničenu, prenosivu, neekskluzivnu i besplatnu dozvolu da umnožava, koristi i prenosi dokumentaciju izvođača, kao i da je modifikuje I koristi u tom obliku. Ta dozvola:

a) Važi tokom stvarnog ili predviđenog radnog vijeka (zavisno od toga koji je duži) relevantnih djelova radova,

b) Daje pravo bilo kom licu koje drži relevantni dio radova u zakonitom posjedu na umnožavanje, korišćenje i prenošenje dokumentacije izvođača radi završavanja, eksploatisanja, održavanja, mijenjanja, podešavanja, popravke i rušenja radova, i

c) U slučaju dokumentacije izvođača u obliku računarskog programa i ostalog softvera, dopusta njihovu upotrebu u bilo kom računaru na gradilištu i drugim mjestima predviđenim ugovorom, uključujući zamjenu bilo kog računara isporučenog od strane izvođača.

Dokumentacija Izvođača i ostala projektna dokumentacija koja je pripremljena od strane Izvođača (ili za njegov račun) ne može da bude korišćena, umnožavana ili prenijeta trećim

licima od strane Investitora (ili u njegovo ime) u svrhe koje su rizične od onih koje su previđene ovom podklauzulom.

1.11 Korišćenje dokumentacije investitora od strane Izvođača

Investitor zadržava autorska i ostala prava intelektualne svojine u zahtjevima Investitora i u ostaloj dokumentaciji pripremljenoj od strane Investitora (ili za njegov račun). Izvođač ima pravo da o sopstvenom trošku umnožava, koristi i prenosi ove dokumente za potrebe izvršavanja Ugovora. Izvođač nema pravo da ih umnožava, koristi ili prenosi trećim licima bez saglasnosti Investitora, osim u mjeri potrebnoj za Izvršavanje Ugovora.

1.12 Povjerljivi podaci

Izvođač nije dužan za otkrije Investitoru bilo kakvu informaciju koju je Izvođač u tenderskoj dokumentaciji naveo kao povjerljivu. Izvođač mora otkriti druge informacije koje Investitor može opravdano da zahtjeva kako bi utvrdio usaglašenost radova Izvođača sa onim što je navedeno u ugovoru.

1.13 Postupanje u skladu sa zakonima

Izvođač se obavezuje da u izvršavanju ugovora postupa u skladu sa primjenljivim zakonima. Ako drugačije nije predviđeno posebnim uslovima:

a) Investitor se obavezuje da pribavi dozvolu za planiranje, zoniranje i slično za osnovne radove i sve ostale dozvole navedene u zahtjevima Investitora. Investitor se obavezuje da izvođača obešteti i zaštiti od posledica svog propusta da to učini; i

b) Izvođač se obavezuje da izdaje sva saopštenja, placa sve poreze, carine i takse i da pribavi sve dozvole, licence i odobrenja koja su predviđena zakonima u vezi projektovanja, izvođenja i završetka radova i otklanjanja nedostataka. Izvođač se obavezuje da investitora obešteti i zaštiti od posledica svog propusta da to učini.

1.14 Solidarna odgovornost

Ako Izvođač pristupi (u skladu sa primjenljivim zakonima) zajedničkom ulaganju, konzorcijum ili nekoj drugoj nestatutarnoj grupi od sva ili više lica:

a) ta se lica smatraju solidarno i pojedinačno odgovornim Investitoru za izvršavanje Ugovora;

b) ta su lica obavezna da Investitoru predoče svog rukovodioca koji je ovlašćen da preuzima obaveze u ime Izvođača i svakog drugog lica pojedinačno; i

c) Izvođač ne može da mijenja svoj sastav ili pravni status bez prethodne saglasnosti Investitora.

2. Investitor

2.1 Pravo pristupa na gradilište

Investitor se obavezuje da Izvođaču da pravo pristupa i držanja u posjedu svih djelova gradilišta u trajanju navedenom u posebnim uslovima. Pravo prilaza i posjeda gradilišta ne daje se isključivo izvođaču. Ako je ugovorom predviđeno da investirao preda (izvođaču) u posjed neke temelje, objekte, postrojenja ili sredstva pristupa, investitor se obavezuje da to učini u vrijeme i na način koji su navedeni u zahtjevima investitora. Međutim, investitor može uskratiti pravo posjeda do prijema garancije o dobrom izvršenju posla.

Ukoliko takvo vrijeme nije navedeno u posebnim uslovima, investitor se obavezuje da izvođaču da to pravo prilaza i posjeda gradilištu počevši od dana početka radova.

Ako izvođač kasni i/ili bude izložen troškovima zbog propusta investitora da mu da takva prava u tom roku, Izvođač to prijavljuje investitoru, pri čemu shodno podklauzuli 20.1 (*Potraživanja Izvođača*) ima pravo na:

a) produženje roka zbog takvog kašnjenja, iako je rok završetka već probijen ili će biti probijen, u skladu sa podklauzulom 8.4 *(Produženje roka završetka*), i

b) naknadu takvih troškova uvećanu za primjernu dobit, sto se uključuje u ugovorenu cijenu.

Po prijemu ove prijave, Investitor postupa u skladu da podklauzulum 3.5 (*Utvrđivanja*) da bi se saglasio ili utvrdio ova pitanja.

Međutim, ako je propust Investitora bio uslovljen nekom greškom ili kašnjenjem od strane Izvođača, uključujući grešku ili kašnjenje u podnošenju bilo kog dokumenta Izvođača, Izvođač nema pravo na produženje roka, naknadu ili dobit.

2.2 Dozvole, licence ili odobrenja

Investitor se obavezuje da izvođaču na njegov zahtjev pruzi pomoć (ako je u mogućnosti da to učini):

a) pribavljanjem primjeraka zakona zemlje koji se odnose na ugovor, a koji se ne mogu lako dobiti, i

b) u vezi zahtjeva izvođača za izdavanje dozvola, licenci ili odobrenja predviđenih zakonima zemlje, i to:

    a. Onih koji su izvođaču potrebni u skladu sa podklauzulom 1.13 (*Postupanje u skladu sa zakonima*),

b. Za isporuku robe, carinjenjem, i
c. Za izvoz opreme izvođača po njenom iznošenju sa gradilišta.

2.3 Osoblje Investitora

Investitor se obavezuje da se postara o tome da osoblje Investitora i njegovih ostalih izvođača na gradilištu:

a) sarađuje sa izvođačem u skladu sa podklauzulom 4.6 (saradnja), i

b) preduzima mjere istovjetne onim koje je Izvođač obavezan da preduzima u skladu sa tačkama (a), (b) i (c) podklauzule 4.8 (*Bezbjedonosne procedure*) I podklauzulom 4.18 (*Zaštita životne sredine*).

2.4 Finansijski aranžmani investitora

Investitor se obavezuje da u roku od 28 dana od prijema zahtjeva Izvođača, podnese odgovarajući dokaz o tome da su zaključeni i odrzavaju finansijski aranžmani koji će investitoru omogućiti da isplati ugovorenu cijenu (u to vrijeme procijenjenu) u skladu sa klauzulom 14 (*Ugovorena cijena i plaćanje*). Ako Investitor namjerava da izvrši bilo kakve materijalne izmjene u svojim finansijskim aranžmanima, on se obavezuje da o tome podrobno obavijesti Izvođača.

2.5 Potraživanja investitora

Ako Investitor bude smatrao da ima pravo na bilo kakvu isplatu na osnovu bilo koje klauzule ovih uslova ili po nekom drugom osnovu, i/ili na produženje perioda za obavještenje o nedostacima, investitor može da obavijesti izvođača sa svim pojedinostima. Međutim, ovo obavještenje nije potrebno za plaćanja iz podklauzule 4.19 (*Električna energija, voda i gas*) i podklauzule 4.20 (*Oprema investitora i besplatni materijal*) i za ostale usluge zahtijevane od strane Izvođača.

Obavještenje se daje u najkraćem mogućem roku po investitorovom saznanju postojanje događaja ili okolnosti koje mu daju pravo na potraživanje. Obavještenje koje se odnosi na produženje roka za prijavu nedostataka daje se prije isteka tog roka.

U obavještenju se navodi klauzula ili neka druga osnova potraživanja sa potvrdom iznosa i/ili produženja roka na koji investitor smatra da ima pravo u vezi Ugovora. Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi davanja saglasnosti ili utrvrdjivanja (i) iznosa (eventualnog) na koji Investitor ima pravo da primi od Izvođača i/ili (ii) produženja (eventualnog) perioda za obavještavanje o nedostacima u skladu sa podklauzulom 11.3 (*Produženje perioda za obavještavanje o nedostacima*).

Investitor može odbiti taj iznos od bilog kog preostalog iznosa, ili iznosa koji će preostati u budućnosti, Izvođaču. Izvođač će samo imati pravo da umanji iznos koji bi se trebao uplatiti izvođaču, ili da na drugi način tuzi izvođača radova, u skladu sa ovom podklauzulom ili u skladu sa podstavovima (a) i/ili (b) subklauzule 14.6 (*Privremena plaćanja*).

3. Administracija investitora

3.1 Predstavnik investitora

Investitor može imenovati svog predstavnika da djeluje u njegovo ime prema Ugovoru. U tom slučaju, on je dužan da obavijesti Izvođača o imenu, adresi, obavezama i ovlašćenjima svog predstavnika.

Predstavnik Investitora vrši poslove koje su mu predate, pa će vršiti ovlašćenja koja su mu povjerena, od strane investitora. Osim ukoliko i sve dok investitor ne obavijesti izvođača o drugačijem, smatra se da predstavnik Investitora ima puno ovlašćenje Investitora prema Ugovoru, osim u pogledu klauzule 15 (*Otkaz od strane Investitora*).

Ukoliko Investitor poželi da zamijeni bilo koje lice koje je imenovano kao predstavnik investitora, investitor daje izvođaču obavještenje koje neće trajati duže od 14 dana o imenu, adresi, obavezama i ovlašćenjima, kao i o datumu imenovanja.

3.2 Ostalo osoblje Investitora

Investitor ili predstavnik investitora može s vremena na vrijeme odrediti dužnosti i ustupiti nadležnosti asistentima, a može i da opozove takav prenos i delegiranje. Ovi asistenti mogu podrazumijevati rezidentnog inženjera i/ili nezavisne inspektore postavljeni da vrše inspekciju i/ili da testiraju djelove postrojenja i/ili materijala. Zadatak, delegacija ili opoziv ne može stupiti na snagu dok kopiju istog ne primi Izvođač.

Asistenti moraju biti odgovarajuća i kvalifikovana lica, koja su kompetentna za obavljanje ovih poslova i obavljanje ovih odgovornosti, i koji su dobro poznaju jezik komunikacije kako je to definisano u podklauzuli 1.4 (*Zakon i jezik*).

3.3 Povjerena lica

Svim ovim licima, uključujući i predstavnika investitora i asistente, kojima su dodijeljene određene dužnosti ili data ovlašćenja, se mogu dati ovlašćenja za izdavanje uputstava Izvođaču u već definisanoj mjeri. Bilo koje odobrenje, provjera, sertifikat, saglasnost, ispitivanje, inspekcija, uputstvo, obavještenja, predlog, zahtjev, test ili sličan akt delegiranog lica, u skladu sa delegacijom, imaju isti efekat kao da je to uradio investitor. Međutim:

a) osim ukoliko nije drugačije naznačeno u komunikaciji povjerenih osoba koja se odnosi na taj čin, to ne oslobađa izvojaca od bilo kod odgovornosti koju ima prema ugovoru, uključujući i odgovornost za greške, propuste, razlike i neslaganja;
b) svaki neuspjeh da se ne odobri bilo kakav posao, postrojenje ili materijali ne zahtijevaju odobrenje, i prema tome ne utiču na pravo poslodavca da odbije rad, postrojenja ili materijali; i
c) ukoliko Izvođac preispituje bilo koje određenje ili instrukcije od strane delegiranog lica, izvođač može uputiti predmet investitoru, koji mora u kratkom vremenskom roku potvrditi, preokrenuti ili izmijeniti odluku ili instrukciju.

3.4 Instrukcije

Poslodavac može izdati Izvođaču uputstva, koje mogu biti neophodne za Izvođača da izvrši svoje obaveze prema ugovoru. Svaka instrukcija se daje u pitanoj formi i mora da sadrži obaveze na koje se odnosi i na subklauzule (ili na drugi član u ugovoru) u kome se navode obaveze. Ako bilo koja instrukcija predstavlja varijaciju, klauzula 13 (*Varijacije i prilagođavanja*) se primjenjuju.

Izvođač uzima uputstva od strane poslodavca, ili od strane predstavnika poslodavca ili od asistenta kome je odgovarajuća nadležnost delegirana na osnovu ovog člana.

3.5 Odluke

Kada god ovi uslovi predvide da ce investitor postupiti u skladu sa subklauzulom 3.5 da se saglasi ili utvrdi bilo koje pitanje, Investitor će konsultovati Izvođača radova u nastojanju da se postigne dogovor. Ukoliko se ne postigne sporazum, Investitor je dužan da donese pravičnu odluku u skladu sa ugovorom, uzimajući u obzir sve relevantne okolnosti.

Investitor je dužan da obavijesti Izvođača o svakom sporazumu i rješenju, uz dodatne pojedinosti. Svaka strana će dati ovlašćenje svakom sporazumu ili rješenju, osim ukoliko Izvođač ne da obavještenje Investitoru, o njegovom nezadovoljstvu vezanom za oluku u roku od 14 dana od kada je primi. Svaka strana u tom slučaju moze dostaviti spor komisiji za rješavanje sporova u skladu sa podklauzulom 20.4 (*Dobijanjem odluke o rješavanju sporova)*.

4. Izvođač

4.1 Opšte obaveze Izvođača

Izvođač se obavezuje da projektuje, izvede i završi radove u skladu sa ugovorom, kao i da otkloni sve nedostatke u radovima. Po završetku, radovi moraju da budu pogodni za korišćenje u svrhe predviđene Ugovorom.

Izvođač se obavezuje da obezbijedi ugovorom predviđenu opremu i dokumentaciju izvođača, kao i svo osoblje Izvođača, robu, potrošni materijal i sve ostale stvari i usluge, bilo privremen ili trajne prirode, koje su potrebne za projektovanje, izvođenje, završetak i otklanjanje nedostataka.

Radovi obuhvataju sav rad koji je potreban da bi se udovoljilo zahtjevima Investitora ili koji se iz ugovora podrazumijeva, kao i sav rad koji je potreban (mada nije predviđen ugovorom) za stabilnost ili završetak, ili bezbjedno i propisno korišćenje radova.

Izvođač će biti odgovoran za adekvatnost, stabilnost i bezbijednosti svih radnji na gradilištu i za sve metode izvođenja radova.

Izvođač se obavezuje da na zahtev nadzornog organa podnese pojedinosti aranžmana i metoda koja izvođač namjerava da usvoji za potrebe izvođenja radova. Nikakve bitne izmene u

tim aranžmanima i metodama ne mogu se vršiti prije nego sto one budu saopštene nadzornom organu.

4.2 Garancija za dobro izvršenje posla

Izvođač se obavezuje da pribavi (o sopstvenom trošku) garanciju za dobro izvršenje posla, i to u iznosu u valuti koja je navedena u posebnim uslovima. Ako iznos nije naveden u posebnim uslovima, ova podklauzula ne važi.

Izvođač se obavezuje da investitoru uruči garanciju za dobro izvršenje posla u roku od 28 dana nakon sto obije strane potpisu Ugovor. Izdavač garancije za dobro izvršenje posla i zemlja izdavanja te garancije podliježu odobrenju investitora, i ona se izdaje u formi priloženoj u posebnim uslovima ili u nekoj drugoj formi odobrenoj od strane investitora.

Izvođač se obavezuje da se postara o tome da garancije za dobro izvršenje posla bude vazeća i primjenjiva sve dok izvođač ne izvede i završi radove i otkloni nedostatke. Ukoliko je uslovima garancije predviđen datum njenog prestanka, a izvođač ne stenke pravo na povraćaj garancije 28 dana prije datuma prestanka garancije, izvođač se obavezuje da produži važnost garancije sve do završetka radova i otklanjanja nedostataka.

Investitor nema pravo na potraživanja po osnovu garancije za dobro izvršavanje posla u iznosima većim od onih na koje ima pravo po ugovoru u slučaju:

a) Propusta izvođača da produži važnost garancije u skladu sa prethodnim stavom, u kom slučaju investitor ima pravo da potražuje cio iznos garancije,
b) Propusta izvođača da investitoru isplati dospjeli iznos, sa kojim se izvođač saglasio ili koji je utvrđen u skladu sa podklauzulom 2.5 (potraživanja investitora) ili klauzulom 20 (potraživanja, sporovi i arbitraža) u roku od 42 dana od datuma davanja sigurnosti ili utvrđivanja,
c) Propusta izvođača da otkloni nekakav nedostatak u roku od 42 dana od prijema obavještenja investitora o potrebi da se nedostatak otkloni, ili
d) Nastanka okolnosti koje investitoru daju pravo na raskid ugovora u skladu sa podklauzulom 15.2 (raskid ugovora od strane investitora), nezavisno od toga da li je otkaz podnijet.

Investitor se obavezuje da izvođača obešteti i zaštiti od šteta, gubitaka i troškova (uključujući i sudske takse i troškove) nastalih u vezi potraživanja na osnovu garancije za dobro izvršenje posla u mjeri u kojoj investitor nije imao pravo na potraživanje.

Investitor se obavezuje da Izvođaču vrati garancije za dobro izvršenje posla u roku od 21 dana po prijemu primjeraka potvrde o dobro izvršenom poslu.

4.3 Predstavnik Izvođača

Izvođač određuje predstavnika izvođača i daje mu sva ovlašćenja koja su mu potrebna za djelovanje u ime izvođaca u skladu sa ugovorom.

Ukoliko predstavnik Izvođača nije imenovan u Ugovoru, Izvođač se obavezuje da prije datuma početka nadzornom organu podnese na saglasnost ime i podatke o licu koje namjerava da postavi kao predstavnika izvođača. Ako saglasnost bude uskraćena ili kasnije povučena, ili ako postavljeno lice ne djeluje kao predstavnik izvođača, izvođač se obavezuje da na sličan način predoči ime i podatke o nekom drugom licu pogodnom za takvo postavljanje.

Izvođač ne može bez prethodne saglasnosti nadzornog organa da smijeni predstavnika Izvođača ili da postavi novog.

Predstavnik Izvođača prima u ime Izvođača naloge iz podklauzule 3.4 (*Nalozi*).

Predstavnik Izvođača ima pravo da ovlašćenja i funkcije prenese na bilo koje kompetentno lice, kao i da u svako doba povuče takva ovlašćenja i funkcije. Nikakav prenos ili povlašćenje ne može da stupi na snagu prije nego sto investitor ne primi prethodno obavještenje potpisano od strane predstavnika izvođača sa imenom dotičnog lica i naznakom ovlašćenja i funkcija koje se prenose ili povlače.

Predstavnik Izvođača i sva pomenuta lica moraju da tečno govore jezik za komunikacije koji je naveden u podklauzuli 1.4 (*Zakon i jezik*).

4.4 Podizvođači

Izvođač nema pravo da radove u cjelini ustupi podizvođačima.

Izvođač je odgovoran za postupke i neizvršavanje obaveza bilo kojeg podizvođača, njegovih zastupnika ili radnika isto kao da su to postupci i neizvršavanja obaveza od strane izvođača. Kada je navedeno u posebni uslovima, izvođač mora dati investitoru obavještenje najmanje 28 dana prije za:

a) Planirano imenovanje podizvođaša, sa detaljnim pojedinostima koje uključuju I njegovo odgovarajuće radno iskustvo,
b) Planiran početak radova podizvođača,
c) Planiran početak radova podizvođača na gradilištu.

4.5 Imenovani podizvođači

U smislu ove podklauzule, “imenovani podizvođač” predstavlja podizvođača čije je angažovanje naloženo izvođaču od strane investitora u skladu sa klauzulom 13 (*Izmjene i korekcije*). Izvođač nije obavezan da angažuje nekog imenovanog podizvođača na čiji račun izvođač ima zamjerke, ako u sto je moguće kraćem roku o tome obavijesti investitora sa obrazloženjem.

4.6 Saradnja

Izvođač se obavezuje da pruži priliku za izvođenje radova, koji su predviđeni Ugovorom ili naloženi od strane rukovodioca izgradnje:

a) Osoblju Investitora,
b) Bilo kojim drugim izvođačima angažovanih od strane Investitora, i
c) Osoblju zakonski konstituisanih javnih organa,

koji se mogu angažovati na izvođenju radova, na gradilištu ili u njegovoj blizini, koji nisu predviđeni ugovorom.

Svaki takav nalog sačinjava izmjenu, ukoliko se Izvođač izlaze troškovima u iznosu koji nije mogao biti predviđen od strane iskusnog izvođača do datuma predaje tenderske dokumentacije. Usluge pružene takvom osoblju mogu da se odnose na korišćenje opreme izvođača, privremene radove ili aranžmane za pristup za koje je odgovoran izvođač.

Izvođač je odgovoran za svoje graditeljske aktivnosti na gradilištu i obavezan je da usaglašava svoje aktivnosti sa aktivnostima ostalih izvođača u mjeri (eventualno) predviđenoj zahtjevima investitora.

Ukoliko je Investitor po ugovoru obavezan da Izvođaču preda u posjed bilo koji temelj, objekat ili postrojenje ili sredstvo pristupa u skladu sa dokumentacijom izvođača, izvođač se obavezuje da takvu dokumentaciju podnese investitoru u roku i na način naveden u zahtjevima investitora.

4.7 Obilježavanje

Izvođač se obavezuje da obilježi radove u odnosu na prvobitne tačke, linije ili kote predviđene ugovorom. Izvođač je odgovoran za tačnost rasporeda svih djelova radova i obavezan je da ispravi svaku grešku u položajima, kotama, dimenzijama ili pravcima radova.

4.8 Bezbjedonosni postupci

Izvođač se obavezuje:

a) Da postupa u skladu sa svim odgovarajućim propisima o bezbjednosti,
b) Da vodi računa o bezbjednosti svih lica koja imaju pravo da budu na gradlištu,
c) Da se stara o tome da na gradilištu i radovima ne postoje nepotrebne prepreke kako se ta lica ne bi izlagala opasnostima,
d) Da obezbijedi ogradu, rasvjetu, čuvare i nadzor radova sve do preuzimanja u skladu sa klauzulom 10 (prijem od strane investitora), i
e) Da obezbijedi sve privremen radove (uključujući put, pješačke staze, čuvare i ogradu), koji su potrebni u izvođenju radova radi korišćenja i zaštite prolaznika i vlasnika ili korisnika okolnog zemljišta.

4.9 Garancija kvaliteta

Izvođač se obavezuje da uspostavi system garantovanja kvaliteta da bi se vidjelo da posputa u skladu sa uslovima ugovora. Taj sistem mora da bude u skladu sa detaljima iz Ugovora. Investitor ima pravo da vrši kontrolu bilo kog aspekta sistema.

Pojedinosti svih procedura i postupanja u skladu sa dokumentacijom podnose se Investitoru na uvid prije početka svake faze projektovanja i izvođenja. Na svakom dokumentu tehničke prirode koji se podnion Investitoru mora da se vidi dokaz o tome da ga je Izvođac prethodno odobrio.

Postupanje u skladu sa sistemom garantovanja kvaliteta ne oslobađa Izvođača od bilo koje svoje ugovorene obaveze ili odgovornosti.

4.10 Podaci o gradilištu

Investitor se obavezuje da prije osnovnog datuma izvođaču dostavi sve relevantne podatke koje ima u vezi podzemnih I hidroloških uslova na gradilištu, uključujući i ekološke aspekte. Investitor se isto tako obavezuje da izvođaču predoči sve takve podatke koje bude saznao posle osnovnog datuma.

Izvođač je odgovoran za tumačenje tih podataka. Investitor nije odgovor za tačnost, dovoljnost ili ispravnost tih podataka, osim onoga što je navedeno u podklauzuli 5.1 (*Projektne odgovornosti*).

4.11 Dovoljnost prihvaćenog ugovornog iznosa

Smatra se da je Izvođač uvjeren u ispravnost i dovoljnost prihvaćenog ugovornog iznosa.

Ukoliko nije drukčije predviđeno ugovorom, prihvaćeni ugovorni iznos pokriva sve obaveze izvođača (uključujući i one pod okvirnim sumama, ako su predviđene) i sve ostalo sto je potrebno za dobro projektovanje, izvođenje i završetak radova i otklanjanje eventualnih nedostataka.

4.12 Nepredviđene poteškoće

Osim ukoliko nije drugačije navedeno u ugovoru:

a) Izvođač će se smatrati odgovorim da je dobio sve informacije o rizicima, potencijalnim komplikacijama ili drugim okolnostima koje mogu uticati ili imati efekat na rad;
b) Potpisivanjem ugovora, Izvođač prihvata potpunu odgovornost da je predvidio sve teškoće i troškove koji su potrebni za uspješno izvršenje radova;
c) Ugovorna cijena se neće prilagođavati uzimajući u obzir bilo koje nepredviđene teškoće ili troškove.

4.13 Pravo prolaza i pogodnosti

Izvođač se obavezuje da snosi sve troškove i dažbine vezane za dobijanje posebnog i/ili privremenog prava prolaza za njegove potrebe, uključujući i prilaz gradilištu. Izvođač se takodje obavezuje da na sopstveni rizik i o sopstvenog trošku obezbijedi sve ostale pogodnosti van gradilišta koje su mu potrebne radi izvođenja radova.

4.14 Izbjegavanje ometanja

Izvođač ne smije da nepotrebno ili nepropisno ometa:

a) Građane, ili
b) Prilaz, korišćenje i zauzimanje svih puteva i pješačkih staza, kako javnih tako i onih u posjedu investitora ili drugih lica.

Izvođač se obavezuje da Investitora obešteti i zaštiti od štete, gubitka i troškova (uključujući i sudske troškove) nastalih zbog nepotrebnog ili nepropisnog ometanja.

4.15 Prilazni put

Smatra se da se Izvođač uvjerio u podobnost i raspoloživost prilaznih puteva za gradilište. Izvođač se obavezuje da se postara o tome da ne dođe do oštećenja bilo kog puta ili mosta od strane vozila ili osoblja izvođača. Obaveza se odnosi i na pravilno korišćenje odgovarajućih vozila I pravaca.

Ukoliko drukčije nije predviđeno ovim Ugovorom:

a) Izvođač je odgovoran za svo potrebno održavanje svojih prilaznih puteva;
b) Izvođač se obavezuje da obezbijedi svu potrebnu signalizaciju ili putokaze duž prilaznih puteva i da prihvati dozvolu nadležnih organa za korišćenje puteva, signalizacije i putokaza;
c) Investitor ne odgovara za bilo kakva potraživanja koja proizilaze iz korišćenja prilaznog puta;
d) Investitor ne garantuje podobnost ili raspoloživost posebnih prilaznih puteva, i
e) Izvođač snosi troškove nastale zbog nepodobnosti ili neraspoloživosti prilaznih puteva za potrebe Izvođača.

4.16 Prevoz robe

Ukoliko nije drugačije predvđeno Posebnim uslovima:

a) Izvođač se obavezuje da investitora obavijesti najmanje 21 dan unaprijed o prispjeću bilo koje opreme ili glavnih pozicija robe na gradilištu;
b) Izvođač je odgovoran za pakovanje, utovar, prevoz, prijem, istovar, skladištenje i zaštitu robe i ostalih stvari potrebnih za izvođenje radova; i
c) Izvođač se obavezuje da bešteti i zaštiti Investitora od svih šteta, gubitaka i troškova

(uključujući i sudske troškove) nastalih u prevozu robe i da pregovara i plati sva potrživanja vezana za njen prevoz.

4.17 Oprema izvođača

Izvođač je dogovoran za svu opremu Izvođača. Po dopremi na gradilište, oprema Izvođača se smatra namijenjenom isključivo izvođenju radova.

4.18 Zaštita životne sredine

Izvođač se obavezuje da u razumnim granicama primijeni mjere zaštite životne sredine (kako na gradilištu, tako i van njega), kako bi sveo na minimum štetu i neprijatnosti nanijete ljudima, odnosno imovini usled zagađenja, buke ili nekih drugih njegovih radnji.

Izvođač se obavezuje da se postara o tome da izduvni gasovi, površinska pražnjenja i otpadne vode nastale usled njegovih aktivnosti ne pređu vrijednosti navedene u zahtjevima investitora, niti vrijednosti propisane odgovarajućim zakonima.

4.19 Električna energija, voda i gas

Osim u nize navedenim slučajevima, izvođač je odgovoran za obezbjedjivanje električne energije, vode i ostalih usluga koje mu budu potrebne.

Izvođač ima pravo da za potrebe izvođenja radova koristi električnu energiju, vodu, gas i ostale usluge postojećih priključaka na gradilištu, u vezi kojih su pojedinosti i cijene dati u zahtjevima investitora. Izvođač se obavezuje da na sopstveni rizik i o sopstvenom trošku obezbijedi svu aparaturu koja mu je potrebna za korišćenje tih usluga i mjerenje utrošenih količina.

Investitor odobrava ili određuje utrošene količine i plative iznose (po tim cijenama) u skladu sa podkauzulom 2.5 (*Potraživanja investitora*) i podklauzulom 3.5 (*Utvrđivanja*). Izvođač se obavezuje da te iznose plati Investitoru.

4.20 Oprema investitora i besplatni materijal

Investitor se obavezuje da Izvođaču stavi na raspolagalanje svoju opremu (ako postoji) radi izvođenja radova u skladu sa detaljima, aranžmanima i cijenama navedenim u zahtjevima investitora. Ukoliko nije drugačije predviđeno zahtjevima investitora:

a) Investitor je odgovoran za opremu investitora, s tim sto je
b) Izvođač odgovoran za svaki dio opreme investitora kojim osoblje izvođača rukuje, vozi, upravlja, drži u posjedu ili kontroliše.

Odgovarajuće količine i iznosi koji slijede (po tako navedenim cijenama) za korišćenje opreme investitora odobrava ili utvrđuje investitor u skladu sa podklauzulom 2.5 (*Potraživanja*

investitora) i podklauzulom 3.5 (*Utvrđivanja*). Izvođač se obavezuje da te iznose isplaćuje Investitoru.

Investitor se obavezuje da izvođača snadbije sa (eventualnim) “besplatnim materijalima” u skladu sa pojedinostima navedenim u zahtjevima izvođača. Investitor se obavezuje da na sopstveni rizik o sopstvenom trošku obezbijedi te materijale u vrijeme i na mjestu predviđenim ugovorom. Nakon vizuelnog pregleda, izvođač odmah obavještava investitora o eventualnom manjku, nedostacima ili manjkavostima tih materijala. Ukoliko se stranke nijesu drugačije sporazumjele, investitor se obavezuje da odmah ispravi prijavljeni manjak, nedostatak ili manjkavost.

Nakon tog vizuelnog pregleda, besplatni materijali se predaju izvođaču na staranje, u posjed i na kontrolu. Obaveze Izvođača u pogledu staranja, posjedovanja i kontrole ne oslobađaju Investitora od odgovornosti za bilo koji manjak, nedostatak ili manjkavost koja nije utvrđena pri vizuelnom pregledu.

4.21 Izvještaj o napredovanju radova

Ukoliko nije drugačije predviđeno posebnim uslovima, Izvođač se obavezuje da Investitoru podnosi mjesečne izvještaje o napredovanju radova u šest primjeraka. Prvi izvještaj pokriva period do kraja prvog kalendarskog mjeseca poslije datuma početka. Izvještaji se nakon toga podnose mjesečno, i to u roku od 7dana od poslednjeg dana perioda na koji se odnose.

Izvještavanje se vrši sve dok Izvođač ne završi sve radove koji su bili nezavršeni na dan završetka koji je naveden u potvrdi o preuzimanju radova.

Svaki izvještaj sadrži:

a) Grafikone i detaljni opis napredovanja, uključujući svaku fazu projektovanja, dokumentaciju izvođača, nabavku, izradu, dopremu na gradilište, izgradnju, montažu, ispitivanje, puštanje u pogon i probni pogon;
b) Fotografije koje prikazuju stanje izgrade i napredovanje na gradilištu;
c) Za izradu svakog dijela postrojenja i materijala, naziv proizvođača, mjesto izgrade, procenat napredovanja I stvarni ili očekivani datum:
    a. Nakon izrade
    b. Kontrole od strane izvođača
    c. Ispitivanja, i
    d. Otpreme I prispijeća na gradilište.
d) Pojedinosti predviđene podklauzulom 6.10 (*Evidencija osoblja i opreme Izvođača);*
e) Primjerke garancije kvaliteta, rezultate ispitivanja i ateste za materijale;
f) Spisak izmjena, obavjestenja podnijetih u skladu sa podklauzulom 2.5 (*Potraživanja investitora*) i obaveštenja podnijetih u skladu sa podklauzulom 20.1 (*Potraživanja izvođača*);
g) Statističke podatke o bezbjednosti, uključujući pojedinosti opasnih incidenata i aktivnosti vezanih za ekološke aspekte i odnose sa javnošću; i
h) Poređenja između stvarnog i planiranog napredovanja, sa pojedinostima okolnosti koje bi mogle da uslove probijanje ugovornog roka za završetak i mjerama koje su usvojene

(ili će biti usvojene) radi sprečavanja kašnjenja.

4.22 Obezbjeđenje gradilišta

Ukoliko nije drugačije predviđeno posebnim uslovima:

a) Izvođač je odgovoran za sprečavanje ulaska neovlašćenih lica na gradilište, i
b) Ovlašćena lica su osoblje Izvođača i Investitora, kao i svako drugo lice za koje je izvođač obaviješten od strane investitora da je ovlašćeno lice drugih investitorovih izvođača.

4.23 Radnje Izvođača na gradilištu

Izvođač se obavezuje da svoje radnje ograniči na gradilište i da dodatne prostore koje Izvođač obezbijedi i koje investitor odobri kao radne prostore. Izvođač se obavezuje da preduzme sve potrebne mjere kako bi se oprema i osoblje Izvođača zadržavali na gradilištu i dodatnim prostorima bez prelaženja na susjedno zemljište.

Izvođač se obavezuje da se postara o tome da tokom izvođenja radova gradilište bude bez nepotrebnih prepreka i da uskladisti ili odstrani opremu Izvođača i suvisan materijal, Izvođač se obavezuje da raščisti i odstrani sa gradilišta sve ruševina, smeće i privremene radove koji vise nisu potrebni.

Izvođač se obavezuje da po izdavanju potvrde o preuzimanju raščisti I odstrani svu opremu Izvođača, visak materijala, ruševine, smeće ili privremene radove. Izvođač se obavezuje da taj dio gradilišta ili radova ostavi u cistom i bezbijednom stanju. Međutim, Izvođač ima pravo da do isteka roka za prijavljivanje nedostataka na gradilištu zadrži robu koja je izvođaču potrebna za izvršavanje svojih ugovornih obaveza.

4. 24 Fosili

Svi fosilni ostaci, novčići, vrijedne stvari ili antikviteti, strukture i ostali ostaci ili stvari od geološkog i arheološkog interesa koji budu pronađeni na gradilištu predaju se investitiru na staranje i raspolaganju. Izvođač se obavezuje da preduzme razumje mjere za sprečavanje odnošenja ili oštećenja tih nalaza odstrane osoblja izvođača ili nekih drugih lica.

Izvođač se obavezuje da po pronalaženju takvih stvari o tome odmah obavijesti investitora, koji ce nazoliti dalji postupak o njima. Ako izvođac bude kasnio ili bude izložen troškovima zbog postupanja u skladu sa takvim nalogom, po obavjestenju investitora u tom smislu, Izvođač ima pravo, shodno podklauzuli 20.1 (*Potraživanja Izvođača*) na:

a) Produženje roka srazmjerno takvom kašnjenju, ako je rok završetka probijen ili će biti probijen, shodno podklauzuli 8.4 (produženje roka za završetak), i
b) Naknadu takvih troškova, sto se uključuje u ugovornu cijenu.

Po prijemu daljeg obavjestenja, Investitor postupa u skladu sa podklauzulom 3.5 (utvrđivanja) da bi se saglasio ili utvrdio te stvari.

5. Projektovanje

5.1 Opšte obaveze u projektovanju

Izvođač će se smatrati da je nadzorom, prije baznog datuma, kada su u pitanju zahtjevi investitora (uključujući projektne kriterijume i kalkulacije, ukoliko ih ima). Izvođač je odgovoran za projektovanje radova i za tačnost prema zahtjevima Investitora (uključujući i projektne kriterijume i kalkulacije), osim dolje navedenog.

Investitor nije odgovoran za bilo koje greške, netačnosti ili propuste bilo koje vrste kada su u pitanju zahtjevi investitora koji su prvobitno uključeni u ugovor i ne može se smatrati da je dao bilo kakve izjave o tačnosti ili kompletnosti bilo kojih podataka ili informacija, osim dolje navedenog. Sve podatke ili informacije koje primi Izvođač, od strane investitora ili na drugi način, ne oslobađa Izvođača od njegove odgovornosti za projektovanje I izvođenje radova.

Međutim, Investitor mora biti odgovoran za tačnost sledećih djelova zahtjeva poslodavca, kao i sledećih podataka i informacija koje pruža (ili u ime) investitor:

a) Djelovi, podaci i informacije koje su navedene u ugovoru koje su nepromjenjive ili su odgovornost investitora,
b) Definicije namijenjene planiranim radovima ili pojedinim djelovima tih radova,
c) Kriterijumi za testiranje i obavljanje završenih radova, i
d) Djelovi, podaci i informacije koje ne mogu biti ovjerene od strane investitora, osim ukoliko to nije drugačije naznačeno u ugovoru.

5.2 Dokumentacija izvođača

Dokumentaciju Izvođača sačinjavaju tehnička dokumentacija predivđena zahtjevima investitora, dokumenti koji su potrebni za dobijanje odobrenja I dokumenti iz podklauzule 5.6 (dokumentacija izvedenog stanja) i podklauzule 5.7 (*Priručnik za eksploataciju i održavanje*). Ukoliko drugačije nije predviđeno zahtjevima investitora, dokumentacija izvođača piše se na jeziku za komunikacije na koju je izveden u podklauzuli 1.4 (*Pravo i jezik).*

Izvođač se obavezuje da pripremi dokumentaciju izvođača, kao i ostale dokumente koji su potrebni za davanje uputstava osoblju izvođača.

Ako je u zahtjevima investitora precizirana dokumentacija izvođača koje se podnosi investitoru na pregled, ona se podnosi skupa sa nize opisanom bilješkom. U sledećim odredbama ove podklauzule, (i) “period pregleda” znaci vrijeme koje je potrebno Investitoru za pregled, I (ii) “dokumentacija izvođača” ne obuhvata bilo koje documente koji nisu predviđeni za podnošenje radi pregleda.

Ukoliko nije drugačije navedeno u zahtjevima investitora, period drugačije navedeno u zahtjevima investitora, period pregleda ne može da bude od 21 dana, računao od dana prijema dokumentacije i obavještenja Izvođača od strane Investitora. U obavjestenju se navodi da se dokumentacija izvođača smatra spremnom kako za pregled u skladu sa ovom podklauzulom, tako i za korišćenje. U obavjestenju se takodje navodi da je dokumentacija izvođača u skladu sa ugovorom ili mjera u kojoj ona nije u skladu sa ugovorom.

Tokom perioda pregleda, investitor može da saopšti izvođaču da neki njegov dokument nije u skladu sa ugovorom (navodeći mjeru odstupanja). Takav se dokument ispravlja, ponovo podnosi I pregleda u skladu sa ovom podklauzulm, i to o trošku izvođača.

Za svaki dio radova, osim ukoliko se strane drugačije ne dogovore:

a) Izvršenje takvih djelova radova neće početi prije isteka perioda za razmatranje svih dokumenta Izvođača koji su vezani za projektovanje i izvođenje;
b) Izvršenje takvih dijelova radova moraju biti u skladu sa ovim dokumentima Izvođača, kao predate na razmatranje; i
c) Ukoliko Izvođač želi da izmijeni bilo koji projekat ili dokument koji je prethodno poslat na pregled, Izvođač o tome mora odmah obavijestiti investitora. Nakon toga, Izvođač dostavlja izmijenjene dokumente investitoru u skladu sa navedenom procedurom.

Svaki sporazum tog tipa (iz prethodnog stave) ili bilo koji pregled (pod ovom subklauzulom ili na neki drugi način) ne oslobađa Izvođaca od bilo koje obaveze ili odgovornosti.

5.3 Garancija Izvođača

Izvođač garantuje da će projekat, dokumentacija Izvođača, izvođenje i završeni radovi biti u skladu sa:

a) zakonima zemlje, i
b) dokumentacijom koja sačinjava ugovor, sa odobrenim izmjenama.

5.4 Tehnički standardi i propisi

Projekat, dokumentacija Izvođača, izvođenje i završeni radovi moraju da budu u skladu sa tehničkim standardima, zakonima o izgradnji i zaštiti životne sredine, zakonima koji se primjenjuju na proizvode koji se od radova proizvode i ostalim standardima preciziranim u zahtjevima investitora, a koji se odnose na radove ili su predviđeni odgovarajućim zakonima, koji su na snazi u zemlji.

Što se radova i svake sekcije pojedinačno tiče, svi ovi za koji su oni koji su bili na snazi kada su radovi ili sekcije bili primljeni od strane investitora u skladu sa klauzulom 10 (*Prijem radova od strane Investitora*). Pozivanja u ugovoru na objavljene standard podrzumijevaju pozive na izdanja koja su bila primjenjiva osnovnog datuma, ukoliko nije dugačije predviđeno.

U slučaju da u zemlji stupe na snagu izmijenjeni ili novi standardi posle osnovnog datuma, Izvođač se obavezuje da o tome obavijesti investitora i (po potrebi) podnese predloge za usaglašavanje. U slučaju da:

a) Investitor utvrdi da je potrebno usaglašavanje, i
b) Predlozi sa usaglašavanje sačinjavaju izmjenu

Investitor inicira vršenje izmjene u skladu sa klauzulom 13 (*Izmjene i korekcije*).

5.5 Obuka

Izvođač se obavezuje da izvrši obuku osoblja investitora za eksploataciju i održavanje radova u obimu navedenom u zahtjevima investitora. Ukoliko Ugovor predviđa da se obuka izvrši prije primopredaje, radovi se neće smatrati završenim za potrebe prijema u skladu sa klauzulom 10.1 (*Prijem radova i sekcija*) sve dok se obuka ne završi.

5.6 Dokumentacija izvedenog stanja

Izvođač se obavezuje da priprema i ažurno vodi kompletan set evidencije “izvedenog stanja” radova, sa prikazom tačnih kolacija izvedenog stanja, dimenzija i detalja izvedenog rada. Takva evidencija se drži na gradilištu i koristi se isključivo u svrhe predviđene ovom podklauzulom. Dva primjerka se podnose nadzornom organu pre početka ispitivanja na završetku.

Pored toga, Izvođač se obavezuje da nadzornom organu podnese grafičku dokumentaciju u izvedenom stanju radova koja prikazuje sve izvedene radove radi pregleda u skladu sa pokdlauzulum 5.2 (*Dokumentacija Izvođača*). Izvođač se obavezuje da trazi saglasnost nadzornog organa u vezi njihovih dimenzija, referentnog sistema i ostalih bitnih podataka.

Prije izdavanja potvrde o prijemu, Izvođač se obavezuje da nadzornom organu podnese određeni broj primjeraka grafičke dokumentacije u izvedenom stanju, u skladu sa zahtjevima Investitora. Radovi se ne mogu smatrati završenim za potrebe prijema u skladu sa podklauzulom 10.1 (*Prijem radova i sekcija*) prije nego sto Investitor primi tu dokumentaciju.

5.7 Priručnici za eksploataciju i održavanje

Prije nego sto pristupi ispitivanju na završetku, Izvođač se obavezuje da Investitoru dostavi privrmene priručnike za eksploataciju i održavanje koji su detaljni u mjeri potrebnoj da se investitoru omogući da eksploatiše, održava, razmontira, montira, podesi i popravi postrojenje.

Radovi se ne mogu smatrati završenim za potrebe prijema u skladu sa podklauzulom 10.1 (*Prijem radova i sekcija*) sve dok Investitor ne primi konačne priručnike za eksploataciju i održavanje sa potrebnim detaljima i neke druge priručnike predviđene zahtjevima investitora u te svrhe.

5.8 Greške u projektima

Ukoliko se u dokumentaciji Izvođača utvrde greške, propusti, dvosmislenosti, neadekvatnosti i ostale manjkavosti, onda i radovi podliježu korekcije o trošku Izvođača, bez obzira na bilo koju saglasnost ili odobrenje koje je bilo datu u skladu sa ovom klauzulom.

6. Osoblje i radna snaga

6.1 Angažovanje osoblja i radne snage

Ukoliko drugačije nije navedeno u Zahtjevima Investitora, Izvođač se stara i angažovanju cjelokupnog osoblja i radne snage, lokalne ili neke druge, i njihovim platama, smještaju, ishrani i prevozu.

6.2 Plate i radne uslovi

Izvođač se obavezuje da isplaćuje plate i obezbijedi radne uslove i to tako da plate ne budu niže i uslovi da ne budu lošiji od onih koji su utvrđeni za takve djelatnosti u mjestu gdje se izvode Radovi. Ako plate i radni uslovi nisu utvrđeni, Izvođač se obavezuje da isplaćuje plate i obezbijedi radne uslove koji nisu niži od onog koji praktikuju lokalni poslodavci čija je djelatnost slična.

6.3 Lica zaposlena kod drugih

Izvođač neće zaposliti, niti da pokuša da zaposli osoblje ili radnu snagu iz redova osoblja Investitora.

6.4 Radno zakonodavstvo

Izvođač se obavezuje da poštuje zakone o radu koji važe za osoblje Izvođača, uključujući i zakone koji regulišu njihove radne odnose, zdravstvenu zaštitu, bezbjednost, socijalno osiguranje, imigraciju i emigraciju i da im omogući da koriste svoja zakonska prava.

Izvođač se obavezuje da od svojih radnika zahtijeva da se pridržavaju odgovarajućih zakona, uključujući i one koji se odnose na zaštitu na radu.

6.5 Radno vrijeme

Nije dozvoljen nikakav rad na gradilištu u zvanične lokalne dane odmora ili van normalnog radnog vremena, osim ako:

(a) drugačije nije predviđeno Ugovorom;

(b) ako Investitor da svoju saglasnost za to; i

(c) ako je rad neizbježan ili je neophodan radi zaštite lica i imovine ili zbog bezbjednosi Radova, u kom slučaju se Izvođač obavezuje da to odmah saopšti Investitoru.

6.6 Pogodnosti za osoblje i radnu snagu

Ukoliko nije drugačiije navedeno u Zahtjevima Investitora, Izvođač se obavezuje da obezbijedi i održava potrebni smještaj i ostale socijalne uslove za svoje radnike. Izvođač se takođe obavezuje da za radnike Investitora obezbijedi pogodnosti navedene u Zahtjevima Investitora.

Izvođač ne smije da dozvoli bilo kom svom radniku privremeni ili trajni smještaj u objektima koji sačinjavaju Osnovne radove.

6.7 Zdravlje i bezbjednost

Izvođač se obavezuje da stalno vodi računa o zdravlju i bezbjednosti svojih radnika u razumnim granicama. On se obavezuje da se u saradnji sa lokalnim zdravstvenim institucijama postara o tome da zdravstveni radnici, prva pomoć i ambulantne usluge budu stalno na raspolaganju radnicima Izvođača i Investitora na gradilištu i smještajnim objektima, kao i da se postara o higijenskoj zaštiti i zaštiti od epidemije.

Izvođač se obavezuje da na gradilištu angažuje referenta za zaštitu na radu, koji bi bio odgovoran za bezbjednost i zaštitu od nesreća. To lice mora da ima odgovarajuću kvalifikaciju i ovlašćenje da daje naloge i preduzima mjere za sprječavanje nesreća. Izvođač se obavezuje da tokom cijelog trajanja izvođenja Radova tom licu obezbijedi sve što mu je potrebno za izvršavanje svojih dužnosti.

Izvođač se obavezuje da Investitoru podnese detaljan izvještaj o svakoj nesreći u najkraćem mogućem roku poslije nastanka nesreće. Izvođač se obavezuje da vodi evidenciju i podnosi izvještaje u vezi zdravlja, bezbjednosti i šteti nanijetoj imovini, na zahtjev Investitora.

6.8 Nadzor Izvođača

Izvođač se obavezuje da tokom projektovanja i izvođenja radova u cjelini i nakon toga po potrebi, obezbijedi nadzornu službu za planiranje, uređivanje, usmjeravanje, upravljanje, kontrolu i ispitivanje radova.

Nadzorna služba mora da ima dovoljan broj radnika koji u dovoljnoj mjeri vladaju jezikom za komunikacije (u smislu podklauzule 1.4 (*Pravo i zakon*)) i poznaju poslove koji se obavljaju radi zadovoljavajućeg i bezbjednog izvođenja Radova**.**

6.9 Osoblje izvođača

Osoblje izvođača mora da ima odgovarajuće kvalifikacije i da bude stručno i iskusno. Investitor ima pravo da od Izvođača zahtijeva da sa gradilišta ili Radova odstrani (ili izdejstvuje odstranjenje) bilo kog lica, pa i predstavnika Izvođača, po potrebi, koje:

(a) se loše ponaša ili je nepažljivo;

(b) se bavi svojim poslom nekompetentno ili nemarno;

(c) se ne povinuje bilo kojoj odredbi Ugovora; i

(d) istrajava u ponašanju koje ugrožava bezbjednost, zdravlje ili zaštitu životne sredine.

Nakon toga, Izvođač može da odredi drugo odgovarajuće lice kao zamjenu, po potrebi.

6.10 Evidencija osoblja i opreme Izvođača

Izvođač se obavezuje da Investitoru podnese izvještaj o broju svojih radnika svih kategorija i svakoj vrsti opreme Izvođača na gradilištu. Izvještaj se podnosi svakog kalendarskog mjeseca u obliku koji je odobren od strane Investitora, sve do završetka Radova i izdavanja Potvrde o prijemu Radova**.**

6.11 Nekorektno ponašanje

Izvođač se obavezuje da stalno preduzima mjere za sprječavanje nezakonitog, buntovničkog ili nekorektnog ponašanja osoblja Izvođača, i čuvanja mira i zaštite lica i imovine na ili u blizini gradilišta.

7. Postrojenja, materijali i izrada

7.1 Način izvođenja

Izvođač se obavezuje da proizvede Postrojenje, proizvede i izradi materijal i izvede sve ostale Radove:

(a) na način predviđen Ugovorom (ako je predviđen),

(b) stručno i pažljivo, u skladu sa priznatom dobrom praksom, i

(c) koriseći propisnu opremu i bezopasne materijale, ukoliko nije drugačije predviđeno Ugovorom.

7.2 Uzorci

Izvođač se obavezuje da Investitoru podnese na pregled uzorke u skladu sa procedurama za dokumentaciju Izvođača iz podklauzule 5.2 *(Dokumentacija Izvođača).* Svi uzorci treba da imaju etiketu sa naznakom porijekla i predviđene primjene u Radovima.

7.3 Kontrola

Osoblje investitora ima pravo u svako razumno doba:

(a) na potpuni pristup svim djelovima gradilišta i mjestima na kojima se dobijaju prirodni materijali, i

(b) da tokom proizvodnje, izrade i izgradnje (na gradilištu ili nekom drugom mjestu) pregledaju, kontrolišu, mjere i ispitaju materijale i izradu, i da kontrolišu napredovanje izrade postrojenja i proizvodnju materijala.

Izvođač se obavezuje da Investitorovom personalu omogući da obavi te aktivnosti obezbjeđujući im pristup, pogodnosti, dozovle i zaštitnu opremu. Nijedna takva aktivnost ne oslobađa Izvođača bilo koje obaveze ili odgovornosti.

U vezi sa Radovima za koje Investitorov personal ima pravo da vrši pregled, kontrolu, mjerenje i/ili testiranje, Izvođač će obavijestiti Investitora kad god su radovi spremni ili prije nego što se oni pokriju, sklone ili upakuju za skladištenje ili transport. Investitor zatim vrši pregled, kontrolu, mjerenje ili ispitivanje bez nepotrebnog zastoja ili odmah saopštava Izvođaču da Investitor to ne zahtijeva. Ukoliko Izvođač ne obavijesti, on će, na zahtjev Investitora, otkriti radove i nakon toga ih vratiti u pređašnje stanje, o sopstvenom trošku.

7.4 Ispitivanje

Ova podklauzula važi za sva ispitivanja koja su predviđena Ugovorom, ali ne i za (eventualna) ispitivanja poslije završetka.

Izvođač se obavezuje da obezbijedi svu aparaturu, pomoć, dokumentaciju i ostale informacije, električnu energiju, opremu, gorivo, potrošni materijal, instrumente, radnu snagu, materijal i stručno i iskusno osoblje koji su potrebni za efikasno vršenje predviđenih ispitivanja. Izvođač se obavezuje da se sa Investitorom dogovori o terminu i mjestu predvidjenog ispitivanja svakog postrojenja, materijala i ostalih djelova Radova.

Investitor ima pravo, da u skladu sa klauzulom 13 *(Izmjene i korekcije)* mijenja mjesto i pojedinosti predvidjenih ispitivanja ili da naloži Izvođaču vršenje dodatnih ispitivanja. Ako se tako izmijenjenim ili dodatnim ispitivanjima utvrdi da ispitivano postrojenje, materijali ili izrada nisu u skladu sa Ugovorom, troškove izmjene snosi Izvođač, bez obzira na ostale odredbe Ugovora.

Investitor se obavezuje da Izvođača obavijesti najmanje 24 časa unarijed o svojoj namjeri da prisustvuje ispitivanjima. Ako Investitor ne bude prisutan u dogovoreno vrijeme na dogovorenom mjestu, Izvođač može da pristupi ispitivanjima, ukoliko mu Investitor nije nešto drugo nazložio, i tada će se smatrati da je ispitivanje izvršeno u prisustvu Investitora.

Ako Investitor kasni i/ili bude izložen troškovima zbog postupanja u skladu sa tim nalozima ili zastoja za koji je odgovoran Investitor, Izvođač o tome obavještava Investitora i shodno podklauzuli 20.1 *(Potraživanje Izvođača)* ima pravo na:

(a) produženje roka srazmjerno kašnjenju, ako završetak kasni ili će kasniti, u skladu sa podklauzulom 8.4 *(Produženje roka za završetak radova),* i

(b) naknadu troškova uvećanu za primjerenu dobit, što se uključuje u ugovornu cijenu.

Po prijemu tog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrdjivanja*) radi davanja saglasnosti ili utvrđivanja tih stvari.

Izvođač se obavezuje da Investitoru odmah proslijedi propisno ovjerene izvještaje o ispitivanjima. Kada se dobiju povoljni rezultati Investitor potvrđuje atest Izvođača ili mu izdaje potvrdu u tom smislu. Ako Investitor nije prisustvovao ispitivanju, smatraće se da je prihvatio rezultate kao tačne.

7.5 Odbijanje

Ako se pregledom, kotrolom, mjerenjem ili ispitivanjem postrojenja, materijala, projekta ili izrade utvrde njegovi nedostaci ili njihova nesaglasnost sa Ugovorom u nekom drugom smislu, Investitor ima pravo da odbije postrojenje, materijale, prjekt ili izradu i da to Izvođaču saopšti sa obrazloženjem. Izvođač se obavezuje da odmah potom otkloni nedostatke i da odbijenu stvar uskladi sa Ugovorom.

Ako Investitor zahtijeva ponovno ispitivanje tog postrojenja, materijala, projekta ili izrade, ispitivanje se ponavlja pod istim uslovima. Ako odbijanje i ponovno ispitivanje izlaže Investitora dodatnim troškovima, Izvođač se obavezuje da Investitoru nadoknadi te troškove u skladu sa podklauzulom 2.5 *(Potraživanja Investitora).*

7.6 Otklanjanje nedostataka

Bez obzira na bilo koja ranija ispitivanja ili potvrđivanja, Investitor ima pravo da Izvođaču naloži:

(a) odstranjivanje sa gradilišta i zamjenu bilo kog postrojenja ili materijala koji nije u skladu sa Ugovorom,

(b) odstranjivanje i ponovno izvođenje bilo kojih drugih radova koji nisu u skladu sa Ugovorom, i

(c) da izvede sve radove koji su hitno potrebni radi bezbjednosti Radova, sprečavanje nesreće, nepredviđenih događaja ili nešto drugo.

Ako Izvođač ne postupi po nalogu, u skladu sa podklauzulom 3.4 (*Instruction*), Investitor ima pravo da angažuje nego drugo lice za izvršenje posla uz naknadu. Osim u obimu u kojem bi Izvođač imao pravo na naknadu za obavljeni rad, Izvođač se obavezuje da u skladu s podklauzulom 2.5 (*Potraživanja Investitora)* Investitoru nadoknadi sve troškove nastale usled tog propusta.

7.7 Vlasništo postrojenja i materijala

Svaka pozicija postrojenja i materijala postaje vlasništvo Investora u mjeri predviđenoj zakonima Zemlje, bez ikakvih prava zadržavanja i ostalih tereta, zavisno od prvonastalog slučaja, i to:

(a) kada se isporuči na gradilištu;

(b) kada Izvođač stekne pravo na isplatu vrijednosti postrojenja i materijala u skladu sa podklauzulom 8.10 (*Plaćanje na postrojenja i materijale u slučaju obustave*).

7.8 Naknade

Ukoliko nije drugačije navedeno u Zahtjevima Investitora, Izvođač plaća sve naknade, zakupnine i ostala potraživanja u vezi:

(a) prirodnih materijala dobijenih van gradilišta, i

(b) odnošenje ruševina i materijala iz iskopa i ostalog nepotrebnog materijala (prirodnog ili vještačkog), ukoliko ugovorom nisu predviđena stovarišta na gradilištu.

8. Početak, zastoj i obustava

8.1 Početak radova

Ukoliko drugačije nije predviđeno Ugovornim Sporazumom:

(a) Investitor će Izvođaču dostaviti obavještenje o Datumu početka radova, najmanje 7 dana unaprijed; i

(b) Datum početka radova će biti u roku od 42 dana nakon dana stupanja na snagu Ugovora i efekata u skladu sa podklauzulom 1.6 (*Ugovorni sporazum).*

Izvođač se obavezuje da pristupi projektovanju i izvođenju Radova što je moguće prije poslije Datuma početka radova, nakon čega počinje da izvodi Radove ekspeditivno i bez zastoja.

8.2 Rok za završetak

Izvođač se obavezuje da izvrši cjelokupne Radove i sve sekcije (ako postoje), u roku za završetak Radova ili sekcija (zavisno od slučaja), uključujući:

(a) postizanje povoljnih rezultata ispitivanja na završetku, i

(b) završetak svih radova koji su po Ugovoru potrebni da bi se Radovi ili sekcije smatrali završenim za potrebe preuzimanja u skladu sa podklauzulom 10.1 (*Preuzimanje Radova i sekcija).*

8.3 Program radova

Izvođač se obavezuje da Investitoru podnese program radova u roku od 28 dana od Dana početka radova. Izvođač se takođe obavezuje da podnese izmijenjeni program radova ako predhodni program radova nije bio u skladu sa stvarnim napredovanjem ili obavezama Izvođača. Ukoliko drugačije nije predviđeno Ugovorom, svaki program radova sadrži:

(a) redosled po kojem Izvođač namjerava da izvodi Radove, uključujući očekivano vrijeme svake faze Radova.

(b) rokove za pregled u skladu sa podklauzulom 5.2 (*Dokumentacija Izvođača).*

(c) redosled i vremenski raspored kontrola i ispitivanja predvidjenih Ugovorom, i

(d) prateći izvještaj koji sadrži:

(i) opšti opis metoda koje Izvođač namjerava da usvoji za svaku glavnu fazu izvođenja Radova, i

(ii) okvirni broj osoblja Izovđača po vrstama i svake vrste opreme Izvođača za sve glave faze.

Ukoliko Investitor, u roku od 21 dan od prijema programa radova, ne obavijesti Izvođača o mjeri u kojoj on nije u saglasnosti sa Ugovorom, Izvođač može da postupa u skladu sa tim programom radova, pod uslovom da izvršava svoje ostale obaveze iz Ugovora. Osoblje Investitora može da se osloni na ovaj program radova u planiranju svojih aktivnosti.

Izvođač se obavezuje da odmah obavijesti Investitora o specifičnim mogućim događajima ili okolnostima koje mogu da nepovoljno utiču ili odlože izvršenje Radova. U ovom slučaju, ili ako Investitor bilo kad saopšti Izvođaču da program radova nije u skladu sa ugovorom i stvarnim napredovanjem i izraženim namjerama Izvođača, Izvođač se obavezuje da Investitoru podnese izmijenjeni program radova u skladu sa ovom podklauzulom.

8.4 Produženje roka za završetak

Izvođač ima pravo na produženje roka za završetak u skladu sa podklauzulom 20.1 (*Potraživanja Izvođača*), u slučaju da je došlo ili će doći do kašnjenja završetka u smislu podklauzule 10.1 (*Preuzimanje radova i sekcija*), zbog:

(a) izmjene (ako nije bilo dogovoreno usklađivanje sa rokom završetka u skladu sa podklauzulom 13.3 (*Postupak izmjene*)),

(b) nekog uzroka zastoja koji daje pravo na produženje roka u skladu sa nekom podklauzulom ovih Uslova, ili

(c) zastoja, smetnji ili spriječenosti izazvanih od strane Investitora, osoblja Investitora, ili ostalih Investitorovih Izvođača na gradilištu.

Ako Izvođač smatra da ima pravo na produženje roka za završetak, on o tome obavještava Investitora u skladu sa podklauzulom 20.1 (*Potraživanja Izvođača*). Pri određivanju produžetka roka u skladu sa podklauzulom 20.1, Investitor razmatra ranije utvrđivanja i može da produži, ali ne i da skrati, ukupnu dužinu produžetka.

8.5 Zakašnjenja izazvana od strane organa vlasti

Ako se radi o sledećim slučajevima:

(a) Izvođač se u svemu pridržavao postupaka propisanih od strane relevantnih organa vlasti Zemlje,

(b) ti organi usporavaju ili ometaju radove Izvođača, ili

(c) usporavanje ili ometanje nije bilo predvidljvo od strane iskusnog izvođača u vrijeme podnošenja ponude.

tada se takvo usporavanje ili ometanje smatra uzrokom kašnjenja u skladu sa podklauzulom 8.4 *(Produženje roka za završetak).*

8.6 Dinamika napredovanja

Ako bilo kada:

(a) stvarno napredovanje bude isuviše sporo za ispunjavanje roka za završetak, i/ili

(b) napradovanje zaostane (ili će zaostati) za tekućim Programom radova iz podklauzule 8.3 (*Program radova*),

a ne proizilazi iz uzoroka koji su navedeni u podklauzuli 8.4 (*Produženje roka za završetak*), Investitor ima pravo da Izvođaču naloži da podnese u skladu sa sa podklauzulom 8.3 (*Program radova*) izmijenjeni program radova sa pratećim izvještajem o izmijenjenim metodama koje Izvođač predlaže za usvajanje radi ubrzanja napredovanja i završavanj radova u predviđenom roku.

Ako Investitor ne odredi nešto drugo, Izvođač usvaja te izmjene metode, koji možda iziskuju produženje radnog vremena i/ili povećanje broja radnika Izvođača i/ili robe, na rizik i o trošku Izvođača. Ako takve izmjene metode izlažu Investitora dodatnim troškovima, Izvođač se obavezuje da u skladu sa podklauzulom 2.5 (*Potraživanje Investitora*) Investitoru nadoknadi te troškove i plati (eventualno) obeštećenje za kašnjenje u skladu sa podklauzulom 8.7.

8.7 Obeštećenje za kašnjenje

Ako Izvođač ne izvrši svoju obavezu iz podklauzule 8.2 (*Rok za završetak*), on se obavezuje da u skladu sa podklauzulom 2.5 (*Potraživanje Investitora*) Investitoru plati obeštećenje za kašnjenje. Iznos obeštećenaj za kašnjenje naveden je u Posebnim uslovima, i on se plaća za svaki dan koji protekne između relevantnog roka za završetak i datuma navedenog u Potvrdi o preuzimanju. Međutim, ukupni iznos koji je plativ u skladu sa ovom podklauzulom ne može da bude veći od maksimalnog iznosa obeštećenja za kašnjenje koji je naveden u Posebnim uslovima.

To obeštećenje je jedino obeštećenje koje je plativo od strane Izvođača za takvo ne izvršavanje obaveza, osim u slučaju raskida u skladu sa podklauzulom 15.2 (*Raskid od strane Investitora*) prije završetka Radova. Tako obeštećenje ne oslobađa Izvođača svoje obaveze da završi Radove ili bilo koji ugovornih obaveza ili odgovornosti.

8.8 Obustava radova

Investitor ima pravo da u svako doba Izvođaču izda nalog za obustavu Radova u cjelini ili djelimično. Izvođač se obavezuje da tokom takve obustave štiti, uskladišti i obezbijedi takav dio ili Radove u cjelini od propadanja, gubljenja ili oštećenja.

Investitor takođe može da saopšti uzrok obustave. Ako je uzrok saopšten i predstavlja odgovornost Izvođača, podklauzule 8.9, 8.10 i 8.11 ne važe.

8.9. Posledice obustave

Ukoliko Izvođač kasni i/ili bude izložen troškovima zbog postupanja u skladu sa nalogom Investitora iz podklauzule 8.8 (*Obustava radova*) i/ili nastavljanje radova, Izvođač obavještava Investitora u tom smislu i shodno podklauzuli 20.1 (*Potraživanja Izvođača*) ima pravo na:

(a) produženje roka zbog takvog kašnjenja, ako završetak kasni ili će kasniti shodno podklauzuli 8.4 (*Produženje roka za završetak*), i

(b) naknadu takvih troškova, što se uključuje u ugovornu cijenu.

Nakon prijema takvog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi saglašavanja ili utvrđivanja tih stvari.

Izvođač nema pravo na produženje roka zbog vremena utrošenog na saniranje posledica manjkavog projekta, izrade ili materijala Izvođača i nadoknadu troškova kojim je pri tom bio izložen, ili zbog propusta Izvođača da zaštiti, uskladišti ili obezbijedi u skladu sa podklauzulom 8.8 (*Obustava radova*).

8.10 Plaćanje za postrojenje i materijale u slučaju obustave

Izvođač ima pravo na naknadu vrijednosti (na dan obustave) postrojenja i/ili materijala koji nisu isporučeni na gradilištu,ukoliko je:

(a) rad na postrojenju ili isporuci postrojenja i/ili materijala bio obustavljen u trajanju dužem od 28 dana, i

(b) Izvođač označio postrojenje i/ili materijale kao vlasništvo Investitora u skladu sa nalogom Investitora.

8.11 Produžena obustava

Ukoliko obustava iz podklauzule 8.8 (*Obustava radova*) traje duže od 84 dana, Izvođač ima pravo da od Investitora zahtijeva dozvolu za nastavak Radova. Ukoliko Investitor ne izda dozvolu u roku od 28 dana od podnošenja zahtjeva, Izvođač ima pravo da obustavu smatra izostavljanjem dotičnog dijela Radova shodno klauzuli 13 (*Izmjene i korekcije*) i o tome obavijesti Investitora. Ukoliko obustava utiče na Radove u cjelini, Izvođač ima pravo da otkaže Ugovor u skladu sa podklauzulom 16.2 (*Raskid od strane Izvođača*).

8.12 Nastavak radova

Po izdavanju dozvole ili naloga za nastavak, Strane vrše zajedniči pregled Radova, postrojenja i materijala na koje se obustava odnosila. Izvođač se obavezuje da sanira eventualne kvarove, nedostatke ili gubitke u radu, postrojenjima i materijalima, koji su nastali tokom obustave.

9. Ispitivanja na završetku

9.1 Obaveze Izvođača

Izvođač se obavezuje da izvrši ispitivanje u skladu sa ovom klauzulom i podklauzulom 7.4 (*Ispitivanje*) nakon obezbjeđenja dokumentacije iz podklauzule 5.6 (D*okumentacija izvedenog stanja)* i 5.7 *(Priručnici za eksploataciju i održavanje*).

Izvođač se obavezuje da Investitoru saopšti najmanje 21 dan unaprijed datum poslije kojeg će Izvođač biti spreman da izvrši svako ispitivanje na završetku pojedinačno. Ukoliko nije drukčije dogovoreno, ispitivanja na završetku vrše se u roku od 14 dana od tog datuma ili na dan, ili u dane koje Investitor bude odredio.

Ukoliko drukčije nije predvidjeno Posebnim uslovima, ispitivanja na završetku vrše se po sledećem redosledu:

(a) ispitivanja prije puštanja u pogon, koja obuhvataju odgovarajuće kontrole i funkcionalne probe (na "suvo" i "hladno") radi utvrđivanja da li se svaki dio postrojenja može bezbjedno podvrgnuti narednoj fazi, (b);

(b) ispitivanja pri puštanju u pogon koja obuhvataju predvidjena operativna ispitivanja radi utvrđivanja da li se Radovi ili sekcije mogu eksplatisati bezbjedno i na predviđeni način, pod postojećim radnim uslovima; i

(c) probni pogon kojim se utvrđuje da li radovi ili sekcije funkcionišu pouzdano i u skladu sa Ugovorom.

Tokom probnog pogona, kada se Radovi eksploatišu pod stabilnim uslovima, Izvođač se obavezuje da Investitora obavijesti o spremnosti Radova za bilo koja druga ispitivanja na završetku, uključujući i ispitivanja performansi radi utvrđivanja da li su Radovi u skladu sa kriterijumima navedenim u Zahtjevima Izvođača i garancijama.

Probni pogon ne podrazumijeva prijem u skladu sa klauzulom 10 (*Prijem radova od strane Investitora).* Ukoliko drukčije nije predviđeno Posebnim uslovima, svi proizvodi Radova koji nastanu tokom probnog pogona predstavljaju vlasništvo Investitora.

Pri razmatranju rezultata ispitivanja na završetku, uzeće se u obzir uticaj korišćenja radova od strane Investitora na performanse i ostale karakteristike radova. Kada se dobiju povoljni rezultati ispitivanja Radova ili sekcije na završetku predviđenih u pod (a), (b) ili (c), Izvođač podnosi Investitoru ovjereni izvještaj o rezultatima tih ispitivanja.

9.2 Kašnjenje ispitivanja

Ukoliko dođe do neopravdanog kašnjenja ispitivanja na završetku krivicom Investitora, primjenjuje se podklazula 7.4 *(Ispitivanje*) (stav pet) i/ili podklauzula 10.3 (*Ometanje ispitivanja na završetku)*.

Ukoliko dođe do neopravdanog kašnjenja ispitivanja na završetku krivicom Izvođača, Investitor ima pravo da zahtijeva od Izvođača da izvrši ispitivanje u roku od 21 dan od prijema zahtjeva. Izvođač se obavezuje da ispitivanje izvrši na dan ili u dane koje Investitor bude odredio i saopštio izvođaču.

Ukoliko Izvođač ne izvrši ispitivanja na završetku u roku od 21 dan, osoblje Investitora može da pristupi ispitivanju na rizik i o trošku Izvođača. U tom slučaju će se smatrati da su ispitivanja izvršena u prisustvu Izvođača i rezultati ispitivanja se prihvataju kao tačni.

9.3 Ponovno ispitivanje

Ukoliko se dobiju nepovoljni rezultati ispitivanja Radova ili sekcija na završetku, važi podklauzula 7.5 (*Odbijanje*) i Investitor ili izvođač ima pravo da zahtijeva ponovna ispitivanja pod istim uslovima.

9.4 Nepovoljni rezultati ispitivanja na završetku

Ukoliko se dobiju nepovoljni rezultati ispitivanja Radova ili sekcije na završetku u skladu sa podklauzulom 9.3 (*Ponovno ispitivanje*), Investitor ima pravo da:

(a) naloži dalje ispitivanje na završetku u skladu sa podklauzulom 9.3;

(b) ako nepovoljni rezultat Investitoru bitno uskraćuju korist od radova ili sekcije, odbije radove ili sekciju (zavisno od slučaja), u kom slučaju Investitor ima puna prava koja su predviđena pod tačkom (c) podklauzule 11.4 (*Neotklanjanje nedostataka*); ili

(c) izda potvrdu o prijemu na zahtje Investitora.

U slučaju iz tačke (c), Izvođač nastavlja da postupa u skladu sa svim ostalim ugovornim obavezama, a ugovorna cijena se umanjuje za iznos koji odgovara umanjenju vrijednosti za Investitora zbog nepovoljnih rezultata ispitivanja. Ukoliko relevantno umanjenje zbog nepovoljnih rezultata nije navedeno (ili način njegovog obračuna nije definisan) u Ugovoru, Investitor može da zahtijeva da se umanjenje (i) sporazumno utvrdi i isplati prije izdavanja Potvrde o predaji, ili (ii) utvrdi i isplati u skladu sa podklauzulom 2.5 (Potraživanje Investitora) i podklauzulom 3.5 (*Utvrđivanja*).

10. Prijem od strane Investitora

10.1 Prijem radova i sekcija

Osim u slučajevima iz podklauzule 9.4(*Nepovoljni rezultati ispitivanja na završetku*), Investitor prima radove kada (i) radovi budu završeni u skladu sa ugovorom, uključujući stvari opisane u podklauzuli 8.2 (*Rok za završetak radova*) i osim onog što je dozvoljeno pod tačkom (a) u daljem tekstu, i (ii) izda Potvrdu o završetku Radova, ili se Potvrda smatra izdatom u skladu sa ovom podklauzulom.

Izvođač ima pravo da Investitoru podnese zahtjev za izdavanje Potvrde o prijemu najmanje 14 dana prije nego što će po mišljenju Izvođača Radovi biti završeni i spremni za prijem. Ako su Radovi podijeljeni na sekcije, Izvođač ima isto tako pravo da podnosi zahtjev za izdavanje Potvrde o prijemu za svaku sekciju pojedinačno.

Investitor se obavezuje da u roku od 28 dana od prijema zahtjeva Izvođača:

(a) izda Izvođaču Potvrdu o prijemu, sa naznakom datuma završetka Radova ili sekcije u skladu sa Ugovorom, bez sitnijih preostalih radova, i nedostataka koji neće bitno uticati na korišćenje Radova ili sekcije u predviđene svrhe (sve dok se takvi radovi ne obave ili nedostaci otklone); ili

(b) odbije zahtjev sa obrazloženjem i naznakom radova koje je Izvođač obavezan da izvrši da bi mu se izdala Potvrda o prijemu Radova.

Ukoliko Investitor ne izda Potvrdu o prijemu Radova ili odbije zahtjev Izvođača u roku od 28 dana, i ako su Radovi ili sekcije (zavisno od slučaja) bitno u skladu sa Ugovorom, Potvrda o prijemu smatra se izdatom poslednjeg dana tog roka.

10.2 Prijem dijelova Radova

Djelovi Radova (osim sekcija) neće biti preuzeti ili korišćeni od strane Investitora, osim ako to nije naglašeno u Ugovoru ili usaglašeno od obje Strane.

10.3 Ometanje ispitivanja na završetku

Ukoliko je izvođaču onemogućeno da nastavi sa ispitivanjima na završetku duže od 14 dana i to krivicom Investitora, Izvođač ima pravo da nastavi sa ispitivanjima što je prije izvodljivo.

Ako Izvođač bude kasnio i/ili izložen troškovima zbog takvog kašnjenja u vršenju ispitivanja na završetku, Izvođač o tome obavještava Investitora, pri čemu ima pravo u skladu sa podklauzulom 20.1 (*Potraživanja Izvođača*), na:

(a) produženje roka srazmjerno zakašnjenju, ako završetak kasni ili će kasniti, u skladu sa podklauzulom 8.4 (*Produženje roka za završetak*), i

(b) naknadu takvih troškova sa primjerenom dobiti, što se uključuje u ugovornu cijenu.

Po prijemu tog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) u cilju saglašavanja ili utvrđivanja tih stvari.

11. Odgovornost za nedostatke

11.1 Završetak preostalih radova i otklanjanje nedostataka

Da bi se Radovi i Dokumentacija Izvođača, kao i svaka sekcija, doveli u stanje predviđeno Ugovorom (uzevši u obzir normalno habanje) do isteka roka za prijavljivanje nedostataka ili što je moguće prije toga, Izvođač se obavezuje da:

(a) završi sve radove koji nisu bili završeni do dana navedenog u Potvrdi o prijemu u razumnom roku određenom od strane Investitora, i

(b) izvede sve radove koji su potrebni za otklanjanje nedostataka ili oštećenja prijavljenih od strane Investitora (ili u njegovo ime) prije ili na dan isteka roka za prijavljivanje nedostataka Radova ili sekcija (zavisno od slučaja).

Ako se pojavi nedostatak ili nastane oštećenje, Investitor obavještava Izvođača u tom smislu.

11.2 Troškovi otklanjanja nedostataka

Sav Rad predviđem pod tačkom (b) podklauzule 11.1 (*Završetak preostalih radova i otklanjanje nedostataka*) izvodi se na rizik i o trošku Izvođača ako je potreban zbog:

(a) projekata Radova,

(b) postrojenja, materijala ili izrade koji nisu u skladu sa Ugovorom,

(c) nepravilne eksploatacije ili održavanja zbog stvari za koje je Izvođač odgovoran (na osnovu podklauzule 5.5 do 5.7 ili po nekom drugom osnovu), ili

(d) neizvršavanja bilo koje obaveze Izvođača.

Ako se potreba za takvim radom može pripisati nekom drugom uzroku, Investitor se obavezuje da o tome Izvođača odmah obavijesti i primjenjuje se podklauzula 13.3(*Postupak izmjene*).

11.3 Produženje roka za prijavljivanje nedostataka

Investitor ima pravo u skladu sa podklauzlom 2.5 (*Potraživanja Investitora*) na produženje roka za prijavljivanje nedostataka Radova ili sekcija, ako se poslije prijema ustanovi da se Radovi, neke sekcije ili bitan dio postrojenja (zavisno od slučaja) ne može koristiti u predviđene svrhe zbog nedostatka ili oštećenja. Međutim, rok za prijavu nedostataka ne može da se produži za više od dvije godine.

Ako je isporuka i/ili izgradnja nekog postrojenja i/ili materijala obustavljena u skladu sa podklauzulom 8.8 (*Obustava Radova*) ili podklauzulom 16.1 (*Pravo Izvođača na obustavu Radova)*, obaveze Izvođača predviđene ovom klauzulom ne važe za nedostatke ili oštećenja

koja nastanu više od dvije godine po isteku roka za prijavljivanje nedostataka postrojenja i/ili materijala.

11.4 Neotklanjanje nedostataka

Ako Izvođač ne otkloni bilo koji nedostatak ili oštećenje u razumnom roku, Investitor ima pravo da odredi (ili da to neko drugi učini u njegovo ime), rok za otklanjanje tog nedostatka ili oštećenja.

Ako Izvođač ne otkloni nedostatak ili oštećenje u novopostavljenom roku, a što je trebalo da se uradi o trošku izvođača u skladu sa podklauzulom 11.2 (*Troškovi otklanjanja nedostataka*), Invesitor ima prava (po sopstvenom nahođenju) da:

(a) sam otkloni nedostatak ili oštećenje ili da to neko drugi učini na odgovarajući način i o trošku Izvođača, s tim što Izvođač ne snosi nikakvu odgovornost za takav rad, a Izvođač se obavezuje u skladu sa podklauzilom 2.5 (*Potraživanja Investitora*) da Investitoru nadoknadi u razumnoj mjeri troškove koje je imao u vezi otklanjanja nedostataka ili oštećenja;

(b) potvrđuje ili određuje primjeren odbitak od ugovorene cijene u skladu sa podklauzulom 3.5 (*Utvrđivanja*); ili

(c) ukoliko ubog nedostataka ili oštećenja Investitoru bude uskraćena puna korist od Radova ili bitnog dijela Radova, raskine ugovor u cjelini ili u dijelu koji se odnosi na pomenuti bitan dio koji se ne može privesti svojoj namjeni. Investitor pri tom ima pravo na povraćaj iznosa plaćenih za Radove ili dio istih (zavisno od slučaja), sa zateznom kamatom i troškova demontaže, raščišćavanja gradilišta i vraćanja postrojenja i materijala Izvođaču, bez uticaja na njegova sva ostala prava po Ugovoru ili po nekom drugom osnovu.

11.5 Odstranjivanje Radova sa nedostacima

Ako ekspeditivno otklanjanje nedostataka ili oštećenja nije moguće na gradilištu, Izvođač može da uz saglasnost Investitora sa gradilišta odstrani djelove postrojenja koji imaju nedostatke ili su oštećeni. Kao uslov za izdavanje te saglasnosti, od Izvođača se može zahtijevati da poveća iznos garancije za dobro izvršenje posla za cijenu potpune zamjene ovih stvari ili da plati orgovarajuću kauciju.

11.6 Dalja ispitivanja

Ako rad na otklanjanju bilo kakvog nedostatka ili oštećenja može da utilče na performanse Radova, Investitor ima pravo da zahtijeva da se ponovi bilo koje ispitivanje koje je Ugovorom predviđeno, uključujući i ispitivanja na završetku i/ili ispitivanja poslije završetka. Zahtjev se podnosi u roku od 28 dana od otklanjanja nedostataka ili oštećenja.

Ova isitivanja se vrše pod istim uslovima kao i predhodna ispitivanja, s tom razlikom što se vrše na rizik i o trošku odgovorne strane u skladu sa podklauzilom 11.2 (*Troškovi otklanjanja nedostataka).*

11.7 Pravo pristupa

Sve do izdavanja Potvrde o dobrom izvršenju posla, Izvođač ima pravo pristupa svim djelovima Radova i evidenciji o eksploataciji i performansama Radova, uz ograničenje koje iziskuju Investitorove mjere bezbjednosti.

11.8. Obaveza Izvođača da istražuje

Na zahtjev Investitora, Izvođač se obavezuje da istraži uzroke bilo kog nedostatka po uputstvima Investitora. Ukoliko troškovi otklanjanja nedostataka ne idu na teret Izvođača u skladu sa podklauzulom 11.2 (*Troškovi otklanjanja nedostataka*), troškovi istraživanja sa primjerenom dobiti potvrđuje ili utvrđuje Invesitor u skladu sa podklauzulom 3.5 (*Utvrđivanja*) i oni se uključuju u ugovornu cijenu.

11.9 Potvrda o dobrom izvršenju posla

Izvršavanje obaveza Izvođača ne može se smatrati završenim sve dok Investitor ne izda Izvođaču Potvrdu o dobrom izvršenju posla, naznačavajući datum kada je Izvođač izvršio svoje ugovorne obaveze.

Invesitor se obavezuje da izda Potvrdu o dobrom izvršenju posla u roku od 28 dana od isteka poslednjeg roka za prijavljivanje nedostataka ili nakon toga, kada Izvođač podnese dokumentaciju Izvođača i završi i ispita sve Radove, uz otklanjanje eventualnih nedostataka. Ukoliko Investitor ne izda Potvrdu o dobrom izvršenju posla:

(a) smatraće se da je Potvrda o dobrom izvršenju posla izdata na dan nakon 28 dana od dana kada je trebala da bude izdata, u skladu sa ovom podklauzulom, i

(b) podklauzula 11.11 (*Raščišćavanje gradilišta*) i podparagraf (a) podklauzule 14.1 (*Prestanak odgovornosti Investitora*) neće važiti.

Isključivo se Potvrda o dobrom izvršenju posla smatra dokazom prihvatanja Radova.

11.10 Neizvršene obaveze

Po izdavanju Potvrde o dobrom izvršenju posla, svaka strana ostaje odgovorna za izvršavanje svake do tada neizvršene obaveze. Za potrebe utvrđivanja prirode i obima neizvršenih obaveza Ugovor se još uvijek smatra pravosnažnim.

11.11 Raščišćavanje gradilišta

Izvođač se obavezuje da po prijemu Potvrde o dobrom izvršenju posla sa gradilišta odstrani svu preostalu opremu izvođača, višak materijala, ruševine, smeće i privremene radove.

Ukoliko se pomenute stvari ne odstrane u roku od 28 dana od prijema primjerka Potvrde o dobrom izvršenju posla od strane Investitora, Investitor ima pravo da proda ili na drugi način odstrani sve preostale stvari. Investitor ima pravo na naknadu troškova kojima je bio izložen u vezi prodaje ili odstranjivanja tih stvari i vraćanje gradilišta u pređašnje stanje.

Eventualna razlika od prodaje isplaćuje se izvođaču. Ako je takav iznos manji od troškova Investitora, Izvođač se obavezuje da razliku isplati Investitoru.

12. Ispitivanje poslije završetka

12.1. Postupak ispitivanja poslije završetka

Ukoliko su ispitivanja poslije završetka predviđena Ugovorom, važi ova klauzula. Ukoliko drugačije nije predviđeno posebnim uslovima:

a.) Investitor se obavezuje da obezbijedi električnu energiju, gorivo i materijale i stavi na raspolaganje osoblje i postrojenje;

b.) Izvođač se obavezuje da obezbijedi ostala postrojenja, opremu i stručno i iskusno osoblje za efikasno vršenje ispitivanja poslije završetka; i

c.) Izvođač se obavezuje da ispitivanje poslije završetka izvrši u prisustvu osoblja Investitora i/ili Izvođača koje bude tražila bilo koja strana.

Ispitivanje poslije završetka vrši se što je moguće prije po prijemu Radova ili sekcije od strane Investitora. Insvestitor obavještava Izvođača najmanje 21 dan unaprijed o datumu poslije kojeg će se vršiti ispitivanje poslije završetka. Ukoliko ne bude drugačije dogovoreno, ispitivanje se vrši u roku od 14 dana od pomenutog datuma, i to na dan ili u dane koje Investitor bude odredio. Obje strane vrše kompilaciju i procjenu rezultata ispitivanja poslije završetka i pripremaju detaljan izvještaj. U obzir se uzima uticaj prethodnog korišćenja Radova od strane Investitora.

12.2. Kašnjenje ispitivanja

Ukoliko Izvođač bude izložen troškovima zbog toga što je Investitor neopravdano prouzrokovao kašnjenje ispitivanja po završetku, Izvođač (i) obavještava Investitora i (ii) ima pravo shodno podklauzuli 20.1 (*Potraživanje Izvodjača*) na naknadu tih troškova sa primjerenom dobiti, što se uključuje u ugovornu cijenu.

Po primjemu pomenutog obavještenja Investitor postupa u skladu da podklauzulom 3.5. (*Utvrđivanja*) radi potvrđivanja ili utvrđivanja tih troškova i dobiti.

Ako bez krivice Izvođača ne bude moguće izvršavanje nekog ispitivanja po završetku na Radovima ili nekoj sekciji u roku za prijavljavanje nedostataka (ili u nekom drugom dogovorenom roku), smatraće se da su dobijeni povoljni rezultati ispitivanja Radova ili sekcija.

12.3. Ponovno ispitivanje

Ako se ne dobiju povoljni rezultati ispitivanja posle završetka Radova ili neke sekcije

a.) primjenjuje se tačka (b) podklauzule 11.1. (završetak preostalih radova i otklanjanje nedostataka), i

b.) svaka strana ima pravo da traži ponovno ispitivanje i ispitivanje nakon završetka, pod isptim uslovima

Ako se nepovoljni rezultati i ponovno ispitivanje mogu pripisati bilo kojoj stvari navedenoj pod tačkama (a) do (d) podklauzule 11.2. (*Troškovi otklanjanja nedostataka*) i izlože Investitora dodatnim troškovima, Izvođač se obavezuje da u skladu sa podklauzulom 2.5. (*Potraživanje Investitora)* Investitoru nadoknadi te troškove.

12.4. Nepovoljni rezultati ispitivanja poslije završetka

U slučaju da:

a.) se dobiju nepovoljni rezultati ispitivanja poslije završetka Radova ili neke sekcije,

b.) je navedeno u Ugovoru relevantan iznos koji je plativ kao obeštećenje za nepovoljne rezultate (ili je način njegovog obračuna definisan) i

c.) Izvođač isplati takav relevantan Iznos investitoru u roku za prijavljivanje nedostataka,

Smatra se da su dobijeni povoljni rezultati tih ispitivanja poslije završetka Radova ili sekcija.

Ako se dobiju nepovoljni rezultati ispitivanja Radova ili neke sekcije i Izvođač predloži korekcije ili izmjene Radova ili sekcije, Investitor može (ili neko drugi u njegovo ime) da saopšti Izvođaču da mu se ne može dati pravo pristupa Radovima ili sekciji sve dok to ne bude odgovaralo Investitoru. Izvođač zatim ostaje u obavezi da izvrši korekcije ili izmjene u cilju postizanja povoljnih rezultata, i to u razumnom roku od prijema obavještenja od Investitora (ili u njegovo ime) o vremenu koje odgovara Investitoru. Međutim, ako Izvođač ne primi to obavještenje u relevantnom roku za prijavljivanje nedostataka, Izvođač se oslobađa te obaveze i smatraće se da su ispitivanja Radova ili sekcija (zavisno os slučaja) dala povoljne rezultate ispitivanja poslije završetka.

Ako Izvođač bude izložen dodatnim troškovima zbog Investitorovog neopravdanog kašnjenja u davanju Izvođaču prava pristupa Radovima ili postrojenju, bilo radi istraživanja uzroka nepovoljnih rezultata ispitivanja poslije završetka ili radi vršenja korekcija ili izmjena, Izvođač (i) to saopštava Investitoru i (ii) ima pravo shodno podklauzuli 20.1. (*Potraživanje Izvođača*) na naknadu takvihh troškova i primjerenu dobit, što se uključuju u ugovornu cijenu.

Po prijemu takvog obavještenja, Investitor će postupiti u skladu sa podklauzulom 3.5. (*Utvrđivanja*) radi potvrđivivanja ili utvrđivanja tih troškova i dobiti.

13. Izmjene i korekcije

13.1. Pravo na izmjene

Investitor ima pravo da inicira izmjene bilo kada prije izdavanja Potvrde o prijemu Radova, bilo davanjem upustva ili nalaganja Izvođaču da podnese predlog. Izmjena ne podrazumijeva izuzeće bilo kakvih radova koje izvode druga lica.

Izvođač se obavezuje da izvrši svaku izmjenu i da se nje pridržava, ukoliko odmah ne saopšti Investitoru (sa obrazloženjem) da (i) Izvođač ne može brzo da nabavi robu potrebnu za vršenje izmjene, (ii) da će to umanjiti bezbijednost ili podobnost Radova, ili (iii) da će se to loše odraziti na garancije kvaliteta. Po prijemu takvog saopštenja, Investitor poništava, potvrđuje ili mijenja nalog.

13.2. Tehnika vrednovanja

Izvođač ima pravo da u svako doba Investitoru podnese predlog u pisanoj formi koji bi, po Izvođačevom mišljenju, ako bi bio usvojen, (i) ubrzao završetak, (ii) smanjio troškove investitora vezane za izvođenje, održavanje i eksplataviju Radova, (iii) povećao efikasnosti ili vrijednost završenih Radova u korist Investitora ili (iv) bio od koristi Investitoru na neki drugi način.

Predlog se priprema o trošku Izvođača i sadrži stavke navedene u podklauzuli 13.3 (*Postupak Izmjene*).

13.3 Postupak izmjene

Ako Investitora zahtijeva predlog prije davanja naloga za neku izmjenu, Izvođač se obavezuje da odgovori u što je moguće kraćem roku u pisanoj formi, navodeći razloge zbog kojih ne može da udovolji tom zahtjevu (ako je to slučaj) ili podnošenjem:

(a) opisa predloženog projekta i/ili radova koje ni trebalo izvesti i programa njihovog izvođenja,

(b) Izvođaćevog predloga u vezi potrebnih izmjena programa u skladu sa podklauzulom 8.3 (Termin plan) i rokom za završetak, i

(c) Izvođačevog predloga za korekciju ugovorene cijene.

Investitor se obavezuje da u što je moguće kraćem roku po prijemu takvog predloga odgovori u skladu sa podklauzulom 13.2 (*Tehnika vrednovanja*) u vidu odobrenja, odbijanja ili primjedbi. Izvođač ne može da odloži bilo kakav rad u očekivanju odgovora.

Investitor izdaje Izvođaču nalog za vršenje bilo koje izmjene sa uslovima za evidentiranje troškova, pri čemu je izvođač obavezan da potvrdi prijem.

Po nalaganju ili odobravanju neke izmjene, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi odobravanja ili utvrđivanja korekcija ugovorne cijene i cjenovnika. Korekcije uključujući primijenjenu dobit i uzimaju u obzir Izvođačeve eventualne podneske iz podklauzule.

13.4 Plaćanje u primjenljivim valutama

Ukoliko je Ugovorom predviđeno isplaćivanje ugovorne cijene u više valuta, kad god se korekcija dogovori, odobri ili utvrdi kako je ranije rečeno, preciziraju se iznosi plativi u svakoj primjenjivoj valuti pojedinačno. U te svrhe se navode stvarne ili očekivane valutne razmjerne cijene izmijenjenih radova i razmjere valuta predviđenih za isplaćivanje ugovorne cijene.

13.5 Okvirne sume

Svaka okvirna suma se koristi, u cjelini ili djelimično, u skladu sa nalozima Investitora i ugovorna cijena se koriguje shodno tome. Ukupan iznos koji se isplaćuje Izvođaču uključuje samo te iznose za rad, isporuke i usluge na koje se okvirna suma odnosi, a po nalogu Investitora. Investitor ima pravo da za svaku okvirnu sumu odredi:

(a) radove (sa postrojenjem, materijalima i uslugama) koje bi Izvođač trebalo da izvede i vrijednost u skladu sa podklauzulom 13.3 (*Postupak izmjene*); ili

(b) postrojenje, materijale i usluge koje kupuje Izvođač, a koji se uključuju u u ugovnu cijenu manje od prvobitne okvirne sume:

(i) stvarno plaćene iznose (ili plative) od strane Izvođača, i

(ii) iznos za režijske troškove i dobit koji je obračunat kao procenat tih stvarnih iznosa primjenom relevantne procentne stope (eventualne) navedene u Ugovoru.

Izvođač se obavezuje da na zahtjev Investitora podnese ponude, fakture, potvrde i obračune ili priznanice kao dokaz.

13.6 Dodatni radovi

U slučaju sitnijih ili sporednih radova, Investitor može da naloži izvođenje sa plaćanjem po satu. Rad se zatim obračunava u skladu sa cjenovnikom za dodatne radove koji je priložen uz Ugovor i postupa se kako slijedi. Ukoliko cjenovnik dodatnih radova nije priložen uz Ugovor ova podklauzula ne važi.

Izvođač se obavezuje da prije naručivanja robe Investitoru podnese ponude. Uz zahtjev za isplatu, Izvođač mora da podnese fakture, potvrde i obračune ili priznanice za svu robu.

Osim u slučaju stavki dodatih radova koje nisu dospjele za plaćanje, Izvođač se obavezuje da Investitoru svakodnevno podnosi tačne izvještaje u dva primjerka koji sadrže sledeće pojedinosti o resursima korišćenim u radovima prethodnog dana:

(a) imena, zanimanja vrijeme osoblja Izvođača,

(b) oznaku, vrstu i vrijeme opreme i privremenih radova Izvođača, i

(c) količine i vrste korišćenih postrojenja i materijala.

Investitor potpisuje jedan primjerak svakog izvještaja, ako je tačan ili odobren, i vraća ga Izvođaču. Izvođač zatim podnosi Investitoru iskalkulisane izvještaje o tim sredstvima prije njihovog uključivanja u naredni izvještaj u skladu sa podklauzulom 14.3 (*Zahtjev za izdavanje privremene situacije*).

13.7 Korekcije zbog izmjena u zakonskim propisima

Korekcija ugovorene cijene vrši se radi njenog usaglašavanja sa povećanjima ili smanjenjima troškova nastalih zbog izmneja u zakonskim propisima Zemlje (donošenje novih propisa ili ukidanje ili izmjene i dopune postojećih propisa) ili u zvaničnim tumačenjima takvih zakonskih propisa objavljenim poslije Osnovnog datuma, a koji utiču na izvršavanje ugovornih obaveza.

Ukoliko Izvođač bude kasnio (ili će kasniti) i/ili bude (ili će biti) izložen dodatnim troškovima zbog izmjena u zakonskim propisima ili takvim tumačenjima nastalih posle Osnovnog datuma, on o tome obavještava Investitora i ima pravo shodno podklauzuli 20.1 (*Potraživanja Izvođača*) na:

(a) produženje roka zbog takvog kašnjenja, ako se kasni sa završetkom ili će se kasniti, u skladu sa podklauzulom 8.4 (*Produženje roka za završetak*), i

(b) naknadu takvih troškova, što se uključuje u ugovornu cijenu.

Po prijemu takvog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi potvrđivanja ili utvrđivanja tih stvari.

13. 8 Korekcije zbog izmjene u troškovima

Ukoliko je ugovorna cijena korigovana za povećanje ili smanjenje cijena radne snage, robe i ostalih inputa za Radove, korekcija će biti računata u skladu sa odredbama Posebnih uslova.

14. Ugovorna cijena i plaćanje

14.1 Ugovorna cijena

Ako drugačije nije predviđeno Posebnim uslovima:

(a) plaćanje za Radove predstavlja ukupni prihvaćeni iznos koji podliježe korekcijama u skladu sa Ugovorom.

(b) Izvođač se obavezuje da plaća sve takse, carine i dažbine koje je po ugovoru obavezan da plaća, te se ugovorna cijena ne može korigovati zbog tih izdataka,

osim u slučaju koji je predviđen podklauzulom 13.7 (*Korekcije zbog izmjena propisa*).

14.2 Avansno plaćanje

Investitor se obavezuje da vrši avansno plaćanje u vidu beskamatnog zajma za pripremne radove i projektovanje kada Izvođač podnese garanciju u skladu sa ovom podklauzulom. Uključujući detalje navede u Posebnim uslovima. Ukoliko Posebni uslovi ne predvidjaju:

(a) iznos avansa, ova podklauzula ne važi,

(b) broj i vrijeme isplate tranši, onda će postojati samo jedna,

(c) primjenljive valute and proportions, one će biti one u kojima je ugovorna cijena plativa, i/ili

(d) amortizaciona stopa povraćaja, će biti obračunata dijeljenjem ukupnog iznosa avansa sa ugovornom cijenom koja je navedena u Ugovoru i umanjena za okvirne sume.

Investitor se obavezuje da plati prvu tranšu nakon prijema (i) Izvještaja (u skladu sa podklauzulom 14.3 (*Zahtjev za izdavanje privremene situacija*)), (ii) Garancije za dobro izvršenje posla u skladu sa podklauzulom 4.2 (*Garancija za dobro izvršenje posla*) i (iii) garanciju u iznosima i valutama koje odgovaraju iznosu avansnog plaćanja. Ta se garancija izdaje uz saglasnost Investitora u pogledu izdavača i zemlje u kojoj se nalazi njegovo sjedište, i to u formi predviđenoj Posebnim uslovima ili nekoj drugoj formi sa kojom je Investitor saglasan.

Izvođač se obavezuje da se postara o tome da garancija bude na snazi i primjenljiva do povraćaja avansa, s tim što se njen iznos može progresivno smanjivati za iznose vraćene od strane Izvođača. Ako je uslovima garancije predviđen datum isteka njene važnosti, ii avans ne bude vraćen 28 dana prije tog datuma, izvođač se obavezuje da produži važnost garancije do povraćaja avansa.

Povraćaj avansa vrši se putem procentualnih odbijanja navedenih u situacijama. Odbici se vrše po amortizacionoj stopi koja je navedena u Posebnim uslovima (ili, ako nije navedena, u skladu sa gore navedenim podparagrafom (d)), koja će se primjenjivati i na preostali dospjeli iznos (bez avansa, odbitka i povraćaja garantnog depozita), sve do povraćaja avansa.

Ukoliko se povraćaj avansa ne izvrši do izdavanja Potvrde o prijemu Radova ili prije raskida u skladu sa klauzulom 15 (*Raskid od strane Investitora*), klauzulom 16 (*Obustava ili raskid od strane Izvođača*) ili klauzulom 19 (*Viša sila)* (zavisno od slučaja), cjelokupna neisplaćena razlika odmah dospijeva i biva plativa Investitoru od strane Izvođača.

14.3 Zahtjev za izdavanje privremenih situacija

Izvođač se obavezuje da Investitoru podnese Izvještaj u šest primjeraka po isteku ugovornog perioda plaćanja (ako taj period nije naveden, na kraju svakog mjeseca) u formi odobrenoj od strane Investitora, u kojoj su precizirani iznosi na koje Izvođač smatra da ima pravo, i sa

pratećom dokumentacijom, uključujući i relevantni izvještaj o napredovanju radova u skladu sa podklauzulom 4.21 (*Izvještaj o napredovanju radova*).

Izvještaj sadrži sledeće stavke, po potrebi, koje se izražavaju raznim valutama u kojim je ugovorena cijena plativa, po navedenom redosledu:

(a) procijenjena ugovorna vrijednost izvedenih Radova i Izvođačeva dokumentacija izrađena do kraja mjeseca (uključujući izmjene, ali bez stavki navedenih pod tačkama (b) do (g));

(b) iznosi koji se dodaju ili odbijaju zbog promjena propisa ili promjena u troškovima, u skladu sa podklauzulom 13.7 (*Korekcije zbog izmjene zakonskih propisa*) i podklauzulom 13.8 (*Korekcije zbog izmjene u troškovima*);

(c) iznos koji se odbija za garantni depozit, a koji se obračunava primjenom procenta garantnog depozita koji je naveden u Posebnim uslovima, sve dok tako zadržani iznosi od strane Investitora ne dostignu granicu (eventualnog) garantnog depozita iz Posebnih uslova;

(d) Iznosi koji se dodaju ili dobijaju za avansno plaćanje i povraćaje u skladu sa podklauzulom 14.2 (*Avansno plaćanje*);

(e) Ostali dodaci ili odbici koji dospijevaju po Ugovoru ili nečem drugom, uključujući i one iz klauzule 20 (*Potraživanja, Sporovi i Arbitraže*); i

(f) Odbitak iznosa potvrđenih u predhodnom Izvještaju.

14. 4 Vremenski raspored plaćanja

Ako Ugovor sadrži Vremenski raspored plaćanja u kojem se preciziraju tranše u kojima se ugovorna cijena plaća, ukoliko nije drukčije predviđeno Vremenskim rasporedom plaćanja:

(a) tranše navedene u Vremenskom rasporedu predstavljaju procjene ugovorne vrijednosti u smislu tačke (a) podklauzule 14.3.(*Zahtjev za izdavanje privremenih situacija*), i podklauzule 14.5 (*Oprema i materijali za radove*); i

(b) ako ove rate nisu definisane sa pozivom na stvarno napredovanje radova i ako se utvrdi da je stvarno napredovanje manje od onog na kojem je Vremenski raspored plaćanja zasnovan, Investitor ima pravo da postupi u skladu sa podklauzulom 3.5 (*Utvrđivanja)* da bi se saglasio ili odredio izmijenjene rate, uzimajući u obzir mjeru u kojoj je stvarno napredovanje manje od onog na kojem su ranije tranše bile zasnovane.

Ako Ugovor ne sadrži Vremenski raspored plaćanja, Izvođač podnosi ne obavezujuće procjene plaćanja koje, po njemu, dospijevaju tromjesečno. Prva procjena se podnosi u roku od 42 dana od Datuma početka. Izmijenjene procjene se podnose tromjesečno, sve dok ne bude izdata Potvrda o prijemu radova.

14.5 Oprema i materijali za radove

Iako Izvođač ima pravo, u skladu sa Ugovorom, na garantni depozit za postrojenja i materijale koji još nisu na gradilišu, Izvođač neće imati pravo na ova plaćanja osim ako:

(a) su relevanta postrojenja i materijali u Zemlji i označena su kao vlasništvo Investitora u skladu sa Investitorovim instrukcijama; ili

(b) je Izvođač dostavio Investitoru dokaz o osiguranju i bankarsku garanciju u formi i izdatu od organa koji je odobren od strane Investitora, u vrijednosti i valuti koje su jednake takvnom iznosu. Ova garancija mora biti u istoj formi kao što je forma navedena u podklauzuli 14.12 (*Avansno plaćanje*) i važiće dok su postrojenja i materijali propisno uskladišteni na gradilištu i zaštićeni od gubljenja, oštećenja ili propadanja.

14.6 Izdavanje privremenih situacija

Nikakav iznos se ne može isplatiti prije nego što Investitor primi i odobri Garanciju za dobro izvršenje posla. Investitor se nakon toga obavezuje da u roku od 28 dana od prijema Izvještaja i prateće dokumentacije, izda Izvođaču obavještenje o bilo kom pitanju iz Izvještaja sa kojim Investitor nije saglasan, sa pratećim podacima. Plaćanje ne može biti uskraćeno , osim ako:

(a) ako bilo koja isporuka ili rad izveden od strane Izvođača ne bude u skladu sa Ugovorom, naknada troškova ispravke ili zamjene može biti uskraćena sve do završetka ispravke ili zamjene, i/ili

(b) ako Izvođač nije obavio bilo kakav rad ili izvršio bilo koju svoju ugovornu obavezu i o tome bio upozoren od strane Investitora, isplata vrijednosti takvog rada ili obaveze može se uskratiti sve dok se takav rad ne obavi ili takva obaveza ne izvrši.

Investitor ima pravo da, do bilo kog plaćanja, izvrši korekciju ili izmjenu koja je trebalo da bude izvršena u predhodnoj situaciji. Plaćanje se ne može smatrati kao da odražava prihvatanje, odobravanje, saglasnost ili zadovoljstvo Investitora.

14.7 Vrijeme plaćanja

Ukoliko drugačije nije predviđeno podklauzulom 2.5 (*Potraživanja Investitora*), Investitor se obavezuje da isplati Izvođaču:

(a) prvu tranšu akontacije u roku od 42 dana od dana stupanja na snagu Ugovora ili 21 dan po prijemu dokumentacije u skladu sa podklauzulom 4.2 (*Garancija za dobro izvršenje posla*) i podklauzulom 14.2 (*Avansno plaćanje*), zavisno od poslednje nastalog slučaja;

(b) iznos dospio za svaki dio Izvještaja, osim Završnog Izvještaja, u roku od 56 dana po prijemu Izvještaja i prateće dokumentacije, i

(c) konačni dospjeli iznos, u roku od 42 dana po prijemu Završnog Izvještaja i pisanog razrješenja u skladu sa podklauzulom 14.11 (*Zahjev za okončanu situaciju*) i podklauzule 14.12 (*Razrješenje*).

Uplata dospjelog iznosa u svakoj valuti pojedinačno vrši se na Izvođačev račun u banci u Zemlji plaćanja (u toj valuti) navedenoj u Ugovoru.

14.8 Kašnjenje u plaćanju

Ako Izvođač ne primi uplatu u skladu sa podklauzulom 14.7 (*Vrijeme plaćanja*), izvođač ima pravo na zateznu kamatu na mjesečnom nivou za neisplaćeni iznos tokom perioda kašnjenja.

Ukoliko drugačije nije predviđeno u Posebnim uslovima, zatezna kamata se obračunava po godišnjoj stopi koja je za tri procentna poena viša od eskontne stope centralne banke zemlje u čijoj se valuti vrši isplata, i plaća se u toj valuti.

Izvođač ima pravo na ovu isplatu bez formalnog saopštenja o ovjeri i bez uticaja na bilo koje njegovo drugo pravo ili pravni lijek.

14.9 Isplata garantnog depozita

Kada se izda Potvrda o primopredaji Radova i predviđena ispitivanja (uključujući eventualna ispitivanja poslije završetka radova) daju povoljne rezultate, polovina garantnog depozita će biti isplaćen Izvođaču. Ako se Potvrda o prijemu izdaje za jednu sekciju, odgovarajući procenat prve polovine garantnog depozita se isplaćuje kada se dobiju povoljni rezultati ispitivanja za sekciju.

Odmah po isteku poslednjeg roka za prijavljivanje nedostataka, preostali dio garantnog depozita će biti isplaćen Izvođaču. Ako se Potvrda o prijemu izdaje za jednu sekciju, odgovarajući procenat ostatka garantnog depozita će biti isplaćen Izvođaču odmah po isteku roka za prijavljivanje nedostataka dotične sekcije.

Međutim, u slučaju da još uvijek postoje radovi za izvođenje shodno klauzuli 11 (*Odgovornost za nedostatke*) ili klauzuli 12 (*Ispitivanje poslije završetka radova*), Investitor ima pravo da uskrati potvrdu procijenjenih troškova tih radova do njihovog završetka.

Odgovarajući procenat za svaku sekciju predstavlja procenat vrijednosti sekcije koja je navedena u Ugovoru. Ako procenat vrijednosti sekcije nije naveden u Ugovoru, nikakav procenat bilo koje polovine garantnog depozita ne postaje plativ po ovoj klauzuli u vezi dotične sekcije.

14.10 Izvještaj o završetku

Izvođač se obavezuje da u roku od 84 dana od prijema Potrvde o prijemu Investitoru podnese u šest primjeraka Izvještaj o završetku sa pratećom dokumentacijom, u skladu sa podklauzulom 14.3 (*Zahtjev za izdavanje privremenih situacija*), koji sadrži:

(a) vrijednost radova izvedenih u skladu sa Ugovorom do datuma navedenog u Potvrdi o prijemu Radova;

(b) bilo koje druge iznose koje Izvođač smatra dospjelim;

(c) procjenu bilo kojih drugih iznosa koje Izvođač smatra sebi plativim po Ugovoru. Procijenjeni iznosi se prikazuju posebno u tom Izvještaju o završetku.

Investitor se obavezuje da obavijesti Izvođača u skladu sa podklauzulom 14.6 (*Izdavanje privremenih situacija*) i izvrši plaćanje u skladu sa klauzulom 14.7 (*Vrijeme plaćanja*).

14.11 Zahtjev za okončanu situaciju

Izvođač se obavezuje da u roku od 56 dana od prijema Potvrde o dobrom izvršenju posla, Investitoru podnese u šest primjeraka nacrt završnog izvještaja sa pratećom dokumentacijom u formi odobrenoj od strane Investitora, gdje se prikazuju:

(a) vrijednost svih izvedenih radova u skladu sa Ugovorom, i

(b) svi ostali iznosi na koje Izvođač pretenduje u skladu sa Ugovorom ili po nekom drugom osnovu.

Ako se Investitor ne salasi ili nije u mogućnnosti da ovjeri bilo koji dio nacrta završnog izvještaja, Izvođač podnosi Investitoru sve ostale podatke koje ovaj bude opravdano zatražio i da izvrši izmjene u nacrtu o kojima su se dogovorili. Izvođač zatim priprema i Investitoru dostavlja konačni izvještaj u dogovorenom obliku. Tako dogovoreni izvještaj se u ovim Uslovima pominje kao „Konačni izvještaj“.

Međutim ako se poslije razgovora između Strana i eventualno dogovorenih izmjena u nacrtu završnog izvještaja, utvrdi da postoji spor, Investitor se obavezuje da isplati dogovorene djelove nacrta završnog izvještaja u skladu sa podklauzulom 14.6 (*Izdavanje privremenih situacija*) i podklauzulom 14.7 (*Vrijeme plaćanja*). Nakon toga, ako spor bude konačno riješen u skladu sa podklauzulom 20.4 (*Dobijanje odluke Komisije za rješavanje sporova*) ili podklauzulom 20.5 (*Prijateljsko rješavanje sporova*), Izvođač priprema i Investitoru podnosi Konačni izvještaj.

14.12 Razrješenje

Pri podnošenju Završnog izvještaja, Izvođač se obavezuje da podnese razrješenje u pisanoj formi kojom se potvrđuje da ukupni iznos koji je naveden u Završnom izvještaju pokriva sva potraživanja Izvođača po Ugovoru ili u vezi Ugovora. U razrješenju može da se navede da ono postaje pravosnažno kada Izvođač primi garanciju za dobro izvršenje posla i preostali iznos i to od tog datuma.

14.13 Konačani iznos

U skladu sa podparagrafom (c) podklauzule 14.7 (*Vrijeme plaćanja*), Investitor se obavezuje da Izvođaču isplati iznos koji je dospio za isplatu, umanjen za iznos svih ranijih plaćanja Investitora i bilo koje umanjenje u skladu sa podklauzulom 2.5 (*Potraživanja Investitora*).

14.14 Prestanak odgovornosti Investitora

Investitor nije odgovoran Izvođaču po bilo kom pitanju ili bilo kojoj stvari po Ugovoru ili u vezi Ugovora ili izvođenja radova, osim u mjeri u kojoj je Izvođač uključio iznos isključivo u te svrhe u:

(a) Završnom izvještaju, kao i

(b) Izvještaju po završetku iz podklauzule 14.10 (*Izvještaj po završetku*) (osim po pitanjima ili stvarima posle izdavanja Potvrde o prijemu).

Međutim, ova podklauzula ne ograničava odgovornost Investitora po obavezu obeštećenja ili odgovornosti Investitora u slučaju prevare, namjernog neizvršenja obaveza ili malverzacija od strane Investitora,

14.15 Valute plaćanja

Ugovorna cijena se isplaćuje u valuti ili valutama navedenim u Ugovoru. Ukoliko drugačije nije predviđeno Ugovorom, ako je navedeno više valuta, plaćanje se vrši kako slijedi:

(a) ako je prihvaćeni ugovoreni iznos izražen isključivo u domaćoj valuti:

(i) razmjeri ili iznosi domaćih i stranih valuta i fiksni kursevi razmjene za korišćenje pri obračunu isplata navode se u Ugovoru, osim ako ugovorne strane nisu drugačije dogovorile.

(ii) plaćanja i odijanja na osnovu podklauzule 13.5 (*Okvirna suma*) i podklauzule 13.7 (*Korekcije zbog izmjene zakonskih propisa*) vrše se u odgovarajućim valutama i razmjerama, i

(iii) ostala plaćanja i odbijanja po osnovu stavova (a) do (d) podklauzule 14.3 (*Zahtjev za izdavanje privremenih situacija)* vrše se u valutama i razmjerama navedenim u stavu (a) (i);:

(b) isplata obeštećenja navedenog u Posebnim uslovima vrši se u valutama i razmjerama navedenim u Posebnim uslovima.

(c) Izvođač vrši ostala plaćanja Investitoru u valuti u kojoj je Investitor vršio plaćanja ili u valuti u kojoj se ugovrne strane dogovore;

(d) ako je neki iznos koji je plativ Investitoru od strane Izvođača u određenoj valuti veći od iznosa koji je plativ Izvođaču od strane Investitora u toj valuti, Investitor ima pravo na povraćaj ove razlike iz iznosa koji su inače plativi Izvođaču u drugim valutama; i

(e) ako kursevi razmjene nisu navedeni u Ugovoru, koriste se kursevi centralne banke Zemlje koji su važili na dan Osnovnog datuma.

Raskid od strane investitora

15.1 Opomena za ispravljanje propusta

Ukoliko izvođač ne ispuni bilo koju ugovornu obavezu, investitor može putem obavještenja da traži da ispravi svoj propust u definisanom roku.

15.2 Raskid ugovora od strane investitora

Investitor ima pravo da raskine ugovor, ukoliko izvođač:

a) ne postupi u skladu sa podklauzulom 4.2 (*Garancija za dobro izvršenje posla*) ili putem obavještenja u okviru podklauzule 15.1 (*Opomena za otklanjanje nedostataka*).
b) napusti radove ili na drugi način jasno pokaže namjeru da neće nastavati sa ispunjavanjem obaveza iz ugovora,
c) bez razumnog objašnjenja ne nastavi sa radovima, u skladu sa klauzulom 8 (*Početak, kašnjenje i obustava*)
d) zaključi podugovor za sve radove ili prenese ugovor bez potrebnog dogovora,
e) bankrotira ili postane nesolventan, ode u likvidaciju, ima administrativnu odluku na njegovu štetu, napravi poravnanje sa njegovim povjeriocima ili poslujepod stečajnom upravom, povjerenika ili menadžera, a u korist njegovih povjerioca ili ukoliko se bilo šta učini ili dogodi što (prema važećim zakonima) ima sličan uticaj na bilo koje djelo ili događaj ili
f) preda ili ponudi nekoj osobi (posredno ili neposredno) mito, poklon, napojnicu, nadoknadu ili drugu vrijednu stvar, kao što je podsticaj ili nagrade bilo kojoj osobi:
    i) za činjenje ili nečinjenje u vezi ugovora ili
    ii) za favorizovanje ili nefavorizovanje neke osobe u vezi sa ugovorom,

ili ako je bilo koji izvođačev službenik, zastupnik ili podizvođač preda ili ponudi (posredno ili neposredno) bilo kome takvu vrstupodsticaja ili nagrade, kao što je opisano u ovom podstavu (f). Međutim, zakoniti podsticaji ili nagrade licima koja su zaposlena kod izvođača neće povlačiti za sobom i raskid.

Ukoliko se bilo šta od ovoga dogodi, investitor može da, nakon što izda upozorenje od 14 dana izvođaču, raskine ugovor i odstrani ga sa gradilišta. Međutim, u slučaju podstava e) ili f), investitor može putem obavještena odmah da raskine ugovor.

Odluka investitora da raskine ugovor ne utiče na bilo koja druga prava investitora,koja su predviđena ugovorom ili po nekom drugom osnovu.

Izvođač se zatim obavezuje da napusti gradilište i danadzornom organu preda svu traženu robu, svu dokumentaciju izvođača i drugu projektnu dokumentaciju, koju je on izradio ili koja je izrađena za njega. Međutim, izvođač se obavezuje da odmah postupi u skladu sa nalozima

sadržanim u obavještenju i) u cilju dodjeljivanja bilo kog podugovora i ii) u cilju ili imovine ili bezbednosti radova.

Po raskidu investitor može da završi radove i/ili da to neka druga lica urade za njega. Nakon toga, investitor i ovi subjekti mogu da koriste svu robu, dokumentaciju izvođača i drugu projektnu dokumentaciju koju je izradio izvođač ili koja je izrađena za izvođača.

Investitor zatim obavještava izvođača da će se oprema izvođača i privremeni radovi biti predati izvođaču na gradilištu ili u blizini gradilišta. Izvođač se obavezuje da blagovremeno organizuje njihovo uklanjanje o trošku i na rizik izvođača. Međutim, ukoliko je do ovog trenutka izvođač nije namirio potraživanja investitora, investitor ima pravo da te stvari proda, radi namirivanja svojih potraživanja i da eventualnu razliku isplati izvođaču.

15.3 Vrednovanje na dan raskida

U najkraćem mogućem roku od dana pravosnažnosti otkaza datog u skladu sa podklauzulom 15.2 *Raskid od strane investitora*, investitor postupa u skladu sa podklauzulom 3.5 *Određivanja*, radi odobravanja ili određivanja vrijednosti radova, robe i dokumentacije izvođača i svih ostalih iznosa koji se plaćaju izvođaču za izvršene radove, u skladu sa ugovorom.

15.4 Plaćanje poslije raskida

Po pravosnažnosti otkaza podnijetog u skladu sa podklauzulom 15.2 *Raskid od strane investitora*, investitor može:

a) da postupi u skladu sa podklauzulom 2.5 *Potraživanja investitora*
b) da obustavi dalja plaćanja izvođaču sve dok se ne utvrde svi troškovi koji se odnose na projektovanje, izvođenje, završetak i otklanjanje nedostataka, obeštećenja zbog odlaganja (ukoliko ih ima) i svi ostali troškovi, koje je investitor imao i/ili
c) da naplati od izvođača naknadu za sve gubitke i štetu koje je pretrpeo i troškove koje je imao, a odnose se na završetak radova, od čega se odbija eventualni iznos koji je izvođaču, u okvir podklauzule 15.3 *Vrednovanje na dan raskida*. Nakon što povrati takve gubitke, štete i dodatne troškove, investitor plaća izvođačueventualnu razliku.

15.5 Pravo investitora na raskid

Investitor ima pravo da raskine ugovor u bilo kom trenutku, ukoliko investitor nađe za shodno, tako što daje obaveštenje izvođaču o raskidu. Raskid stupa na snagu 28 dana od podnošenja otkaza izvođaču ili od vraćanja garancije za dobro izvršenje posla izvođaču od strane investitora.Investitor nema pravo da raskine ugovor na osnovu ove podklauzule da bi sam izveo radove ili angažovao nekog drugog izvođača da izvrši radove.

Nakon ovog raskida, izvođač postupa u skladu sa podklauzulom 16.3 *Prestanak radova i odstranjenje* opreme izvođača i njemu se vrši isplata u skladu sa podklauzulom (19.6 *Raskid, plaćanje i oslobađanje po slobodnom izboru*).

OBUSTAVA I RASKID OD STRANE IZVOĐAČA

16.1 Pravo izvođača na obustavu radova

Ukoliko se investitor ne pridržava podklauzule 2.4 *Finansijski aranžmani investitora* ili podklauzulu 14.7 *Plaćanja*, izvođač ima pravo da obustavi radove (ili da uspori izvođenje radova) sve dok ne dobije dokaz o isplati, nakon što obavijesti investitora najmanje 21 dan unaprijed.

Takav postupak izvođača ne utiče na njegovo pravo na obeštećenje zbog kašnjenja, u skladu sa podklauzulom 14.8 (*Kašnjenje u plaćanju*) i raskid, u skladu sa podklauzulom 16.2 *Raskid od strane izvođača*.

Ukoliko izvođač naknadno dobije takav dokaz o isplati (kao što je opisano u odgovarajućoj podklauzuli i u gore navedenom obaveštenju) prije davanja obaveštenja o raskidu, izvođač nastavlja sa uobičajenim radom, što je prije moguće.

Ukoliko izvođač kasni i/ili bude izložen troškovima kao posledice obustave rada (ili usporavanja radova), u skladu sa ovom podklauzulom, izvođač obavještava investitora i ima pravo u skladu sa podklauzulom 20.1 (*Potraživanja izvođača)* na:

(a) produženje roka srazmjerno takvom zakašnjenju, ako se kasni ili će se kasniti u završavanju radova, u skladu podklauzulom 8.4 (*Produženje roka za završetak radova*) i
(b) naknadu takvih troškova uvećanu za primjerenu dobit, što se uključuje u ugovornu cijenu.

Po dobijanju ovakvog obavještenja, investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) da radi saglašavanj ili utvrđiavanja tih stvari.

16.2 Raskid od strane izvođača

Izvođač ima pravo da raskine ugovor ukoliko:

(a) izvođač ne dobije valjan dokaz u roku od 42 dana nakon davanja obavještenja u okviru podklauzule 16.1 (*Pravo izvođača na obustavu radova*) u vezi ne postupanja u skladu sa podklauzulom 2.4 (*Finansijski aranžmani investitora*),
(b) izvođač ne dobije iznos u roku od 42 dana nakon isteka roka , koji je naveden u podklauzuli 14.7 (*Plaćanja*) tokom koga treba da se izvrši isplata (osim odbitaka, u skladu sa podklauzulom 2.5 *Potraživanja investitora*)
(c) investitor u značajnoj mjeri ne izvrši svoje obaveze iz ugovora,
(d) se investitor ne pridržava podklauzule 1.7 (*Prenos*)
(e) prolongirana obustava utiče na sve radove, kao što je opisano u podklauzuli 8.11 (*Produžena obustava*), ili
(f) investitor bankrotira ili postane nesolventan, ode u likvidaciju, has a receiving ili administrativnu odluku against him, napravi poravnanje sa povjeriocima ili posluje pod stečajnom upravom, povjerenikom ili menadžera u korist njegovihpovjerilaca ili ukoliko je bilo šta urađeno ili ukoliko se nešto dogodi (u okviru važećih zakona) što ima sličan uticaj na bilo koji od ovih dešavanja ili događaja.

U svakom od događaja ili okolnosti, izvođač može da raskine ugovor, nakon što da obavještenje investitoru 14 dana ranije. Međutim, u slučaju podstava (e) ili (f), izvođač može odmah putem obavještenja da raskine ugovor.

Izbor izvođača da raskine ugovor ne utiče na ostala prava izvođača na osnovu ugovora ili po nekom drugom osnovu.

16.3 Prestanak radova i odstranjenje opreme izvođača

Prekid radova i nakon što obavještenje o raskidu, u skladu sa podklauzulom 15.5 (*Pravo investitora na raskid*), podklauzule 16.2 (*Raskid od strane izvođača*) ili podklauzula 19.6 *Raskid, plaćanje i oslobađanje po slobodnom izboru* stupilo na snagu,izvođač bez odlaganja:

(a) prekida sve dalje radove, osim kada je riječ o radu koji može da naložen od strane investitor radi zaštite lica ili imovine ili bezbjednosti radova,
(b) predaju dokumentaciju izvođača, postrojenje, materijale i druge radove za koje je izvođač primio naknadu, i
(c) odstranjuj sve druge stvari sa gradilišta, izuzev onih koji su neophodni za bezbjednost i napušta gradilište

16.4 Plaćanje po raskidu

Nakon što obavještenje, u skladu sa podklauzulom 16.2 (*Raskid od strane investitora*) stupi na snagu, investitor se obavezuje, da bez odlaganja:

(a) vrati izvođaču garanciju za dobro izvršenje posla,
(b) izvrši plaćanje izvođaču, u skladu sa podklauzulom 19.6 (*Raskid, plaćanje i oslobađanje po slobodnom izboru*), i
(c) izvrši plaćanje izvođaču iznos izgubljene dobiti ili ostalih gubitaka ili štete koju je imao izvođač, kao posledicu ovog raskida.

RIZIK I ODGOVORNOST

17.1 Obeštećenja

Izvođač se obavezuje da obešteti i zaštiti investitora, osoblje investitora i njihove zastupnike u svim slučajevim potraživanja, šteta, gubitaka i troškova (uključujući i sudske troškove) u pogledu:

(a) tjelesne povrede, bolestu ili smrti bilo kojeg lica koje je nastalo kao posledica projekta, izvođenja i završetka radova i otklanjanja nedostataka, ukoliko se to ne može pripisati nemaru, namjernom činu ili kršenju ugovora od strane investitora, zaposlenih kod izvođača ili njihovihzastupnika, i

(b) oštećenje ili gubitak imovine, nepokretne ili lične (osim radova) u mjeri u kojoj je takvo oštećenje ili gubitak:

(i) proisteklo ili je nastalo tokom ili kao posledica projekta, izvođenja i završetka radova i otklanjanja nedostataka, i

(ii) mogu pripisati nemaru, namjernom činu ili kršenju ugovora od strane investitora, osoblja investitora, njihovih zastupnika ili bilo kog drugog lica koje oni zapošljavaju neposredno ili posredno.

Investitor će obeštetiti i štititi izvođača, osoblje izvođača i njihove zastupnike u svim slučajevim potraživanja, šteta, gubitaka i troškova (uključujući sudske troškove) u pogledu: (1) tjelesne povrede, bolesti ili smrti bilo kojeg lica koje se može pripisati nemaru, namjernom činu ili kršenju ugovora od strane investitora, osoblja investitora ili njihovih zastupnika i (2) pitanja za koje odgovornost može biti isključena, kao što je opisano u podstavu (d)(i), (ii) i (iii) podklauzule 18.3 (*Osiguranje od povrede lica i štete imovini*).

17.2 **Staranje o radovima od strane izvođača**

Izvođač preuzima punu odgovornost za staranje o radovima i robi od dana početka radova do izdavanja Potvrde o prijemu radova (ili se od trenutka kada se ona smatra izdatom u skladu sa podklauzulom 10.1*Prijem radova i sekcija*) kada se odgovornost za staranje o radovima prenosi na investitora. Ukoliko je Potvrda o preuzimanju radova izdata (ili se smatra da je izdata) za neku sekciju radova, odgovornost za brigu o sekciji prelazi na investitora.

Nakon što je odgovornost prešla na investitora, izvođač preuzima odgovornost za brigu o preostalom radu na dan koji je naveden u potvrdi o preuzimanju radova, sve dok ovaj rad nije završen.

Ukoliko dođe do gubitka ili štete na radovima, robi ili dokumentaciji izvođača u periodu tokom koga je izvođač odgovoran za staranje o njima, iz bilo kog razloga koji nije naveden u podklauzuli 17.3 (*Rizici investitora*), izvođač će nadoknaditi gubitak ili štetu na sopstveni rizik i o svom trošku, tako da radovi, roba i dokumentacija izvođača budu u skladu sa ugovorom.

Izvođač će biti odgovoran za svaki gubitak ili štetu koje su nastale usled aktivnosti od strane izvođača nakon što je izdata potvrda o prijemu. Izvođač će takođe biti odgovoran za gubitak ili štetu koje nastanu nakon izdavanja potvrde o prijemu radova i koje su nastale iz prethodnog događaja za šta je izvođač bio odgovoran.

17.3 **Rizici investitora**

Rizici iz podklauzule 17.4 su:

(a) rat, sukobi (bez obzira da li je rat objavljen ili ne), invazija, akt stranih neprijatelja

(b) pobuna, teririzam, revolucija, ustanak, vojna ili uzurpirana vlast ili građanski rat u zemlji,

(c) neredi, gužva ili nemiri u zemlji od strane lica koja nisu zaposlena kod izvođača i drugih zaposlenih lica izvođača ili podizvođača

(d) municija, eksplozivni materijali, jonizujuće zračenje ili zagađenje od radioaktivnog zračenja u zemlji, osim ako se to može pripisati korišćenju takve municije, eksploziva, radijacija i radioaktivnog zračenja od strane izvođača i

(e) vazdužni pritisci koje su izazvali avioni ili druge letilice koje putuju brzinom zvuka ili supersoničnom brzinom.

17.4 **Posledice rizika investitora**

Ukoliko neki od rizika koji su navedeni u podklauzuli 17.3 dovede do gubitka ili oštećenjs radova, roba ili dokumentaciji izvođača, izvođač će bez odlaganja obavijestiti investitora i ispraviće ovaj gubitak ili štetu u mjeri u kojoj to zahtijeva investitor.

Ukoliko izvođač pretrpi kašnjenje i/ili trošak kao rezultat ispravljanja gubitka ili štete, izvođač će obavijestiti investitora i imaće pravo, u skladu sa podklauzulom 20.1 *Potraživanja izvođača*, na:

(a) produženje roka za takvo kašnjenje, ukoliko završetak radova kasni ili će kasniti, u skladu sa podklauzulom 8.4 (*Prodežetak roka za zavr*šetak), i

(a) nadknadu za takav trošak, koja će biti uključena u ugovornu cijenu

Nakon dobijanja ovog obavještenja, investitor postupa u skladu sa podklauzulom 3.5 *Utvrđivanja*, radi saglašavanja ili utvrđivanja o gore navedenom.

17.5 Intelektualna i industrijska prava svojine

U ovoj podklauzuli, izraz "prekršaj" znači kršenje (ili navodno kršenje) nekog prava na patent, registrovanog dizajna, autorskog prava, trgovačkog znaka, trgovačkog naziva, komercijalne tajne ili nekih drugih intelektualnih i industrijskih svojinskih prava, koja se odnose na radove; a izraz "potraživanje" predstavlja potraživanje (or proceeding pursuing a claim) podneto zbog navodnog prekršaja.

Ako jedna strana ne obavijesti drugu o potraživanju, u roku od 28 dana od prijema potraživanja, smatraće se da se ta strana odrekla svakog prava na obeštećenje, u skladu sa ovom podklauzulom.

Investitor će obeštetiti izvođača i zaštititi ga od bilo kakve tužbe za navodni prekršaj, koji je ili je bio:

(a) neizbježan zbog izvođačevog postupanja, u skladu sa Zahtjevima investitora ili

(b) posledica korišćenja radova od strane investitora:

I. u svrhu koja nije navedena u Ugovoru ili koje Ugovor ne podrazumijeva ili

II. u vezi sa nečim što izvođač nije isporučio, osim ako izvođaču takvo korišćenje nije bilo saopšteno pre Osnovnog datuma ili ukoliko nije bilo predviđeno ugovorom.

Izvođač će investitora obeštetiti i zaštititi od svakog drugog potraživanja koje proistekne iz ili u vezi (i) iZvođačevog projekta, izrade, izgradnje, ili izvođenja radova, (ii) korišćenja opreme Izvođača ili (iii) pravilnog korišćenja radova.

Ako jedna strana ima pravo na obeštećenje, u skladu sa ovom podklauzulom, druga strana može da (o sopstvenom trošku) vodi pregovore u vezi tog potraživanja, povede parnicu ili preda spor na arbitražu. Druga strana će, na zahtev i o trošku prve strane, pružiti pomoć u osporavanju potraživanja. Ta druga strana (i njeno osoblje) neće priznati bilo šta što bi moglo uticati na stranu koja duguje obeštećenje, ukoliko ta strana nije pokrenula pregovore, parnicu ili arbitražu na zahtjev druge strane.

17.6 **Ograničenje odgovornosti**

Nijedna strana ne može da drugoj strani bude odgovorna za nemogućnost korišćenja bilo kojih radova, gubitak dobiti, gubitak bilo kakvog ugovora ili za posrednu ili nematerijalnuu štetu koju može da pretrpi druga strana u vezi Ugovora, osim na osnovu podklauzule 16.4 *Plaćanje po raskidu* i podklauzule 17.1 *Obeštećenja*.

Ukupna odgovornost izvođača inestitoru,na osnovu ili u vezi Ugovora, izuzev one u vezi podklauzule 4.19 *Električna energija, voda i gas*, podklauzule 17.1 *Oprema investitora i besplatni materijal*, podklauzule 17.1 *Obeštećenja* i podklauzule 17.5 *Intelektualna i industrijska prava svojine*, ne može da premaši iznos naveden u Posebnim uslovima ili (ako taj iznos nije naveden kao takav) ugovornoj ceni, koja je navedena u ugovornom sporazumu.

Ova podklauzula ne ograničava odgovornost u slučaju prevare, namjernog neizvršavanja obaveza ili nekorektnog ponašanja.

OSIGURANJE

18.1 Opšti uslovi osiguranja

U ovoj klauzuli, "strana koje obezbjeđuje osiguranje" predstavlja, kod svake vrste osiguranja, stranu koja je odgovorna za osiguranja, za vršenje i održavanje osiguranja naznačenog u relevantnoj podklauzuli.

Gde god je izvođač, strana koja obezbjeđuje osiguranje, svako osiguranje se vrši kod osiguravača i pod uslovima odobrenim od strane investitora. Ti uslovi moraju da budu u skladu sa uslovima dogovorenim između obje strane, prije nego što su potpisale contract agreement. Ovaj sporazum o uslovima osiguranja ima prednost u odnosu na odredbe ove klauzule.

Gde god je investitor strana koja obezbjeđuje osiguranje, svako osiguranje se vrši kod osiguravača i pod uslovima koji su u skladu sa pojedinostima priloženim uz Posebne uslove.

Ako je polisom predviđeno zajedničko osiguranje, pokriće je posebno za svaku stranu, kao da su posebne polise izdate svim zajedničkim osiguranicima. Ako polisa pokriva obeštećenje dodatnog zajedničkog osiguranika, odnosno još nekog osiguranika pored onih navedenih u ovoj klauzuli, (i) Izvođač djeluje po polisi u ime tih dodatnih osiguranika, s tim što Investitor deluje u ime osoblja Investitora, (ii) dodatni zajednički osiguranici nemaju pravo na neposrednu isplatu od strane osiguravača ili bolo koju drugu vrstu posla sa osiguravačem i (iii) strana koja obezbjeđuje osiguranje zahtjeva od dodatnih osiguranika da postupaju u skladu sa uslovima propisanim u polisi.

Svaka polisa osiguranja od gubitka ili oštećenja propisuje da se isplate vrše u valutama potrebnim za nadomještanje gubitka ili oštećenja. Sredstva, koja osiguravači isplate, koriste se za nadomještanje gubitka ili oštećenja.

Relevantna strana koja obezbjeđuje osiguranje obavezuje se da u odgovarajućim rokovima, navedenim u Posebnim uslovima (računato od Datuma početka), drugoj strani podnese:

(a) dokaz da su izvršena osiguranja, opisana u ovoj klauzuli i

(b) kopije polisa za osiguranja, opisana u podklauzuli 18.2 *Osiguranje radova i opreme izvođača* i podklauzuli 18.3 *Osiguranje od povreda lica i štete imovini*.

Po isplati svake premije, strana koja obezbjeđuje osiguranje podnosi drugoj strani dokaz o isplati.

Svaka strana se obavezuje da postupa u skladu sa uslovima, koji su propisani u svakoj polisi osiguranja. Strana koja obezbjeđuje osiguranje obavezuje se da osiguranike obavjesti o svim relevantnim promjenama u izvođenju radova i da se postara o održavanju osiguranja, u skladu sa ovom klauzulom.

Nijedna strana nema pravo da vrši bilo kakvu materijalnu izmjenu uslova osiguranja bez prethodne saglasnosti druge strane. Ako osiguravač izvrši (ili pokuša da izvrši) bilo kakvu izmjenu, strana koja o tome bude prva obavještena od strane osiguravača, obavezuje se da o tome odmah obavijesti drugu stranu.

Ako strana koja obezbjeđuje osiguranje ne izvrši i ne održava bilo koje osiguranje koje je na osnovu Ugovora obavezna da izvrši i održava ili nepodnese valjan dokaz i kopije polisa, u skladu sa ovom podklauzulom, druga strana može (po sopstvenom nahođenju i bez uticaja na sva druga prava i pravna sredstva) da izvrši osiguranje za relevantno pokriće i plati dospjele premije. Strana koja obezbjeđuje osiguranje obavezuje se da drugoj strani isplati iznos tih premija, a ugovorna cijena se u skladu sa tim koriguje.

Ova klauzula ne ograničava na bilo koji način ugovorne ili neke druge obaveze ili odgovornosti izvođača ili investitora. Svi iznosi koji nisu osigurani ili nisu naplaćeni od osiguravača idu na teret izvođača i/ili investitora u skladu sa tim obavezama i odgovornostima. Međutim, ako strana koja obezbjeđuje osiguranje ne izvrši i ne održava neko osiguranje koje je dostupno i koje je po Ugovoru obavezna da izvrši i održava, a druga strana niti odobrava taj propust, ni vrši osiguranje sa odgovarajućim pokrićem, strana koja obezbjeđuje osiguranje je obavezna da isplati cio iznos koji bi bio naplativ na osnovu tog osiguranja.

Jedna strana vrši plaćanja drugoj u skladu sa podklauzulom 2.5 *Potraživanja investitora* ili podklauzulom 20.1 *Potraživanja izvođača*, zavisno od slučaja.

18.2 Osiguranje radova i opreme izvođača

Strana koja obezbjeđuje osiguranje obavezuje se da osigura radove, postrojenja, materijale i dokumentaciju Izvođača najmanje za iznos koji bi bi potreban za njihovo nadomještanje, uključujući troškove rušenja i odstranjivanja ruševina, strukovnim naknadama i dobiti. Ovo osiguranje traje od dana podnošenja dokaza, u skladu sa tačkom (a) podklauzule 18.1 *Opšti uslovi osiguranja* do dana izdavanja potvrde o prijemu radova.

Strana koja obezbjeđuje osiguranje obavezuje se da do dana izdavanja Potvrde o dobrom izvršenju posla održava osiguranje od gubitka ili oštećenja za koje je izvođač odgovoran, do kojih dođe prije izdavanja Potvrde o prijemu i od gubitka ili oštećenja izazvanih od strane izvođača ili podizvođača tokom vršenja bilo kojih drugih radnji (uključujući one iz klauzule 11 Odgovornost za nedostatke i klauzule 12 Ispitivanja poslije završetka).

Strana koja obezbjeđuje osiguranje obavezuje se da opremu izvođača osigura na punu cijene njenog nadomještanja, uključujući isporuku na gradilištu. Sva oprema izvođača osigurava se od trenutka prevoza na gradilište do prestanka potrebe za njom.

Ukoliko drukčije nije predviđeno Posebnim uslovima, osiguranja predviđena ovom podklauzulom:

(a) vrši i održava izvođač, kao strana koja obezbjeđuje osiguranje,

(b) vrši se zajednički u ime strana, koje zajednički imaju pravo na isplatu od strane osiguravača, pri čemu se te isplate dele stranama isključivo za potrebe nadomještanja gubitka ili oštećenja,

(a) pokriva gubitke ili oštećenja čiji uzroci nisu navedeni u podklauzuli 17.3 *Rizici investitora,*

(b) takođe pokriva gubitke ili oštećenja od rizika koji su navedeni u tački (c) podklauzule 17.3 *Rizici investitora sa odbicima*, u svakom slučaju pojedinačno, koji nisu veći od iznosa navedenog u Posebnim uslovima u prilogu ponude (ako taj iznos nije naveden, tačka (d) se ne primjenjuje), i

(c) može da ne pokriva gubitak, oštećenje i nadomještanje:

(i) dijela radova koji ima nedostatke zbog manjkavosti projekta, materijala ili izrade (s tim što pokriće pokriva sve druge dijelove koji su izgubljeni ili oštećeni upravo zbog takvih manjkavosti, a ne iz razloga navedenih u tački (ii),

(ii) dijela radova koji je izgubljen ili oštećen pri nadomještanju bilo kog drugog dijela radova, ako je taj dio bio manjkav zbog manjkavosti projekta, materijala ili izrade,

(iii) dijela radova koji je bio primljen od strane investitora, osim u mjeri u kojoj je izvođač odgovoran za gubitak ili oštećenje i

(iv) robe dok nije u zemlji, u skladu sa podklauzulom 14.5 *Postrojenja i materijali za radove.*

Ako po isteku jedne godine od Osnovnog datuma pokriće navedeno u tački (d) prestane da bude dostupno pod komercijalno prihvatljivim uslovima, izvođač se obavezuje (kao strana koja obezbjeđuje osiguranje) da obavijesti investitora sa pojedinostima. Investitor u tom slučaju (i) ima pravo shodno podklauzuli 2.5 *Potraživanja investitora* na isplatu iznosa koji odgovara onom iznosu koji bi izvođač očekivao da plati pod takvim komercijalno prihvatljivim uslovima za takvo pokriće, i (ii) odobrio propust iz podklauzule 18.1 *Opšti uslovi osiguranja*, ukoliko nije obezbjedio osiguranje pod komercijalno prihvatljivim uslovima.

18.3 Osiguranje od povrede lica i štete imovini

Strana koja obezbjeđuje osiguranje obavezuje se da svaku stranu osigura od odgovornosti za gubitke, oštećenje fizičke imovine (osim stvari koje su osigurane u skladu sa podklauzulom 18.2 *Osiguranje radova i opreme izvođača*) ili za smrt ili tjelesnu povredu bilo kog lica (osim lica koja su osigurana u skladu sa podklauzulom 18.4 *Osiguranje osoblja izvođača*, do kojih može da dođe kao posljedica izvršavanja ugovora od strane izvođača i to prije izdavanja Potvrde o dobro izvršenom poslu.

Ovo osiguranje je ograničeno za svaki događaj pojedinačno na ne manje od iznosa navedenog u Posebnim uslovima, bez ograničenja u pogledu broja događaja. Ako iznos nije naveden u Prilogu ponude, ova podklauzula se ne primjenjuje:

Ukoliko drugačije nije navedeno u Posebnim uslovima, osiguranja navedena u ovoj podklauzuli:

(a) vrši i održava izvođač, kao strane koja obezbjeđuje osiguranje,

(b) su zajednička u ime strana,

(c) su proširena da bi se pokrila odgovornost za gubitak ili oštećenje imovine investitora (izuzev stvari, osiguranih u skladu sa podklauzulom 18.2) nastalih pri izvršavanju ugovora od strane izvođača i

(d) može da isključi odgovornost, koja proističe iz:

(i) prava investitora na izvođenje osnovnih radova na, preko, ispod, u ili kroz neki teren i na zauzimanje tog terena za permanentosnovne radove,

(ii) oštećenje koje je neizbježna posledicu obaveze izvođača da izvede radove i otkloni nedostatke i

(iii) uzroka navedenog u podklauzuli 17.3 *Rizici investitora*, osim u mjeri u kojoj je pokriće dostupno pod komercijalno prihvatljivim uslovima.

18.4 Osiguranje osoblja izvođača

Izvođač se obavezuje da izvrši i održava osiguranje od odgovornosti za potraživanja, štete, gubitke i troškove (uključujući i sudske troškove) nastale u vezi povrede, bolesti ili smrti člana osoblja izvođača.

Investitor takođe ima pravo na obeštećenje na osnovu polise osiguranja, osim što može da ne uključi gubitke i potraživanja koja proističu iz bilo kog činjenja ili nemara investitora ili njegovog osoblja.

Osiguranje se održava u punoj mjeri za sve vrijeme dok to osoblje pruža pomoć u izvođenju radova. U slučaju radnika podizvođača, osiguranje može da bude obezbijeđeno od strane tog podizvođača, ali izvođač je odgovoran za postupanje u skladu sa ovom klauzulom.

Viša sila

19.1 Definicija više sile

U ovoj klauzuli, "viša sila" znači izuzetan događaj ili okolnost:

(a) koja je izvan kontrole jedne strane,

(b) od koje ta strana objektivno nije mogla da se obezbjedi prije zaključivanja ugovora,

(c) koju, po njenom nastanju, ta strana objektivno nije mogla da izbjegne ili savlada i

(d) koja se u značajnoj mjeri ne može pripisati drugoj strani.

Viša sila može da uključi, ali se ne ograničava na sledeće izuzetne događaje ili okolnosti, ukoliko su ispunjeni uslovi pod (a) do (d):

(i) rat, neprijateljstva (bez obzira da li je rat objavljen ili ne), invaziju, djelovanje stranih neprijatelja,

(iii) pobunu, terorizam, revoluciju, ustanak, vojna ili uzurpirana vlast ili građanski rat,

(iv) metež, nemir, nered, štrajk ili onemogućavanje radnicima prilaz svojim radnim mjestima, ukoliko se ne radi o radnicima izvođača ili podizvođača,

(v) municiju, eksplozivna sredstva, jonizujuća zračenja ili radioaktivno zagađenje, ako se to ne može pripisati korišćenju municije, eksploziva, zračenja ili radioaktivnosti od trane izvođača i

(vi) prirodne katastrofe kao što su zemljotres, uragan, tajfun ili vulkanska aktivnost.

19.2 Obavještenje o nastanku više sile

U slučaju da neka strana bude spriječena da izvršava svoje ugovorne obaveze zbog više sile, ona obavještava drugu stranu o događaju ili okolnosti koje sačinjavaju višu silu i navodi obaveze koje ne može ili neće moći da izvršava. Obavještenje se podnosi u roku od 14 dana nakon što je strana saznala ili trebalo da sazna za takav događaj ili okolnost koji sačinjavaju višu silu.

Po podnošenju obavještenja, strana se oslobađa od izvršavanja takvih obaveza za sve vrijeme tokom kojega je spriječena uslijed više sile da izvršava obaveze.

Bez obzira na ostale odredbe ove klauzule, viša sila se ne primjenjuje na obaveze jedne strane da drugoj strani vrši plaćanja, u skladu sa ugovorom.

19.3 Obaveza da se zastoj svede na minimum

Obije strane se obavezuju da se postaraju da zastoji u izvršavanju ugovora zbog više sile budu svedeni na minimum.

Svaka strana se obavezuje da drugu obavijesti o prestanku dejstva više sile na nju.

19.4 Posljedice više sile

Ako izvođač bude spriječen da izvrši bilo koju svoju ugovornu obavezu zbog više sile, o čemu je dato obavještenje u skladu sa podklauzulom 19.2 (*Obavještenje o nastanku više sile*) i zbog više sile kasni i/ili biva izložen trošku, on ima pravo, shodno podklauzuli 20.1 *Potraživanja izvođača*, na:

(a) produženje roka zbog takvog zastoja, ako se sa završetkom kasni ili će se kasniti, u skladu sa podklauzulom 8.4 *Produžetak roka za završetak*,

(b) naknadu troškova, ako je događaj ili okolnost poput onih koje su opisane u tačkama (i) do (ii) podklauzule 19.1 Definicija više sile i u slučajevima navedenim pod (ii) do (iv) i ako su nastali u zemlji.

Po prijemu takvog obavještenja, investitor postupa u skladu sa podklauzulom 3.5 Utvrđivanja radi saglašavanja ili utvrđivanja tih stvari.

19.5 Uticaj više sile na podizvođača

Ako neki podizvođač ima pravo na osnovu nekog ugovora ili sporazuma, koji se odnosi na radove, na oslobađanje zbog više sile pod dodatnim ili uslovima koji su opsežniji od onih koji su predviđeni ovom klauzulom, takvi opsežniji događaji više sile ili okolnosti ne opravdavaju izvođača za neizvršavanje njegovih obaveza, niti mu daju pravo na oslobađanje u u skladu sa ovom klauzulom.

19.6 Raskid, plaćanje i oslobađanje po slobodnom izboru

Ako izvođenje radova bude onemogućeno, praktično u cjelini, zbog dejstva više sile, u neprekidnom trajanju dužem od 84 dana, o kojoj je dato obavještenje u skladu sa podklauzulom 19.2 *Obavještenje o pojavi više sile*, ili u periodu, koji je sa prekidima duži od 140 dana, bilo koja strana može drugu stranu da obavjesti o raskidu ugovora. U tom slučaju, raskid stupa na snagu 7 dana po davanju obavještenja, a izvođač postupa u skladu sa podklauzulom 16.3 *Prestanak radova i odstranjenje opreme izvođa*ča.

Posle takvog raskida, investitor plaća izvođaču:

(a) iznose, koji se plaćaju za sve izvedene radove, za koje je cijena navedena u ugovoru;

(b) cijenu postrojenja i materijala koji su naručeni za radove i koji su isporučeni izvođaču ili koje je izvođač obavezan da primi: ovo posrojenja i materijal postaju vlasništvo investitora (na njegov rizik) kada ih on bude platio, a izvođač ih stavlja na raspolaganje investitoru;

(c) sve ostale troškove i obaveze, koje je izvođač opravdano snosio, u očekivanju završetka radova;

(d) troškove vezane za odstranjivanje privremenih radova i opreme izvođača sa gradilišta i njihovo vraćanje u zemlju izvođača (ili na neko drugo mjesto, ali ne po većoj cijeni); i

(e) trošak vezan za povratak osoblja izvođača i druge radne snage, koja je u trenutku raskida u potpunosti angažovana na izvođenju radova.

19.7 Oslobađanje od izvršavanja po sili zakona

Bez obzira na ostale odredbe ove klauzule, ako nastanu događaji ili okolnosti koje su, u skladu sazakonom, van kontrole ugovornih strana (uključujući, pored ostalog, i višu silu) koje jednoj ili obema stranama onemogućavaju izvršavanje njihovih ugovornih obaveza ili ga čine nezakonitim ili koje, na osnovu zakona koji reguliše ugovore, oslobađaju ugovorne strane, obaveze daljeg izvršavanja ugovora, i jedna strana obavijesti drugu o takvim okolnostima:

(a) ugovorne strane se oslobađaju obaveze daljeg izvršavanja bez uticaja na prava bilo koje strane u vezi ranijeg kršenja ugovora i

(b) iznos, koji se plaća izvođaču plaća od strane investitora, istovjetan je iznosu koji bi bio plaćen, u skladu sa podklauzulom 19.6 *Raskid, plaćanje i oslobađanje po slobodnom izboru*, da je ugovor bio raskinut u skladu sa podklauzulom 19.6.

Potraživanja, sporovi i arbitraža

20.1 Potraživanja izvođača

Ako izvođač smatra da ima pravo na produženje roka za završetak i/ili dodatne isplate po bilo kojoj klauzuli ovih uslova ili po nekom drugom osnovu u vezi ugovora, on o tome obavještava nadzorni organ i navodi događaj ili okolnosti koje služe kao osnov za potraživanje. Obavještenje se podnosi što prije, ali najviše u roku od 28 dana od dana kada je izvođač postao ili trebalo da postane svjestan tog događaja ili okolnosti.

Ako izvođač ne podnese svoje potraživanje u pomenutom roku od 28 dana, rok za završetak radova se ne produžava, izvođač nema pravo na dodatnu isplatu i investitor se oslobađa obaveza u vezi potraživanja. U suprotnom slučaju primjenjuju se sledeće odredbe ove podklauzule.

Izvođač se takođe obavezuje da podnese sva ostala obavještenja koja su predviđena ugovorom i pateće podatke za potraživanje, koji se odnose na takav događaj ili okolnosti.

Izvođač je dužan da ažurno vodi evidenciju koja je potrebna radi okumentovanja potraživanja, bilo na gradilištu ili na nekom drugom mjestu koje je nadzornom organu prihvatljivo. Bez priznavanja odgovornosti investitora, nadzorni organ može, po prijemu obavještenja iz ove podklauzule, da prati vođenje evidencije i/ili naloži izvođaču da vodi još neku evidenciju. Izvođač se obavezuje da nazornom organu omogući pregled te evidencije i da mu na njegov zahtjev podnese kopije.

U roku od 42 dana od dana kada je izvođač postao (ili trebalo da postane) vjestan događaja ili okolnosti koje služe kao osnov za potraživanje ili u nekom drugom roku predloženom od strane izvođača i odobrenom od strane nadzornog organa, izvođač se obavezuje da nadzornom organu podnese u potpunosti obrazloženo potraživanje sa pratećim podacima, uz naznaku traženog produženja roka i/ili iznosa dodatnog plaćanja. U slučaju da je događaj ili okolnost koja služi kao osnov za potraživanje kontinuirane prirode:

(a) potpuno obrazloženo potraživanje smatra se privremenim;

(b) izvođač podnosi dalja potraživanja u mjesečnim intervaalima, navodeći kašnjenje i /ili tražene iznose kumulativno, kao i sve ostale podatke koje nadzorni organ bude opravdano tražio; i

(c) izvođač podnosi konačno potraživanje u roku od 28 dana od prestanka uticaja događaja ili okolnosti ili u nekom drugom roku predloženom od strane izvođača i odobrenom od straneinvestitora.

U roku od 42 dana od prijema potraživanja ili daljih podataka u vezi prethodnog potraživanja ili unekom drugom rokupredloženim od strane nadzornog organa i odobrenom od strane izvođača. Nadzorni organ odobrava potraživanje ili ga odbija i daje detaljno obrazloženje svoje odluke. On takođe ima pravo da traži dalje pojedinosti, stim što je dužan da da odgovore na principe potraživanja u pomenutom roku.

Svaka privremena situacija mora da sadrži iznose potraživanja za koje je utvrđeno da su dospjeli u skladu sa odgovarajućim odredbama ugovora. Ukoliko podnijeti podaci nisu dovoljni da potkrijepe cio iznos potraživanja, izvođač ima pravo samo na isplatu pokrepljenog dijela potraživanja.

Nadzorni organ postupa u skladu sa podklauzulom 3.5 *Utvrđivanja* radi saglašavanja ili utvrđivanja (i) produženja roka (eventualnog) za završetak (prije i posle isteka) u skladu sa podklauzulom 8.4 *Produženje roka za završetak* i/ili (ii) dodatnog plaćanja (eventualnog) na koje izvođač ima pravo na osnovu ugovora.

Uslovi iz ove podklauzule važe skupa sa uslovima iz svih ostalih podklauzula koje se odnose na potraživanja. Ukoliko izvođač ne postupi u skladu sa ovom ili nekom drugom podklauzulom u vezi nekog potraživanja, pri utvrđivanju produženja roka i/ili dodatnog plaćanja uzima se u obzir mjera (eventualna) u kojoj je taj propust onemogućio ili naškodio pravilnoj obradi potraživanja, ukoliko potraživanje nije isključeno shodno drugom stavu ove podklauzule.

20.2 Imenovanje komisije za rješavanje sporova

Sporove rješava komisija za rješavanje sporova (KRS) u skladu sa podklauzulom 20.4 *Dobijanje odluke Komisije za rješavanje sporova*. Ugovorne strane zajednički određuju KRS u roku od 28 dana od dana kada jedna strana obavjesti drugu o svojoj namjeri da spor podnese KRS na rješavanje u skladu sa podklauzulom 20.4.

Kako je navedno u prilogu ponude, KRS se sastoji od jednog ili tri kompetentna lica ("članovi"). Ukoliko broj nije naveden i stranke se nisu dogovorile drugačije, KRS se sastoji od tri člana.

Ako se KRS sastoji od tri člana, svaka strana kandiduje po jednog člana i njegovo ime podnosi na saglasnost drugoj strani. One zatim konsultuju oba člana i dogovorno određuju trećeg člana koji će djelovati u svojstvu predsjednika.

Međutim, ako ugovor sadrži spisak potencijalnih članova, članovi se biraju sa tog spiskapri čemu se ne uzimaju u obzir oni koji nisu u mogućnosti ili ne žele da budu članovi KRS.

Sporazum između ugovornih strana i jedinog člana ("presuđivača") odnosno svakog člana pojedinačno zaključuje se sa pozivom na opšte uslove sporazuma za rješavanje sporova iz priloga ovih opštih uslova, sa eventualnim zajednički dogovorenim izmjenama.

Strane dogovorno utvrđuju naknadu koja je plativa jedinom članu odnosno svakom članu pojedinačno pri usaglašavanju uslova postavljenja. Strane s obavezuju da ovu naknadu plaćaju po pola.

Ako se strane bilo kad dogovore u tom smislu, one mogu da postave kompetentna lica za zamjenu jednog ili više članova KRS. Ako se strane nisu drugačije dogovorile, postavljenje stupa na snagu, ako neki član odbije da radi ili ne bude u mogućnosti da radi uslijed smrti, onesposobljenosti ili prestanka postavljenja. Zamjena se postavlja na isti način kao što je zamijenjeni član bio postavljen u skladu sa ovom podklauzulom.

Mandat bilo kog člana može da prestane ako se strane o tome dogovore, ali ne i voljom investitora ili izvođača. Ukoliko se strane nisu drugačije dogovorile, mandat KRS (ili svakog člana pojedinačno) prestaje kada KRS donese svoju odluku o sporu koji joj je predat na rješavanje, u skladu sa podklauzulom 20.4 *Dobijanje odluke Komisije za rješavanje sporova*, ukoliko KRS do tada nisu bili podnijeti drugi sporovi u skladu sa podklauzulom 20.4, u kom slučaju je mjerodavan datum donošenja odluka KRS o tim sporovima.

20.3 Nesaglasnost oko imenovanja Komisije za rješavanje sporova

U bilo kojem od sledećih slučajeva:

(a) ako se strane ne dogovore o određivanju jedinog člana KRS do datuma navedenog u prvom stavu podklauzule 20.2 *Imenovanje Komisije za rješavanje sporova*,

(b) ako bilo koja strana ne imenuje člana (za odobrenje od strane druge strane) tročlane KRS do tog datuma,

(a) ako se strane ne dogovore o postavljenju trećeg člana (u svojstvu predsjednika) KRS do tog datuma ili

(b) ako se strane ne dogovore o postavljenju ili zamjeni u roku od 42 dana od dana kada je jedini član ili jedan od trojice članova odbio da radi ili postao nesposoban da radi zbog smrti, onesposobljenosti, ostavke ili prestankamandata, tada će na zahtjev bilo koje ili obje strane i posle konsultacija, organ za postavljanje ili službenik koji je imenovan u prilogu ponude postaviti tog člana KRS. Takvo postavljenje je konačno. Obje strane su obavezne da po pola isplate naknadu organu za postavljanje i službeniku.

20.4 Dobijanje odluke Komisije za rješavanje sporova

U slučaju (bilo kakvog) spora između strana u vezi ugovora ili zvođenja radova, uključujući sporove u vezi ovjervanja, utvrđivanja, naloga, mišljenja ili procjene nadzornog organa, bilo koja strana može da spor u pisanoj formi podnese KRS na odlučivanje, posle njenog određivanja u skladu sa podklauzulama 20.2 *Imenovanje Komisije za rješavanje sporova* i 20.3 *Nesaglasnost oko imenovanja Komisije za rješavanje sporova* i da primjerke dostavi drugoj strani i nadzornom organu, sa pozivom na ovu podklauzulu.

U slučaju tročlane KRS, spor se smatra predatim KRS onog dana kada bude primljen od strane predsjednika KRS.

Obje strane se obavezuju da odmah KRS stave na raspolaganje sve potrebne informacije i odgovarajuće pogodnosti i obezbjede pristup gradilištu radi rješavanja spora. KRS ne djeluje u svojstvu arbitra.

U roku od 84 dana od prijema spora ili isplate akontacije predviđenje klauzulom 6 Priloga-Opšti uslovi sporazuma o rjšavanju sporova, zavisno od posljednjeg nastalog slučaja ili u nekom drugom roku predloženim od strane KRS i prihvaćenom od strane obje ugovorne strane, KRS donosi svoju odluku, koja mora da bude obrazloženai sa naznakom da je donijeta u skladu sa ovom podklauzulom. Međutim, ako nijedna strana nije izvršila isplatu punog iznosa iz faktura podnijetih od strane svakog člana u skladu sa klauzulom 6 priloga, KRS nije u obavezi da donese svoju odluku sve doisplate punog iznosa. Odluka je obavezujuća za obje strane, koje se obavezuju da odmah postupe po njoj, ukoliko ona ne bude promijenjena na prijateljski način ili arbitražnom odlukom. Ukoliko strane već nisu odustale od ugovora ili ga se odrekle ili raskinule, izvođač se obavezuje da nastavi sa izvođenjem radova u skladu sa ugovorom.

Ako je bilo koja strana nezadovoljna odlukom KRS, ona može da u roku od 28 dana od prijema odluke svoje nezadovoljstvo saopšti drugoj strani. Ako KRS ne donese odluku u roku od 84 dana (ili u nekom drugom dogovorenom roku) od prijema spora ili takve isplate, tada bilo koja strana može da svoje nezadovoljstvo saopšti drugoj strani po isteku pomenutih 28 dana.

U svakom slučaju, u saopštenju o nezadovoljstvu navodi se da se daje u skladu sa ovom podklauzulom, izlaže se predmet spora i daje se obrazloženje nezadovoljstva. Osim onog predviđenog podklauzulom 20.7 *Nepostupanje po odluci Komisije za rješavanje spo*rova i podklauzulom 20.8 *Istek mandata Komisije za rješavanje sporova*, nijedna strana nema pravo da spor podnese na arbitražu, ukoliko prethodno nije bilo podnijeto saopštenje o nezadovoljstvu u skladu sa ovom podklauzulom.

Ako po saopštenju odluke KRS obijema stranama nijedna strana ne podnese saopštenje o nezadovoljstvu u roku od 28 dana, odluka postaje konačna i obavezujuća za obije strane.

20.5 Prijateljsko rješavanje

U slučaju saopštenja o nezadovoljstvu podnijetog u skladu sa podklauzulom 20.4, strane se obavezuju da pokušaju da spor riješe na prijateljski način prije podnošenja spora na arbitražu. Međutim, ukoliko se strane nisu drugačije sporazumjele, arbitraža se može pokrenuti po isteku 56. dana od dana kada je bilo podnijeto saopštenje o nezadovoljstvu, čak iako nije bilo pokušaja da se spor riješi na prijateljski način.

20.6 Arbitraža

Ukoliko ne dođe do rješenja na prijateljski način, a odluka KRS (ako postoji) nije postala konačna i obavezujuća, spor se rješava međunarodnom arbitražom. Ukoliko se stranke nisu drugačije sporazumjele:

(a) spor se konačno rješava po pravilima arbitraže Međunarodne trgovačke komore,

(b) spor rješavaju tri arbitra koji su određeni u skladu sa pomenutim pravilima i

(c) arbitražni postupak se vodi na jeziku za komunikacije koji je naveden u podklauzuli 1.4 *Pravo i jezik*

Arbitri su ovlašćeni da otvore, pregledaju i izmijene bilo koju situaciju, utvrđivanje, nalog, mišljenje ili procjenu nadzornog organa i bilo koju odluku KRS koja se odnosi na spor. Nadzorni organ se ni na koji način ne može osloboditi obaveze svjedočenja i davanja podataka arbitrima po bilo kom pitanju uvezi spora.

Nijedna strana se ne može ograničiti u arbitražnom postupku na dokaze i argumente koji su ranije bili predočeni KRS radi dobijanja odluke ili na obrazloženje nezadovoljstva koje je dato u saopštenju o nezadovoljstvu. Bilo koja odluka KRS može se uzeti u obzir u arbitražnom postupku.

Arbitražni postupak može da počne prije ili poslije završetka radova. Obaveze ugovornih strana, nadzornog organa i KRS ne mogu da se mijenjaju zbog arbitražnog postupka koji se vodi tokom izvođenja radova.

20.7 Nepostupanje u skladu sa odlukom Komisije za rješavanje sporova

U slučaju:

(a) da nijedna strana ne podnese saop[tenje o neyadovoljstvu u roku predvi]enim podklauzulom 20.4 *Dobijanje odluke Komisije za rješavanje sporova*,

(b) da je odluka KRS postala kona;na i obaveyujuá i

(c) jedna strana nije postupila u skladu sa tom odlukom,

onda druga strana ima pravo da bez uticaja na svoja ostala prava, to postupanje podnese na arbitražu u skladu sa podklauzulom 2.6 *Arbitraža*. U tom slučaju ne važe podklauzule 20.6 *Dobijanje odluke Komisije za rješavanje sporova* i 20.5 *Prijateljsko rješavanje*.

20.8 Istek mandata Komisije za rješavanje sporova

U slučaju nastanka spora između strana u vezi ugovora ili izvođenja radova, a u mjestu ne postoji KRS zbog isteka mandata ili iz drugih razloga:

(a) podklauzula 20.4 *Dobijanje odluke Komisje za rješavanje sporova* i podklauzula 20.5 *Prijateljsko rješavanje sporova* ne važe i

(b) spor može da se neposredno podnese na arbitražu u skladu sa podklauzulom 20.6 Arbitraža.

PRILOG

Opšti uslovi sporazuma o rješavanju sporova

1 Definicije

Svaki "sporazum o rješavanju sporova" predstavlja trojni sporazum između:

(a) "Investitora"

(b) "Izvođača"

(c) "Člana" koji je u sporazumu o rješavanju sporova definisan kao:

(i) jedini član "KRS" (ili "presuđivač") i u tom slučaju pozivanje na "ostale članove ne važi",

ili

(ii) jedno od tri lica koja se zajedno nazivaju "KRS" "(ili "Komisija za rješavanje sporova") i u tom slučaju se druga dva lica nazivaju "ostali članovi".

Investitor i izvođač su zaključili (ili namjeravaju da zaključe) ugovor koji se zove "Ugovor" koji je definisan u sporazumu o rješavanju sporova koji sačinjava ovaj prilog. Riječi i izrazi koji se koriste u sporazumu o rješavanju sporova imaju značenje kakvo im je dato u ugovoru, ukoliko nisu drugačije definisani.

2 Opšte odredbe

Sporazum o rješavanju sporova postaje pravosnažan kada bude potpisan od strane investitora, izvođača i svakog člana.

Kada sporazum o rješavanju sporova postane pravosnažan, investotor i izvođač obavještavaju člana u tom smislu. Ako član ne primi obavještenje jednog od njih u roku od šest mjeseci po zaključivanju sporazuma o rješavanju sporova, on se smatra ništavnim.

Angažovanje člana predstavlja lično postavljenje. Nije dozvoljen prenos ili podugovaranje sporazuma o rješavanju sporova bez pretodne saglasnosti strana i ostalih članova (eventualnih).

3 Garancije

Član garantuje i pristaje da bude nepristrasan i nezavistan od investitora, izvođača i predstavnika investitora. Član se obavezuje da svakog od njih i ostale članove odmah obavijesti očinjenicama ili okolnostima koje bi mogle da budu u neskladu sa njegovim/njenim garancijama i pristankom u pogledu nepristrasnoti i nezavisnosti.

Pri postavljanju člana, investitor i izvođač se oslanjaju na njegove tvrdnje:

(a) da je iskusan u pogledu radova koje izvođač obavlja po ugovoru,

(b) da je iskusan u pogledu tumačenja ugovorne dokumentacije, i

(c) da vlada jezikom za komunikacije koji je predviđen ugovorom.

4 Opšte obaveze člana

Član:

(a) ne smije da ima finansijski ili neki drugi udio u investitoru,izvođaču ili nadzornom organu, niti finansijski udio u ugovoru, osim isplata u skladu sa sporazumom o rješavanju sporova;

(b) nije ranije bio angažovan kao konsultant ili u nekom drugom svojstvu od strane investitora, izvođača ili ostalih članova, prije zaključivanja sporazuma o rješavanju sporova, osim pod okolnostima koje je saopštio investitoru i izvođaču u pisanoj formi prije nego što su oni potpisali sporazum o rješavanju sporova;

(c) mora da prije zaključivanja sporazuma o rješavanju sporova saopšti investitoru, izvođaču i ostalim članovima, u pisanoj formi, da li je ikada imao profesionalne ili lične odnose sa bilo kojim rukovodiocem, službenikom ili radnikom investitora, izvođača ili nadzornog organa, bez saglasnosti investitora, izvođača i ostalih članova (eventualnih);

(d) ne može da za vrijeme pravosnažnosti sporazuma o rješavanju sporova bude angažovan kao konsultant ili u nekom drugom svojstvu od strane investitora, izvođača ili nadzornog organa, bez saglasnosti investitora, izvođača i ostalih članova (eventualnih);

(e) mora da postupa u skladu sa pravilima postupka i podklauzulom 20.4 Opštih uslova;

(f) ne može da daje savjete investitoru, izvođaču, osoblju investitora ili osoblju izvođača u vezi izvršavanja ugovora, osim u skladu sa priloženim pravilima postupka;

(g) ne može da razgovara ili pravi aranžmane sa investitorom, izvođačem ili nadzornim organom u vezi svog zaposlenja kod njih u svojstvu konsultanta ili u nekom drugom svojstvu po prestanku svog angažmana na osnovu sporazuma o rješavanju sporova;

(h) mora da bude na raspolaganju za sve posjete gradilištu i sve potrebne rasprave; i

(i) mora da postupa sa pojedinostima ugovora i svim aktivnostima i raspravama KRS kao sa privatnim i povjerljivim stvarima i ne smije da objavi ili objelodani bez prethodne saglasnosti investitora, izvođača i ostalih članova (eventualnih).

5 Opšte obaveze investitora i izvođača

Investitor, izvođač, osoblje investitora i osoblje izvođača ne mogu da traže savjete ili konsultantske usluge od lana u vezi ugovora, osim u okviru normalnih aktivnosti KRS na osnovu ugovora i sporazuma o rješavanju sporova i u okviru prethodnog dogovora između investitora, izvođača i ostalih članova (eventualnih). Investitor i izvođač su odgovorni za postupanje u skladu sa ovom odredbom od strane njihobvog osoblja.

Investitor i izvođačse obavezuju uzajamno i članu da ukoliko drugačije nije dogovoreno u pisanoj formi između investitora, izvođača, člana i ostalih članova (eventualnih), član ne može da:

(a) bude postavljen za arbitra u bilo kom arbitražnom postupku u vezi ugovora;

(b) bude pozvan za svjedoka u bilo kom sporu o kome odlučuju arbitri postavljeni za neku arbitražu u vezi ugovora, i

(c) bude odgovoran za potraživanja za bilo kakvo činjenje ili nečinjenje u vršenju ili nevršenju funkcija članova, ukoliko se ne utvrdi da je to činjenje ili nečinjenje bilo nesvjesno.

Investitor i izvođač se solidarno obavezuju da člana obeštete i zaštite od potraživanja za koja je oslobođen odgovornosti na osnovu prethodnog stava.

6 Plaćanje

Član ima pravo na sledeća plaćanja u valuti navedenoj u sporazumu o rješavanju sporova:

(a) dnevnica koja se smatra naknadom za:

(i) svaki radni dan proveden u čitanju podnesaka, prisustvovanju raspravama (eventualnim), pripremanju odluka ili posjećivanju gradilišta (eventualnom);i

(ii) svaki dan ili dio dana do najviše dva dana provede na putovanju između članovog stana i gradilišta ili nekog drugog mjesta sastanka sa ostalim članovima (eventualnim) i/ili investitorom iliizvođačem i nazad.

(b) naknada svih opravdanih troškova napravljenih u vezi izvršavanja obaveza člana, uključujući troškove za administrativne usluge, telefonske razgovore, kurirske usluge,faks i teleks, putne troškove i troškove koji se odnose na ishranu. Potrebna je priznanica za svaku stavku koja premašuje 5% dnevnice nvedene pod tačkom (a); i

(c) porez koji se po propisima zemlje plaća u iznosima koji se isplaćuju članu (ukoliko nije državljanin zemlje ili nema stalni boravak u njoj) u skladu sa ovom klauzulom.

Iznos dnevnice se precizira u sporazumu o rješavanju sporova.

Odmah po pravosnažnosti sporazuma o rješavanju sporova, a prije nego što pristupi aktivnostima u skladu sa sporazumom o rješavanju sporova, član izvođaču podnosi fakturu (sa kopijom za investitora) (a) za akontaciju u iznosu od dvadesetpet (25) odsto procijenjenog ukupnog iznosa dnevnica na koje će imati pravo i (b) akontaciju koja odgovara procijenjenim ukupnim troškovima kojima će biti izložen u obavljanju svojih dužnosti. Izvođač se obavezuje da fakturisani iznos isplati po prijemu fakture. Član nije u obavezi da obavlja svoje dužnosti u skladu sa sporazumom o rješavanju sporova sve dok svakom članu ne budu isplaćeni iznosi koji su fakturisani u skladu sa ovim stavom.

Zatim član podnosi fakture izvođaču, sakopijom za investitora, za razliku svojih dnevnica itroškova, umanjenu za iznos akontacije. KRS nije obavezna da donese svoju odluku sve do potpune isplate svih dnevnica i troškova svakog člana pojedinačno.

Ukoliko nisu isplaćene ranije, u skladu sa prethodnim stavom, izvođač se obavezuje da u potpunosti isplati iznos faktura svakog člana pojedinačno u roku od 28 kalendarskih dana po

prijemu svake fakture i da podnese zahtjev investoru (u izvještajima predviđenim ugovorom) za isplatu polovine fakurianih iznosa. Investitor zatim vrši isplatu izvođaču u skladu sa ugovorom.

Ukoliko izvođač ne isplati članu iznos na koji ima pravo na osnovu sporazuma o rješavanju sporova, investitor se obavezuje da taj iznos isplati članu i sve ostale iznose koji su potrebni za rad KRS, bez uticaja na prava i pravna sredstva investitora. Pored ostalih prava koja proističu iz tog propusta, investitor ima pravo na naknadu svih plaćenih iznosa koji premašuju polovinu tih isplata, sa troškovima povraćaja tih iznosa i zateznom kamatom obračunatom po stopi navedenoj u podklauzuli 14.8 *Opštih uslova*.

Ako član ne primi iznos koje s plaća, u roku od 28 dana od podnošenja ispravne fakture, član ima pravo da (i) obustavi pružanje svojih usluga do islate i/ili (ii) podnese odavanjem otkaza investitoru i izvođaču. Otkaz stupa na snagu kada ga obje straneprime otkaz. Takav otkaz je konačan i obavezujući za investitora, izvođača i člana.

7 Neizvršavanje obaveza člana

Ako član ne izvršava bilo koju svoju obavezu predviđenu klauzulom 4, on nema pravo na dnevnise i naknadu toškova i obavezuje se da bez uticaja na njihova ostala prava, investitoru i izvođaču nadoknadi sve dnevnice i troškove kji su isplaćeni članu i ostalim članovima (eventualnim) za postupak ili (eventualne) odluke KRS koje se smatraju ništavnim.

8 Neizvršavanje obaveza člana

Svi sporovi ili potraživanja u vezi ovog sporazuma o rješavanju sporova, ili kršenja, raskida ili nevažnosti istog, rješava u skladu sa pravilima arbitraže Međunarodne trgovačke komore jedan arbitar koji je postavljen u skladu sa pravilima arbitraže.

Aneks – PRAVILA POSTUPKA

1 Investitor i Izvođač predaju KRS po jedan primjerak svih dokumenata koje KRS bude tražila, uključujući ugovornu dokumentaciju, izvještaje o napredovanju, naloge za izmjene, situacije i ostale dokumente koje se odnose na spor. Kopije komunikacija između KRS investitora ili izvođača upućuju se drugoj strani. Ako se KRS sastoji od tri lica, investitor i Izvođač šalju kopije traženih dokumenata i komunikacija svakom od njih.

2 KRS postupa u skladu sa podklauzulom 20.4 i ovim pravilima. S obzirom na vremenska ograničenja za donošenje odluka i ostale relevantne faktore, KRS se obavezuje da:

a) Djeluje pravično i nepristrasno u odnosu na investitora i izvođača, pruzajući im priliku da iznesu svoj slučaj i odgovore na slučaj druge strane, i
b) Usvoje postupke koji su primjereni sporu, bez nepotrebnog odlaganja i troškova.

3 KRS može da održi raspravu o sporu, u kom slučaju ona utvrđuje datum i mjesto rasprave i može da trazi da joj se pisana dokumentacija i argumenti invesitotra i izvođaca podnesu prije ili tokom rasprave.

4 Ukoliko nije drugačije dogovoreno između investitora i izvođaca, KRS je ovlašćena da usvoji istražni postupak, zabrani učešće ili prisustvo raspravi bilo kom licu osim predstavnika investitora, izvođača I nadzornog organa I da radi u odsustvu bilo kod lica za koje KRS zna da je obavijesteno o održavanju rasprave, s tim sto ima slobodu odlučivanja da li I u kojoj mjeri da to ovlašćenje iskoristi.

5 Pored ostalog, investitor i Izvođač ovlašćuju KRS da:

a) Utvrdi postupak za donošenje odluke o sporu,
b) Odlučuje u okviru svojih nadležnosti I u okviru spora koji joj je podnijet na rješavanje,
c) Sprovodi raspravu na način koji smatra primjerenim, bez obaveze da se drži bilo kojih drugih pravila ili postupaka izuzev onih navedenih u ugovoru i ovih pravila,
d) Preduzme inicijativu u utvrđivanju činjenica i stvari potrebnih za donošenje odluke,
e) Koristi sopstvena stručna znanja, ako ih ima,
f) Odlučuje o plaćanju zatezne kamate u skladu sa ugovorom,
g) Odlučuje o privremenim olakšicama kao sto su to privremene mjere ili mjere očuvanja,
h) Otvori, razmotri I izmijeni bilo koju situaciju, odluku, određenje, nalog, mišljenje ili procjenu nadzornog organa u vezi sporta.

6 KRS može da izrazi bilo kakvo mišljenje tokom rasprave u vezi vrijednosti bilo kog argumenta kojeg strane u sporu iznesu. Zatim KRS donosi svoju odluku u skladu sa podklauzulom 20.4 ili nečim drugim dogovorenim između investitora I izvođača u pisanoj formi. Ako se KRS sastoji od tri člana:

a) Ona zasijeda iza zatvorenih vrata posle rasprave, ako je održana, radi pretresa i pripreme odluke;
b) Ona se trudi da donese jednoglasnu odluku, a ako to nije moguće, odluka se donosi većinom glasova članova, koji mogu da od trećeg člana traže izvještaj za podnošenje investitoru I izvođaču; i
c) Ako jedan član ne prisustvuje zasjedanju ili raspravi ili ne izvrši bilo koju svoju dužnost, ostala dva člana mogu da uprkos tome, nastave sa donošenjem odluke, osim:
    a. Ako investitor ili izvođač bude protiv toga, ili
    b. Ako je odsutni član predsjednik koji im je naložio da ne donosi odluku.

INDEKS PODKLAUZULA

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Avansno plaćanje	14.2	36
Ugovorni Sporazum	1.6	5
Prijateljsko rješavanje	20.5	55
Odobrenje Izvođačeve dokumentacije	5.2	18
Odobrenja, dozvole ili licence	2.2	8
Arbitraža	20.6	55
Dokumentacija izvedenog stanja	5.6	19
Prenos	1.7	5
Assistance by Employer	2.2	8
Predstavnici Investitora	3.2	9
Zakašnjenja izazvana od strane organa vlasti	8.5	26
Izbjegavanje ometanja	4.14	14
Staranje o radovima	17.2	45
Potvrda o dobrom izvršenju posla	11.9	32
Potvrda o prijemu radova	10.1	29
Potraživanja Investitora	2.5	8
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Početak radova	8.1	24
Komunikacije	1.3	5
Jezik komunikacije	1.4	5
Završetak preostalih radova i otklanjanje nedostataka	11.1	30
Izvještaj o završetku	14.10	40

Nepredvidivi uslovi	4.12	14
Rok za završetak	8.2	25
Povjerljivost	1.9	6
Povjerljivi podaci	1.12	7
Ugovorna cijena	14.1	36
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Evidencija osoblja i opreme Izvođača	6.10	22
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Savjeti za pripremu

posebnih uslova

Uslovi ugovaranja za PNI/ključ u ruke projekte

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

Savjeti za pripremu posebnih uslova

Međunarodna Federacija Konsalting Inženjera

Savjeti za pripremu posebnih uslova

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Priručnik za pripremu posebnih uslova

Uvod

Uslovi ugovaranja za EPC/Ključ u ruke projekte su pripremljeni od strane međunarodnog saveza inženjera-konsultanata (FIDIC-a) i preporučuju se kada jedno lice preuzme punu odgovornost za inženjerski projekat, uključujući projektovanje, proizvodnju, isporuku i montažu postrojenja, kao i projektovanje i izvođenje građevinskih radova i inženjering, kao i raspisivanje tendera na međunarodnom nivou. Izmjene i dopune uslova mogu biti potrebne pod nekim jurisdikcijama, naročito ako se primjenjuju na domaće ugovore.

Veliki projekti po principu ključ u ruke mogu podrazumijevati pregovore između dviju strana. Studirajući različite opcije koje su nudili izvođači, Izvođač može smatrati da je od velike važnosti i značaja da se sastane i diskutuje sa njima razne tehničke opcije koje poslodavac smatra poželjnim. Pod uobičajenim aranžmanima za ovu vrstu ugovora, Izvođač sprovodi inženjering, nabavku i izgradnju, i pruža potpuno opremljen objekat, spreman za rad (prilikom “predaje kljuca”).

Ovi savjeti se daju u želji da se pomogne sastavljačima posebnih uslova davanjem opcija za razne podklauzule po potrebi. Gdje god je to moguće, primjer teksta je uključen između redova. Međutim, u nekim slučajevima je data samo promemorija.

Prije unošenja nekog uzornog teksta, mora da se provjeriti da li je on u cjelini prikladan za date okolnosti. Ukoliko se ne smatra prikladnim, uzorni tekst bi trebalo izmijeniti prije primjene.

U slučaju izmijenjenog uzornog teksta I u svim ostalim slučajevima u kojim vrše izmjene i dopune, potrebno je voditi računa o tome da ne dođe do dvosmislenosti u opštim uslovima ili između klauzula posebnih uslova.

Sledeći tekst može da se koristi u pripremi uslova ugovora koji se unose u dokumentaciju ponude za neki ugovor:

“Uslovi ugovora uključuju ‘opšte uslove’, koji sačinjavaju dio 1. izdanja uslova ugovora za postrojenje i projektovanje-izgradnju, koje je objavila međunarodna federacija inženjera konsultanta (FIDIC) 1999. godine, i sledeće posebne uslove, koji sadrže izmjene i dopune opštih uslova.”

Sledeće podklauzule opštih uslova zahtijevaju informacije koji se moraju uključiti u posebne uslove:

1.1.3.3 & 8.2 Rok za završetak radova

1.1.3.7 & 11.1 Period za obavještavanje o nedostacima

1.1.5.6 Definisanje svakog člana, ukoliko ih ima

1.3 Elektronski sistemi za komunikacije

1.4 Zakoni i jezici

2.1 Vrijeme za okupiranje gradilišta

4.2 Sigurnosne performanse

4.4 Obavještenje o podizvođačima

8.7/12.4&14.15(d) Štete prilikom kašnjenja i izvođenja

13.8 Korekcije za promjene u cijeni

14.2 Avansna plaćanja

14.3 (c) Zadržavanje

17.6 Ograničenje odgovornosti

18.1 Osiguranje investitora (ukoliko ga ima). Dokaz osiguranja

18.2 (d) Osiguranje od rizika investitora

18.3 Osiguranje od povreda lica i oštećenja imovine

20.2 Broj članova Komisije za rješavanje sporova

20.3 Imenovanje članova Komisije za rješavanje sporova

Napomene o primjeni dokumentacije ponude

Dokumentaciju ponude trebalo bi da pripremaju inženjeri odgovarajućih kvalifikacija koji su upoznati sa tehničkim askeptkima potrebnih radova, a poželjno bi bilo da ona bude pregledana od strane odgovarajućih pravnika. Dokumentacija ponude se izdaje podnosiocima ponude I ona sadrži uslove ugovora, zahtjeve investitora i (moguće) preferiranu formu ponude. Pored toga, svakom podnosiocu ponude trebalo bi dati podatke predviđene podklauzulom 4.10 i uputstva podnosiocima punde gdje se navode stvari koje bi investitor zelio da budu uključene u njihove ponude, ali koje ne sačinjavaju dio zahtjeva investitora.

Kada se ugovor potpiše od strane investitora i izvođača, ugovor (kada stupu na snagu) uključuje i tender kao i bilo koji memorandum koji predstavlja dodatak ugovoru.

Zahtjevi investitora trebalo bi da preciziraju posebne zahtjeve za završene radove, ukljucujuci funkcionalne zahtjeve, kvalitet i opšteg, a mogu i da zahtijevaju od izvođača da obezbijedi neke stvari kako sto su to potrošni materijali, koji bi mogli da budu navedeni u spiskovima tarifa. Mogle bi se kljuciti pojedine ili sve stvari koje se pominju u sledećim podklauzulama:

1.8 Broj primjeraka dokumentacije izvođača

1.13 Dozvole koje pribavlja investitor

2.1 Fazno uzimanje u posjed temelja, struktura, postrojenja ili sredstava pristupa

4.1 Predviđene namjene radova

4.6 Ostali Izvođači (i druga lica) na gradilištu

4.7 Obilježavanje, linije i referentne kote

4.18 Ekološka ograničenja

4.19 Električna energija, voda, gas i ostale instalacije na gradilištu

4.20 Oprema investitora

5.1 Zahtjevi, podaci i informacije za koje je odgovoran investitor

5.2 Dokumenti Izvođača koje je potrebno pregledati

5.4 Tehnički standardi i građevinski propisi

5.5 Stručna obuka osoblja Izvođača

5.6 Grafička dokumentacija u izvedenom stanju

5.7 Priručnici za eksploataciju i održavanje

6.6 Pogodnosti za osoblje

7.2 Uzorci

7.3 Zahtjevi za inspekciju van gradilišta

7.4 Ispitivanje tokom izrade i/ili izgradnje

9.1 Ispitivanje na završetku

9.4 Obeštećenje za nepovoljne rezultate ispitivanja na završetku

12.1 Ispitivanja posle završetka

12.4 Oštećenje za nepovoljne rezultate ispitivanja posle završetka

Mnoge podklauzule u opštim uslovima pozivaju se na posebne uslove za te podatke što je uglavnom navedeno od strane investitora ili se pozivaju na tender za te podatke što je uglavnom navedeno od strane ponuđača.

U uputstvima za podnosioce ponude mogu da se preciziraju eventualna ograničenja vezana za podatke koji se nalaze u ponudi, i/ili određuju stepen ostalih informacija koje ponuđač uključuje u svoju ponudu. Ako je predviđeno da svaki podnosilac obezbijedi garanciju matične kompanije i/ili garanciju za ponudu, takvi zahtjevi koji važe prije nego sto ugovor postane pravosnažan) trebalo bi da budu navedeni u uputstvima za podnosioce ponude. Uzorni obrasci su priloženi uz ovaj dokument kao akensi A i B. uputstva mogu da sadrže stvari koje se pominju u nekim ili svim sledećim podklauzulama:

4.3 Predstavnik izvođača (ime i radna biografija)

4.9 Garancija kvaliteta

9.1 Ispitivanja na završetku

12.1 Ispitivanja posle završetka

18 Osiguranje

Ključ u ruke ugovori uglavnom uključuju projektovanje, izgradnju, armature, cijevni pribor I opremu u obu navedenom u zahtjevima investitora. U obzir bi trebalo uzeti detaljne zahtjeve kao što su to oni koji se odnose na mjeru u kojoj se objekat oprema da bi bio spreman za eksploataciju, sa rezervnim djelovima i potrošnim materijalima spremnim za eksploataciju za određeni period. Pored toga, od Izvođača se može zahtijevati da rukuje radovima bilo tokom nekoliko mjeseci probnom pogodna u skladu sa podklauzulm 9.1 (c) ili nekoliko godina.

S obzirom na veliku konkurenciju, sasvim je razumljivo sto podnosioci ponude često nisu volji da se izlože velikim troškovima u pripremi ponude projekata. U pripremi uputstva za podnosioce ponude valjalo bi uzeti u obzr obim u kome bi podnosioci realno mogli da pripreme i uključe detalje u svoje ponude. Potrebno je da se obim djelatnosti navede u uputstvima za podnosioce ponude. Trebalo bi imati u vidu činjenicu da se opis ne može dati u dokumentima koji sačinjavaju ugovor, koji postaje pravosnažan tek po potpisivanju ugovora.

U obzir bi trebalo uzeti davanje izvjestne naknade podnosiocima ako bi morali da obave studije ili pripreme idejne projekte da bi mogli da pripreme valjane ponude.

KLAUZULA 1 OSNOVNE ODREDBE

Podklauzula 1.1 Definicije

Posebni uslovi će precizirati Vrijeme za završetak radova i period Obavještenja o nedostacima.

Ako se radovi preduzimaju u fazama, što nije uobičajeno za ugovore ključ u ruke, Posebni uslovi će precizirati svaku fazu sekcije, i definišu opis posla, geografsko određenje i vrijeme završetka radova.

Može se ukazati potreba za izmjenom nekih definicija. Na primjer:

1.1.3.1 osnovni datum bi se mogao definisati kao određeni kalendarski datum

1.1.4.6 određena strana valuta bi se mogla predvidjeti

1.1.4.8 neka druga valuta se može odrediti kao lokalna valuta

1.1.6.2 poziv na Zemlju može da bude neprikladan u slučaju prekograničnog gradilišta

Podklauzula 1.2 Tumačenje

Ako je potrebno da se pozivi na dobit preciznije iskažu,ova se podklauzula može izmijeniti:

PRIMJER:

Na kraju podklauzule 1.2 upisati:

U ovim Uslovima, odredbe koje sadrže izraz trošak uvećan za primjerenu dobit predviđaju dobit koja predstavlja dvadeseti (5%) dio tog troška.

Podklauzula 1.3 Komunikacije

Posebni uslovi će predvidjeti sistem elektronske komunikacija (ako ima potrebe), i mogu takođe predvidjeti adresu Inestitora za Izvođačeva obavještenja.

Podklauzula 1.4 Prava i jezik

Posebni uslovi mogu predvidjeti:

(a) mjerodavno pravo koje će važiti za Ugovor;

(b) pravila korišćenja jezika (ako bilo koja Strana bude pisala jednim jezikom i kasnije prevodila), i

(c) jezik komunikacije (ako je komunikacija nije pisana istim jezikom kojim je napisan Ugovor).

Podklauzula 1.5 Prioritet dokumenata

Redosled je obično potreban u slučaju naknadno utvrđenog sukoba između ugovornih dokumenata. Ako redosled nije određen, ova se podklauzula može izmijeniti:

PRIMJER:

Brisati podklauzulu 1.5 i zamijeniti je sledećim tekstom

Dokumenti koji sačinjavaju Ugovor smatraju se uzajamno objašnjivim. Ukoliko se utvrdi dvosmislenost ili neslaganje, prednost se daje u skladu sa mjerodavnim pravom.

Podklauzula 1.6 Ugovorni sporazum

Ugovorni Sporazum je dokument koji omogućava stupanje na snagu Ugovora, i obično predhodi pregovorima. Ugovorni sporazum treba pažljivo da bude pripremljen. Forma Sporazuma treba da bude uključena u tendersku dokumentaciju kao aneks Posebnim uslovima: na primjer forma je uključena na kraju ove publikacije.

Ugovorni Sporazum mora sadržati nazive obje Strane, ugovornu cijenu, valute plaćanja, dospjeli iznos u svakoj valuti, i bilo koji preduslov koji mora biti ispunjen prije stupanja na snagu Ugovora, a sve uz saglasnost obje Strane. Ukoliko su potrebni duži tenderski pregovori, savjetuje se da Ugovorni sporazum sadrži Osnovni datum i/ili Datum početka.

Ukoliko Investitor želi da predvidi moućnost izdavanja pisma o prihvatanju, ova podklauzula mora biti promijenjena u smislu brisanja prve rečenice, koja predviđa da Ugovor stupa na snagu nakon što Strane potpišu Ugovorni Sporazum. Pismo o namjeri treba da sadrži sledeći paragraf:

„Sve dok se formalni sporazum ne pripremi i izvrši, ovo Pismo o namjerama, zajedno sa vašim pismenim prihvatanjem, smatra se obavezujućim između nas."

Podklauzula 1.10 Korišćenje dokumentacije Izvođača

Dodatne odredbe mogu biti potrebne ako se određene stavke softvera (na primjer) prenose na Investitora. Odredbe bi trebalo da budu u skladu sa mjerodavnim pravom.

Podklauzula 1.13 Postupanje u skladu sa zakonima

Ako će Investitor da pribavi uvozne dozvole i slično, alternativne odredbe mogu biti prikladne:

PRIMJER PODKLAUZULE ZA UGOVOR O POSTROJENJU

Unijeti sledeći tekst na kraju podklauzule 1.13:

Međutim, Izvođač se obavezuje da pojednosti o robi blagovremeno podnese Investitoru, koji se potom obavezuje da odmah pribavi sve uvozne dozvole i licence koje su potrebne za tu robu.

Investitor se takođe obavezuje da pribavi i izda sve saglasnosti, uključujući dozvolu za rad, pravo prolaza i odobrenja koja su potrebna za Radove.

Podklauzula 1.14 Solidarna odgovornost

U slučaju većih ugovora, može se ukazati potreba za preciziranjem detaljnih uslova zajedničkog ulaganja. Na primjer možda bi bilo poželjno da svaki učesnik obezbijedi garanciju matične kompanije, čiji je uzorni obrazac priključen uz ovaj dokument kao Aneks A.

Takvi uslovi, koji važe prije pravosnažnosti Ugovora, trebalo bi da se unesu u Upustva ua podnosioce ponuce. Investitor bi želio da rukovodilac zajedničkog ulaganja bude imenovan što prije i da samo sa njim ima posla, ne želeći da se miješa u sporove između učesnika zajedničkog ulaganja. Investitor bi trebalo da dobro pregleda ugovor o zajedničkom ulaganju, koji inače možda podliježe odobrenju ustanove koja finansira projekat.

KLAUZULA 2 INVESTITOR

Podklauzula 2.1 Pravo pristupa gradilištu

Posebni uslovi će precizirati vrijeme (vremena) do kojeg će Investitor dati Izvođaču pravo pristupa gradilištu, nakon Datuma početka radova. Izvođaču može biti neophodno da mu se omogući raniji pristup gradilištu za potrebe premjere ili ispitivanja njegovog podzemlja. Ukoliko Investitor oganizuje izvođenje radova na gradilištu prije obezbjeđenja prava pristupa, detalji moraju biti navedeni u Investitorovim zahtjevima.

Podklauzula 2.3 Osoblje Investitora

Ove odredve bi trebalo da se odraze na Investitorove ugovore sa bilo kojim drugim izvođačima na gradilištu.

KLAUZULA 3 Investitorova administracija

Podklauzula 3.1 Predstavnik Investitora

Iako Investitor nije u obavezi da imenuje predstavnika, ovo imenovanje može pomoći Investitorovom osoblju. Ukoliko Investitor želi da imenuje nezavisni nadzorni organ kao svog predstavnika, on mora biti naveden u Posebnim uslovima.

KLAUZULA 4 IZVOĐAČ

Podklauzula 4.2

Posebni uslovi će precizirati iznos i valutu Garancije za dobro izvršenje posla, iako to nije zahtijevano.

PRIMJER

Iznos Garancije za dobro obaljeni posao će iznositi 10 posto (10%) od ugovorne cijene koja je navedena u Ugovoru, i biće izražena u valuti i razmjeri u kojoj je ugovorna cijena plativa.

Prihvatljivi obrazac za valjano izvršenje posla uključuje se u dokumentaciju ponude , u vidu dodataka Posebnih uslova. Uzorni obrasci su u ovom dokumentu dati kao Aneks C i Aneks D. Oni se sastoje od dva seta Jedinstvenih pravila koje je objavila Međunarodna trgovačka komora (sa sjedištem u 38 Cours Albert 1 er, 750008 Pariz, Francuska), koja takođe objavljuje smjernice za pomenuta Jedinstvena pravila. Može se ukazati potreba za izmjenama uzornih obrazaca i teksta ove podklauzule radi usaglašavanja sa mjerodavnim pravom.

PRIMJER

Na kraju drugog stava podklauzule 4.2 unijeti:

Ako je garancija za valjano izvršenje posla u obliku bankarske garancije (i) nju izdaje banka sa sjedištem u Zemlji ili (ii) se neposredno izdaje od strane neke inostrane banke koja je prihvatljiva Investitoru. Ako garancija za valjano izvršenje posla nije u obliku bankarske garancije, nju izdaje neka finansijska ustanova koja je registrovana za poslovanje u Zemlji ili ima licencu da u njoj posluje.

Podklauzula 4.3 Predstavnik Izvođača

Ako je predstavnik poznat u vrijeme podnošenja ponude, podnosilac može da predloži predstavnika. Podnosilac ponude može da predloži alternativne predstavnike, naročito ako izgleda da će dodjela ugovora biti odugovlačena. Ako mjerodavni jezik nije onaj jezik koji se koristi u svakodnevnim komunikacijama (u skladu sa podklauzulom 1.4) ili ako je iz bilo kog razloga potrebno da ugovor sadrži odredbu o tome da predstavnik Izvođača u potpunosti valda određenim jezikom, može se dodati jedna od sledećih rečenica:

PRIMJER

Na kraju podklauzule 4.3 dodati

Predstavnik izvođača ili ova lica moraju da tečno

Govore _____ (upisati ime jezika)

PRIMJER

Na kraju podklauzule 4.3 dodati

Ako predstavnik Izvođača ili ova lica ne govore tečno

_____(upisati ime jezika), Izvođač se obavezuje

Da obezbijedi prisustvo prevodioca tokom cijelog radnog vremena.

Podklauzula 4.4 Podizvođači

Ukoliko Investitor želi da dobija obavještenja u skladu sa ovom podklauzulom, njegov zahtjev mora bit predviđen u Posebnim uslovima.

PRIMJER

Izvođač će izdati obavještenja opisana u stavovima (a), (b) i (c) podklauzule 4.4 u vezi sa sledećim Podizvođačima:

(lista relevantnih aktivnosti i/ili djelova Radova).

Podklauzula 4.12 Nepredvidljive teškoće

Ukoliko Radovi uključuju izgradnju tunela ili druge bitne podzemne konstukcije, obično je bolje da se rizik od nepredviđenih zemljanih uslova dodijeli Investitoru. Odgovorni izvođači će nerado preuzeti rizik od nepoznatih zemljanih uslova koje je teško ili nemoguće predvidjeti unaprijed. U ovim uslovima za poslove projektivanja (ili u njihovo ime) treba koristiti Uslove ugovaranja za postrojenja i projektovanje-izgradnju.

Podklauzula 4.19 Elektirčna enegrija, voda i gas

Ako će Izvođač biti omogućeno da koristi instalacije za električnu energiju, vodu i gas, u specifikacijama se daju pojedinosti , sa lokacijama i cijenama.

Podklauzula 4.20 Oprema Investitora i besplatni materijal

Da bi ova podklauzula bila važeća, specifikacije bi trebalo da sadrže opise svakog predmeta kojeg će Investitor obezbijediti i/ili kojim će rukovati, sa svim pojedinostima. U slučaju nekih predmeta mogu biti potrebne dalje odredbe da bi se rasčistila neka pitanja, kao što su ona koja se odnose na odgovornost i osiguranje.

Podklauzula 4.22 Obezbjeđenje gradilišta

Ako Izvođač dijeli gradilište sa drugim licima, možda ne bi bilo prikladno da on snosi odgovornost za bezbjednost gradilišta. U tom slučaju trebalo bi da se obaveze Investitora preciziraju.

KLAUZULA 5 PROJEKTOVANJE

Podklauzula 5.1 Opšte obaveza u projektovanju

Ukoliko Zahtjevi Investitora sadrže konturni projekat, u cilju (na primjer) utvrđivanja izvodljivosti projekta, podnosioce tendera trebalo bi obavijestiti o mjeri u kojoj konturni projekat predstavlja predlog ili zahtjev. Ukoliko je ova podklauzula neprimjenjiva, važiće odredbe FIDIC-ovih Uslovi ugovaranja za postrojenja i projektovanje-izgradnju.

Podklauzula 5.2 Dokumentacija Izvođača

Dokumentaciju Izvođača sačinjavaju dokumenti koje je Izvođač obavezan da preda Investitoru, kao što je precizirano Ugovorom, s tim što ne moraju da budu uključeni (na primjer) svi tehnički dokumenti koji će bit potrebni osoblju Izvođača radi izvođenja Radova. Na primjer, možda bi bilo dobro da se u Zahtjevima Investitora u vezi ugovora za postrojenja precizura da dokumentacija Izvođača mora da sadrži crteže koji prikazuju način pričvršćivanja postrojenja i druge informacije koje su potrebne za:

(a) priremu odgovarajućih temelja i oslonaca,

(b) obezbjeđenje odgovarajućeg pristupa na gradilišu, postrojenju i potrebnoj opremi, na kome se postrojenje montira, i/ili

(c) izrade potrebnih spojeva sa postrojenjem,.

Mogu se precizirati razni periodi pregleda uzimajući u obzir vrijeme potrebno za pregled raznih vrsta crteža i/ili mogućnosti bitnih podnošenja u pojedinim fazama postupka projektovanja-izgradnje.

KLAUZULA 6 Osoblje i radna snaga

Podklauzula 6.6 Pogodnosti za osoblje i radnu snagu

Ukoliko će Investitor da obezbijedi smještajne kapacitete, onda bi njegova obaveza trebala da bude precizirana.

Podklauzula 6.8 Nadzor Izvođača

Ako mjerodavni jezik nije isti kao jezik svakodnevne komunikacije (u skladu sa podklauzulom 1.4), ili ako je iz bilo kog razloga neophodno navesti da Izvođačevo nadzorno osoblje treba da vlada određenim jezikom, sledeća rečenica se može dodati:

PRIMJER

Na kraju podklazule 6.8 dodati:

Razuman dio Izvođačevog nadzornog osoblja treba da ima radno znanje (navesti jezik), ili Izvođač treba da obezbijedi dovoljan broj kompetentnih prevodilaca raspoloživih na gradilištu tokom cijelog radnog vremena.

Dodatna podklauzula

Možda će biti neophodno dodati paragrafe članova koji bi uzeli u obzir okolnosti i položaj gradilišta:

PRIMJER ČLANA

Strano osoblje i radna snaga

Izvođač može da dovede strano osoblje, zanatlije i radnu snagu koliko je neophodno u cilju izvršenja Radova. Izvođač mora da obezbijedi da to navedeno osoblje ima boravišne vize i radne dozvole. Izvođač će biti odgovoran za povratak takvog osoblja u mjesto sa kog su angažovani ili u njihovo stalno boravište. U slučaju smrti nekog od osoblja ili članova njihove porodice u njihovoj zemlji, Izvođač je obavezan da obezbijedi odgovarajući aranžman za njihov povratak ili sahranu.

PRIMJER ČLANA

Alkoholna pića i droge

Izvođač ne smije, osim u skladu sa zakonoma Zemlje, izvoziti, prodavati, poklanjati, razmjenjivati ili na drugi način raspolagati bilo kakvim alkoholnim pićima i drogama od strane njegovog osobnja.

PRIMJER ČLANA

Oružje i municija

Izvođač ne smije davati, razmjenjivati ili na drugi način raspolagati bilo kakvim oružjem ili municijom bilo kog tima sa bilo kojim licem ili licima, niti će dozvoliti isto svom osoblju.

PRIMJER ČLANA

Festivali i religjski običaji

Izvođač će poštovati sve u zemlji priznate festivale, slobodne dane i religijske i ostale običaje.

KLAUZULA 7 POSTROJENJA, MATERIJALI I NAČIN IZRADE

Dodatna podklauzula

U slučaju da je Ugovor finansiran od strane institucije čija pravila ili načela zahtijevaju ograničenje korišćenja njenih fondova, još jedan član može biti dodat:

PRIMJER ČLANA

Sva roba treba da potiče iz prihvatljivih država kao što je navedeno .....(navesti naziv štampanog vodiča za nabavku)

Robu treba da prevoze špediteri iz prihvatljivih država sem ukoliko nisu izuzeti pisanim putem od strane Investitora zbog eventualnih prekomjernih cijena ili kašnjenja. U svakom slučaju, osiguranje i bankarske usluge treba da pružaju osiguravajuće organizacije i banke iz prihvatljivih država.

KLAUZULA 8 POCETAK RADOVA, KAŠNJENJA I OBUSTAVA

Podklauzula 8.7 Obeštećenje za kašnjenje

Po mnogim pravnim sistemima, iznos ovakvog unaprijed određenog obeštećenja mora predstavljati primjeren proračun mogućeg gubitka kojim bi Investitor bio izložen u slučaju kašnjenja. Posebni uslovi bi trebali da preciziraju dnevnu sumu, za Radove ili svaku sekciju, izražen u iznosu ili procentu: vidjeti takođe podklauzulu 14.5 (b)

PRIMJER

U podklauzuli 8.7 predmetna suma navedena u drugoj rečenici će biti 0.02% ugovorne cijene kao obeštećenje za kašnjenje Radova, plativa (dnevno) u djelovima i u valutama u skladu sa Ugovorom. Za svaku sekciju, dnevni iznos će biti 0.02% konačne ugovorne vrijednosti sekcije, plative (dnevno) u tim valutama. Maksimalan iznos obeštećenja za kašnjenje će biti 10 posto(10%) ugovorne cijene predviđene Ugovorom.

Dodatna podklauzula

Potrebno je da se sekcije završe u rokovima navedenim u zahtjevima Investitora, kako bi Investiror mogao da ih zauzme i koristi prije završetka Radova u cjelini. Pojedinosti o radu koji bi Izvođač morao da izvede da bi mu bila isplaćena premija i iznos premije, prikazani su u zahtjevima Investitora.

Za potrebe obračuna premija, rokovi za završetak sekcija su precizirani. Nikakve korekcije rokova odobravanjem produženja roka za završetak nisu dozvoljene.

KLAUZULA 9 Ispitivanja na završetku

Podklauzula 9.1 Obaveze izvođača

Zahtjevi Investitora trebalo bi da sadrže ispitivanja koja bi Izvođač morao da obavi prije nego štp stekne pravo na Potvrdu o prijemu. Takođe bi možda bilo dobro da Ponuda izvođača sadrži detaljne aranžmane, instrumentaciju itd. Ako radovi budu ispitivani i primani u fazama, uslovi ispitivanja treba da uzmu u obzir uticaj nedovršenih Radova.

Tekst podstavova sadrži uslove koji obično važe u slučaju ugovora za postrojenja i koji mogu iziskivati izmjene. Podstav (c) posebno predviđa probni pogon tokom kojeg svi proizvvodi koje Radovi budu proizveli postaju vlasništvo Investitora. On time stiče pravo da ih otuđi i da zaradu

od prodaje zadrži za sebe. Ako bi trebalo da Izvođač zadrži te proizvoce, onda bi trebalo da se ova podklauzula izmijeni u tom smislu.

Podklauzula 9.4 Nepovoljni rezultati ispitivanja

Ako je potrebno da se u Posebnim uslovima ili Zahtjevima Investitora definiše umanjenje zbog nepovoljnih rezultata ispitivanja kako je predviđeno zadnjim stavom, takođe bi trebalo da se preciziraju kriterijumi minimalnih prihvatljivih performansi.

KLAUZULA 10 PRIJEM OD STRANE INVESTITORA

Podklauzula 10.1 Potvrda o prijemu

Ako se primopredaja radova vrši po fazama, što nije uobičajeno po ugovorima o postrojenjima i prokejtovanju-izgradnji, ove faze trebaju biti definisane kao sekcije, u klauzuli 1 Posebnih uslova. Poželjne su i precizne geografske definicije.

KLAUZULA 11 ODGOVORNOST ZA NEDOSTATKE

Podklauzula 11.10 Neizvršene obaveze

Može da se ukaže potreba za razmatranjem uticaja ove podklauzule u odnosu na rok odgovornosti koji je određen odgovarajućim zakonom.

KLAUZULA 12 ISPITIVANJA NAKON ZAVRŠETKA

Podklauzula 12.1 Postupak za ispitivanje posle završetka

U EPC Ugovorima za postrojenja i projektovanje-izgradnju, od Izvođača se obićno zahtijeva da dokaže pouzdanost i performanse postrojenja za vrijeme Ispitivanja poslije završetka, i da su Radovi preduzeti nakon uspješnog izvršenja ispitivanja.Izuzetno, može se smatrati neophodnim da Ispitivanja budu sprovedena nakon završetka, nakon što Investitor preuzme i rukovodi Radovima, tako da garancija za dobro izvršenje posla može biti dokazana pod normalnim radnim uslovima.

Zahtjevi Investitora treba da opišu ispitivanja koja zahtijeva, nakon preuzumanja, u cilju verifikacije ad Radovi ispunjavaju uslove Garancije za uspješno izvršenje posla koji su propisani u ponudi. Za neke vrste Radova, valjano preciziranje tih ispitivanja može da bude teško , i ako su ona od kritičnog značaja za uspješan ishod. Možda bi bilo dobro da se u Ponudu unesu detaljni aranžmani i/ili u njoj definišu potrebni instrumenti, pored onih koji postoje u postrojenju.

Odredbe Opštih uslova zasnovane su na ispitivanjima koja će vršiti Izvođač i u saradnji sa Investitorom kao i osobljem itd. Ovi detalji bi trebali da budu precizirani u zahtjevima Investitora. Ako su predviđeni neki drugi aranžmani, oni moraju biti precizirani u zahtjevima Investitora, i ova odklauzula bi trebala biti promijenjena u skladu sa tim.Na primjer, odredbe FIDIC Uslova o

ugovoaranju za postrojenja i projektovanje-izgradnju su zasnovani na ispitivanjima sprovedenim od strane Investitora i njegovog operativnog osoblja, sa upustvima Izvođačevog osoblja.

Podklauzula 12.4 Nepovoljni rezultati ispitivanja poslije završetka

Ako se primjenjuje prvi dio ove podklauzule, takođe bi trebalo precizirati način obračuna obeštećenja za nepostizanje performansi (na bazi obima nepovoljnih rezultata) u Posebnim uslovima ili Zahtjevima investitora, uz navođenje i kriterijuma za minimalne prihvatljive performanse.

KLAUZULA 13 IZMJENE I KOREKCIJE

Izmjene se mogu inicirati na tri načina:

(a) Investitor može naložiti neku izmjenu u skladu sa podklauzulom 13.1 bez predhodnog sporazuma oko izvodljivosti i cijene;

(b) Izvođač može da podnese svoje predloge u skladu sa podklauzulom 13.2 koji bi bili od koristi objema stranama; ili

(c) Investitor može da traži predlog u skladu sa podklauzulom 13.3 kojim se traži predhodni dogovor da bi se spor minimalizovao.

Podklauzula 13.5 Okvirne sume

Iako obično nije prikladno za ovu vrstu ugovora, okvirna suma se može tražiti za djelove Radova čija se cijena ne određuje na rizik Izvođača. Na primjer, okvirna suma može da bude potrebna kao pokriće za stvari koje Investitor želi da izabere. Neophodno je da se definiše obim svake okvirne sume, jer se tada definisani obim isključuje iz ostalih elemenata prihvaćenog ugovornog iznosa. Ako ima izgleda da se okvirna suma odredi u skladu sa podklauzulom 13.5 (b), procenat bi trebao biti naveden u ponudi.

Podklauzula 13.8 Korekcije zbog izmjena u troškovima

Odredbe o korekcijama mogu da budu potrebne ako bi bilo nerazumno očekivati od Izvođača da snosi rizik od porasta troškova usled inflacije. Formulacija odredbi na kojima su zasnovani indeksi troškova, objavljene su u FIDIC-ovim Uslovima ugovaranja za postrojenja i prokejtovanje-izgradnju, i mogu se smatrati odgovarajućim. Potrebna je posebna pažnja u izračunavanju pondera/koeficijenata (a, b, c...čiji ukupan iznos ne premašuje jedinstvo) i izboru i provjeri troškovnih pokazatelja.Poželjno je pribavljanje mišljenje stručnjaka.

Klauzula 14 - Ugovorna cijena i plaćanje

Pri sastavljanju posebnih uslova, trebalo bi da se uzmu u obzir iznosi i dinamika plaćanja izvođaču. Pozitivni novčani tokovi očigledno idu u korist izvođača, tako da bi ponuđači trebalo da imaju u vidu postupke privremenih plaćanja pri pripremanju svojih tendera.

Obično se ovakav ugovor bazira na paušalnoj cijeni, sa malo ili nimalo naknakdnih mjerenja. Na taj način izvođač preuzima rizik od promjena u troškovima u vezi svojih projekata. Paušalna cijena može da se sastoji od dva ili više iznosa izraženih u valutama plaćanja (uključujući i lokalnu valutu, ali ne i obavezno).

Za potrebe vrednovanja izmjena, uz tender bi možda trebalo priložiti detaljnu analizu cijena, sa količinama, jediničnim stopama i ostalim podacima veznim za cijene. Te informacije bi takođe bile korisne u određivanju privremenih plaćanja. Međutim, cijene iz tih informacija mogu da budu nekonkurentne. Stoga, u pripremi tenderske dokumentacije, investitor bi trebalo da odluči da li da analize ponuđača prihvati kao obavezujuće. Ukoliko odluči da to ne prihvati, on mora da bude siguran da je investitor kompetentan za vrednovanje svih predloženih izmjena.

Dodatne podklauzule bi možda bile potrebne radi pokrića eventualnih izuzetaka od opcija navedenih u podklauzuli 14.1 i bilo kojih drugih stvari vezanih za plaćanje.

Ako ne važi podklauzula 14.1 (a), način određivanja ugovorne cijene definiše se dodatnom podklauzulom, kako je predviđeno posljednjom rečenicom podklauzule 14.1 Ako se plaćanje za bilo koji dio radova vrši na osnovu mjerenja, taj dio mora da se definiše u ugovoru, pa bi sledeća formulacija jedne od dodatnih podklauzule možda biti prikladna:

PRIMJER PODKLAUZULE ZA OSLOBAĐANJE OD CARINA

Sva roba koju izvođač uveye u zemlju oslobođena je od carina i ostalih uvoznih dažbina, ukoliko je prethodno dobijeno odobrenje Investitora za uvoz. Investitor se obavezuje da potvrdi dokumente koji su potrebni za oslobađanje koje je izvođač pripremio za podnošenje radi carinjenja i da takođe obezbjedi sledeće dokumente:

(navesti potrebne dokumente koje izvođač nije u mogućnosti da pripremi)

Ako oslobađanje od carine ne bude odobreno, investitor nadoknađuje plaćenu carinu.

Sva uvezena roba koja ne bude ugrađena ili utrošena u vezi radova, izvozi se po izvšenju ugovora.

Ukoliko ne bude izvezena. roba se carini u skladu sa zakonima zenlje.

Međutim, oslobađanju ne podliježe:

(a) roba koja je slična onoj koja je proizvedena lokalno, osim ako je nema u dovoljnoj količini ili ako nije po standardu potrebnom za radove; i
(b) bilo koji element carine ili poreza koji je nerazdvojiv od cijene robe ili usluge pribavljenih u zemlji, koji se smatra uključenim u prihvaćeni ugovorni iznos.

Lučke dažbine, kejske dažbine ili bilo koji elementi carine ili poreza koji je nerazdvojiv od cijenerobe ii usluga, osim gore pomenutih, smatra se uključenim u prihvaćeni ugovorni iznos.

PRIMJER PODKLAUZULE O OSLOBAĐANJU OD POREZA

Nerezidentno osoblje ne plaća porez na prihod koji je u zemlji propisa za zarade isplaćene u bilo kojoj stranoj valuti ili porez na prihod propisan za životne potrepštine, kirije i slične usluge koje izvođač obezbjeđuje svom osoblju ili za naknade umjesto toga. Ako se bilo kojem članu osoblja izvođača dio zarade isplaćuje u zemlji u nekoj stranoj valuti, taj član se obavezuje da po isteku svog angažmana u izvođenju radova, iz zemlje iznese nepotrošeni dio svoje zarade u stranoj valuti.

Investitor se obavezuje da traži oslobađanje u svrhe predviđene ovom klauzulom. Ako oslobađanje ne bude odobreno, investitor se obavezuje da nadoknadi plaćene poreze.

Podklauzula 14.2 - Avansno plaćanje

Pri sastavljanju posebnih uslova, trebalo bi razmotriti koristi od avansnog plaćanja. Ukoliko ova klauzula ne važi, stvari koje su opisanu o podastavovima (a) do (d) ove podklauzule treba da budu navedevi u posebnim uslovima i prihvatljivi oblici garancije bi trebalo da bude obuhvaćene tenderskom dokumentacijom, koji su u prilogu posebnih uslova: primjer obrasca je u prilogu ovig dokumenta, kao prilog E. Potrebno je da s u tendersku dokumentaciju unesu prihvatljivi obrasci garancija kao prilog posebnih uslova. Primjeri obrasca je priložen uz ovaj dokument, kao Aneks E

Ako je izvođač u obavezi da obezbjedi glavne djelove postrojenja, trebalo bi da se razmotre koristi od plaćanja u tranšama tokom proizvodnje. Za investitora bi možda bio preporučljiv neki oblik obezbjeđenja, jer s ova plaćanja ne odnose na bilo šta što je u njegovom posjedu. Ako se izvođaču odobri plaćanje u tranšama prije otpreme, dokumentacija pponude bi mogla da sadrži:

(a) odredbe priloga tendera koje vezuju avansna plaćanja (u skladu sa ovom podklauzulom) za faze proizvodnje;
(b) u vremenskom rasporedu plaćanja ili nekom drugom dokumentu koji se koristi za utvrđivanje ugovorne vrijednosti u skladu sa sa podklauzulom 14.3 (a), iznos koji se plaća u svakoj fazi pojedinačno (to bi iziskivalo unošenje dodatnih odredbi u vezi obezbjeđenja); ili
(c) detaljne izmjene podklauzole 14.5.

Podklauzula 14.3 - Zahtjev za privremenu situaciju

Posebni uslovi treba da odrede procenat zadržavanja za podstav (c), i takođe može da odredi i **ograničenje za garantni depozit.**

Podklauzula 14.4 - Vremenski raspored plaćanja

Opšti uslovi sadrže odredbe o privremenim plaćanjima izvođaču, koje mogu da budu zasnovane na vremenskom rasporedu plaćanja. Ako se predviđa neki drugi osnov za utvrđivanje privremenog vrednovanja, pojedinosti se unose u posebne uslove. Ako se plaćanja preciziraju u vremenskom rasporedu plaćanja, on bi mogao da bude u jednom od sledećih oblika:

(a) iznos (ili procenat) procijenjene konačne ugovorne cijene) bi mogao da se unese za svaki mjesec (ili neki drugi period) u roku za završetak, koji se može pokazati neprimjerenim, ako napredak izvođača značajno odstupa od očekivanog, na kome je vremensi raspored zasnovan, ili
(b) vremenski raspored može da bude zasnovan na stvarnom napredovanju u izvođenju radova, što iziskuje pažljivo definisanje repera plaćanja. Do neslaganja može da dođe, kada rad koji je potreban za jedan reper plaćannja bude skoro završen, a ostatak može da bude tek za nekoliko mjeseci.

Podklauzula 14.7 Vrijeme plaćanja

Ukoliko treba da se primjeni period za plaćanje, podklauzula može da se izmijeni:

PRIMJER U podstavu (b), podklauzule 14.7, izbrisati "56" i zamijeniti sa "42".

Ukoliko treba da se navede zemlja/zemlje plaćanja, detalji mogu biti obuhvaćeni tenderom.

14.8 Odloženo plaćanje

Ukoliko diskontna stopa valute plaćanja u centralnoj banci u zemlji nije dobra osnova za procjenjivanje finansijskih troškova izvođača, možda će biti potrebno da se definiše nova stopa. Druga mogućnost je da se trenutni troškovi finansiranja olate, imajući u vidu lokalne finansihske aranžmane.

14.9 Isplata garantnog depozita

Ukoliko se garantni depozit oslobađa i zamjenjuje odgovarajućom garancijom, moguće je dodati odgovarajuću garanciju. Prihvatljivi obrazac garancije trebalo bi da se priključi uz tendersku dokumentaciju u prilogu posebnih uslova: primjer obrasca je priložen ovom dokumentu, kao Aneks F.

Primjer podklauzule za isplaćivanje garantog depozita

Kada je garantni depozit dostigao.....investitor vrši plaćanje u iznosu od .....% garanntog depozita izvođaču, ukoliko dobije garanciju, u obliku i obezbjeđenu od strne subjekta kojeg investitor odobrava, u iznosima i u valutama koja su itovjetna isplati.

Izvođač obezbjeđuje da je garancija važeća i da je na snazi, sve dok izvođač nije završio radove i otklonio bilo kakve nedostatke, kao što je navedeno u potvrdi o dobro izvršenom polsu, u podklauzuli 4.2 i u skladu sa tim se garancija vraća izvođaču. Ovo plaćanje je u skladu sa plaćanjem druge polvine garantnog depozita, u okviru drugog stava podklauzule 14.9

Podklauzula 14.15 Valute plaćanja

Ukoliko se sva plaćanja vrše u lokalnoj valuti, ona mora biti naznačena u ugovornom sporazumu i u tom slučaju važi samo prva rečenica ove podklauzule. Druga mogućnost je, da se u tom slučaju, podklauzula može zamijeniti:

PRIMJER PODKLAUZULE ZA JEDNOVALUTNI UGOVOR

Obračunska valuta je lokalna valuta i sva plaćanja u skladu sa ugovorm, vrše se u lokalnoj valuti. Plaćanja u lokalnoj valuti moraju da budu potpuno konvertabilna, osim onih za lokalne troškove. Procenat koji se pripisuje lokalnim troškovima, navodi se u tenderu.

Finansijski aranžmani

U slučaju većih ugovora na nekim tržištima, može se ukazati potreba za obezbjeđivanjem finansijskih sredstava od subjekata, kao što su to agencije za pomoć, banke za razvoj, agencije za kreditiranje izvoza i ostale međunarodne finansiske institucije. Ako se finansiranje obezbjeđuje iz nekog od takvih izvora, u posebne uslove bi trebalo da se unesu njegovi posebni zahtjevi. Tačna formulacija zavisiće od dotične institucije, tako da je potrebno da se povjerilac njoj obrati, da bi saznao njene uslov i da traži odobrenje nacrta tenderske dokumentacije.

Ovi zahtjevi mogu da uključe tendersku proceduru, koje je potrebno usvojiti, kako bi eventualni ugovor ispunjavao uslove u pogledu finansiranja i/ili posebne podklauzule, za koje će možda biti neophodno, da postanu dio posebnih uslova. Sledeći primjeri ukazuju na neke teme, koje zahtjevi institucija mogu da pokrivaju:

(a) zabrana diskriminacije špediterskih kompanije bilo koje zemlje;
(b) obezbjediti da ugovor podliježe neutralnom zakonu, koji je široko prihvaćen;
(c) odredbe o arbitraži u okviru priznatih, međunarodnih pravila i na neutralnoj lokaciji;
(d) davanje prava izvođaču da obustavi/raskine ugovor u slučaju neizvršavanja prema finansijskim aranžmanima;
(e) ograničavanje prava na neodobravanje postrojenje;
(f) navođenje dospjelih plaćanja u slučaju raskida;
(g) navođenje da ugovor ne stupa na snagu, dok određeni uslovi nisu ispunjeni, uključujući uslove prije isplate za aranžmane finansiranja;
(h) obavezivanje investitora da vrši plaćanja iz sopstvenih izvora ukoliko, iz bilo kog razloga, sredstva u okviru finansijskih aranžmana nisu dovoljna da se izvrše plaćanja izvođaču, bez obzira da li je riječ o neizvršavanju u okviru finansijskih aranžmana ili zbog nečeg drugog.

Pored toga, institucija za finansiranje ili banka će možda željeti da ugovor uključi pozivanje na finansijske aranžmane, naročito ako sredstva finansiranja dolaze iz više izvora finansiranje, kako bi se finansirali različiti elementi nabavke.Nije neuobičajeno da posebni uslovi sadrže odredbe koje identifikuju razne kategorije postrojenja i navode dokumentaciju koja se podnosi relevantnoj finansijskoj instituciji radi dobijanja sredstava. Ako se ne ispune zahtjevi finansijske institucije, može biti teško (pa čak i nemoguće) da se obezbjedi odgovarajuće finansiranje projekta i ta institucija mogla bi da odbije finansiranje ugovora u cjelini ili djelimično.

Međutim, kada finansiranje nije vezano za izvoz robe i usluga iz određene zemlje, već se jednostavno obezbjeđuju na osnovu zajma odobrenom investitoru od strane komercijalnih banaka, te banke mogu da se postaraju o tome da prava investitora budu veoma ograničena. Ove banke bi možda željele da se ugovor ne poziva na finansijske aranžmane i/ili da ograniče pravo izvođača, u okviru podklauzule 16.

OBRAZAC PODKLAUZULE KOJI MOŽE DA TRAŽI INSTITUCIJA ZA FINANSIRANJE

Ugovorna cijena se sastoji od sledećeg

(podijeliti po pozicijama /ili nabavka /isporuku/itd.)

i investitor je plaća izvođaču, kao što je prikazano u nastavku.

(a) .....% ukupne ugovorne cijene investitor plaća izvođaču direktim putem, u roku od 28 dana od datuma i platiće se uz predaju sledeću dokumentaciju:
(i)komercijalna faktura adresirana na investitora, navodeći iznos sada dospijelog plaćanja
(ii) garancija za avansno plaćanje, koju izdaje banka u priloženoj formi
(iii) potvrda o dobro izvršenom poslu, koju izdaje banka u priloženoj formi i
(iii) Privremena Situacija, koja potvrđujeda je plaćanje prispjelo sa navedenim iznosom

(b) .....% ugovorne cijene za snabdijevanje postrojenja, se plaća na sledeći način:
I. .....% procijenjene vrijednosti isporučenog postrojenja, direktnim plaćanjem izvođaču od strane investitora, po otpremi svakog dijela, po predaji sledećih dokumenata:
(original) komercijalne fakture
(original) dokumentacija o isporuci
(original) potvrda o porijeklu
(original) potvrda o osiguranju, i (original) Privremene situacije predstavnika investitora, koji potvrđuje da je plaćanje dospjelo sa navedenim iznosom.

II. .....% procijenjene ugovorne vrijednosti isporučenog postrojenja, plaćanjem izvođaču iz ugovora o zajmu, nakon što pokaže povrdu o kvalifikovanju, u formi koja je priložena i kopija dokumenata, koji su navedeni u podstavu (b) (I).

(c) Preostali dio ugovorne cijene se plaća na sledeći način:
I. .....% procijenjene vrijednosti pruženih usluga, neposrednim plaćanjem izvođača od strane investitora, po izvršenjuodređenih usluga, uz podnošenje sledećih dokumenata: (original) komercijalne fakture i (original) Privremene Situacije predstavnika investitora, koja potvrđuje da je plaćanje dospjelo sa navedenim iznosom
II. .....% procijenjene vrijednosti ugovora pruženih usluga, plaćanjem izvođaču iz ugovora o zajmu, nakon što pokaže potvrdu o kvalifikovanju, u formi koja je priložena i kopije dokumenata, koji su navedeni u podstavu (c) (i)

(d) Direktna plaćanja od strane investitora,koja su navedena u podstavu (b) vrše se putem neopozivog akreditiva, ustanovljenog od strane investitora, a u korist izvođača i potvrđeno od strane banke, koja je prihvatljiva izvođaču.

Druga mogućnost je da izvođač bude voljan da inicira finansijske aranžmane i da zadrži odgovornost za njih, iakon on vjerovatno nije u mogućnosti da obezbjedi sredstva iz sopstvenih izvora ili nije vojan da to učini. Tada bi uslovi njegove finansirajuće banke uticali na njegov stav

u pregovorima za ugovor. Ona može da od investitora zahtijeva da vrši prevremena plaćanja, mada veliki dio ugovorne cijene može da bude zadržan do završetka radova.

Možda bi bilo dobro da u pripremi tenderske dokumentacije, investitor predvidi takav uslov, obavezujući se da obezbjedi garanciju za element plaćanja, koji izvođaču dospijeva po završetku radova. Prihvtljive obrasce garancija bi treblo unijeti u tendersku dokumentaciju, kao aneks posebnih uslova. Primjer obrasca priložen je uz ovaj dokument, kao Aneks G. Može se dodati sledeća podklauzula.

PRIMJER ODREDBI O FINANSIRANJU IZVOĐAČA

Investitor se obavezuje da pribavi (o sopstvenom trošku) garanciju za plaćanje, a iznos, valuta i njen izdavač navode se u prilogu tendera. Investitor se obavezuje da izvođaču podnese garanciju uroku od 28 dana po zaključenju ugovora. Garancija se izdaje po obrascu, koji je prihvatljiv za izvođača. Sve dok izvođač ne primi garanciju, investitor ne može da podnese obaveštenje, u skladu sa podklauzulom 8.1

Garancija se vraća investitoru:

(a) kada izvođaču bude isplaćen ugovorna cijena, koja je navedena u ugovornom sporazumu;
(b) kada su obaveze, na osnovu garancije, prestale ili su izvršene;
(c) kada je investitor izvršio sve obaveze, u okviru ugovora.

KLAUZULA 15 - RASKID OD STRANE INVESTITORA

Podklauzula 15.2 - Raskid od strane Investitora

Prije nego sto objavi poziv za podnošenje tendera, Investitor bi trebalo da provjeri da li su tekst ove podklauzule i svaki predviđeni osnov za raskid u skladu sa zakonom koji se primjenjuje na Ugovor.

Podklauzula 15.5 - Pravo investitora na raskid

Može se dodati još jedna rečenica ukoliko nije nedosledna zahtjevima Investitora i/ili finansijske institucije.

PRIMJER

Unijeti sledeći tekst na kraju podklauzule 15.5:

Investitor se takodje obavezuje da Izvođaču nadoknadi svaki gubitak ili štetu koja proistekne iz ovog raskida.

KLAUZULA 16 - OBUSTAVA I RASKID OD STRANE IZVOĐAČA

Podklauzula 16.2 - Raskid od strane Izvođača

Prije nego što objavi poziv za podnošenje tendera, Investitor bi trebalo da provjeri da li je tekst ove podklauzule u skladu sa zakonom koji se primjenjuje na Ugovor. Izvođač bi trebalo da provjeri da li je svaki osnov za raskid u skladu sa tim zakonom.

KLAUZULA 17 - RIZIK I ODGOVORNOST

Podklauzula 17.6 - Ograničenje odgovornosti

PRIMJER

U podklauzuli 17.6, iznos koji se pominje u pretposlednjoj rečenici

jeste _____.

Dodatna podklauzula - Korišćenje smještajnih kapaciteta/pogodnosti Investitora

Ako je predviđeno da Izvođač privremeno zauzme kapacitete Investitora, može se unijeti još jedna podklauzula:

UZORNA PODKLAUZULA

Izvođač preuzima svu odgovornost za staranje o nize navedenim stvarima od dana zauzimanja do dana predaje ili prestanka zauzeća (s tim sto predaja ili prestanak zauzeća mogu da budu posle dana navedenog u Potvrdi o prijemu Radova):

(unijeti pojedinosti)

Ukoliko dođe do gubljenja ili oštećenja bilo koje pomenute stvari dok je Izvođač odgovoran za staranje o njima, iz bilo kojih razloga, osim onih za koje je Investitor odgovoran, Izvođač se obavezuje da o sopstvenom trošku sanira gubitak ili oštećenje na način koji zadovoljava Investitora.

KLAUZULA 18 - OSIGURANJE

U tekstu Opštih uslova navode se osiguranja koja vrši stran koja obezbjeđuje osiguranje, a to je Izvođač, ukoliko nije drugačije predviđeno Posebnim uslovima. Osiguranja koje obezbijedi Izvođač moraju biti u skladu sa Opštim uslovima koji su dogovoreni sa Investitorom. Stoga bi trebalo da se navede da se od podnosioca tendera trazi da iznesu pojedinosti predloženih

uslova. Posebni uslovi trebaju da navedu minimalni iznos pojedinačnog udjela za tačku (d) subklauzule 18.2 i minimalni iznos osiguranja trećeg lica za podklauzule 18.3.

Ako je predviđeno da Investitor obezbijedi bilo koje osiguranje u skladu sa ovom klauzulom, dokumentacija ponude bi trebalo da sadrži pojedinosti u vidu aneksa Posebnih uslova (tako da bi podnosioci tendera mogli da utvrde koji bi im još osiguranje trebalo radi sopstvene zaštite), sa uslovima, ograničenjima, izuzecima i odbicima, a poželjno bi bilo da to bude u formi primjeraka svake polise. Investitoru bi moglo biti teško da izvrši osiguranja navedena u trećem stavu podklauzule 18.2 (za opremu Izvođača koja sadrži i opremu podizvođača), jer Investitor možda ne zna količinu ili vrijednost tih stavki opreme. Može se unijeti sledeća rečenica u Posebne uslove:

PRIMJER

Brisati poslednji stav podklauzule 18.2 i zamijeniti ga sa:

Međutim, osiguranja koja su opisana u prva dva stava podklauzule 18.2 vrši i održava Investitor kao strana koja obezbjeđuje osiguranje, a ne Izvođač.

KLAUZULA 19 - VIŠA SILA

Prije nego sto objavi poziv na podnošenje tendera, Investitor bi trebalo da provjeri da li je tekst ove klauzule u skladu sa zakonom koji se primjenjuje na Ugovor.

KLAUZULA 20 - POTRAŽIVANJA, SPOROVI I ARBITRAŽA

Ugovor treba da sadrži odredbe, koje bez odvraćanja strana od sporazumnog rješavanja sporova, Stranama omogućavaju da sporna pitanja podnose Komisiji za rješavanje sporova (KRS).

Uspjeh postupaka za rješavanje sporova zavisi, pored ostalog, i od povjerenja strana u sporazumno postavljanje lica za članove KRS. Stoga je neophodno da ni jedna strana ne nameće drugoj kandidate za tu funkciju, i ako se neko lice bira u skladu sa podklauzulom 20.3, izbor vrši potpuno nepristrasan entitet. FIDIC je voljan da prihvati takvu ulogu, ako je ovlašćenje za to dato u skladu sa dolje navedenim u podklauzuli 20.3.

Podklauzula 20.2 predviđa određivanje KRS kada jedna od strana saopšti svoju namjeru da spor podnese KRS na rješavanje. Međutim, kod neke vrste projekata, i to naročito onih koji iziskuju ekstezivne radove na gradilištu, gdje bi bilo prikladno da KRS redovno posjećuje gradilište, može se odlučiti da se koriste usluge trajne KRS. U tom slučaju bilo bi potrebno izvršiti izmjene podklauzule 20.2 i 20.4 zajedno sa Prilogom i Aneksom Opštih uslova i Sporazumom o rješavanju sporova kako bi bile u saglasnosti sa odgovarajućim tekstovima FIDIC-ovih Uslova za ugovor o izgradnji.

Podklauzula 20.2 obezbjeđuje dva alternativna aranžmana za KRS:

(a) jedno lice, koje djeluje kao jedini član KRS, po tripatitnom sporazumu sa obje ugovorne strane, ili

(b) KRS koja se sastoji od tri člana, od kojih je svaki zaključio tripatitni sporazum sa obje ugovorne strane.

Dva alternativna obrasca ovog sporazuma data su na kraju ove publikacije, koji se primjenjuju zavisno od usvojenog aranžmana. Ova obrasca sadrže u sebi Opšte uslove sporazuma o rješavanju sporova, koji su dati u Prilogu Opštih uslova, jer se oni takođe pominju u podklauzuli 20.2. U bilo kojoj alternativi Sporazum o rješavanju sporova, svako lice pominje se kao član.

Prije zaključivanja Ugovora, trebalo bi utvrditi da li bi jednočlana ili tročlana KRS bila prikladija u datom projektu, uzevši u obzir njegovu veličinu, trajanje i oblast stručnosti.

Određivanje KRS može da se olakša aako se u Ugovor unese spisah potencijalnih članova.

Podklauzula 20.3 Nepostizanje saglassnosti oko Komisije za rješavanje sporova

PRIMJER

Predsjednik FIDIC-a ili lice koje on imenuje biće postavljeni subjekat ili predstavnik.

Podklauzula 20.5 Prijateljsko rješavanje

Odredbe ove podklauzule predviđene su da se ugovorne strane podstaknu na rješavanje sporova na prijateljski način, bez pribjegavanja arbitraži, na primjer putem neposredih pregovora, mirenja, posredovanja i ostalih oblika alternativnog rješavanja sporova. Uspjeh postupka za prijateljsko rješavanje sporova zavisi od povjerenja i obostranog prihvatanja postupka. Stoga nijedna strana ne smije da ovaj postupak nameće drugoj.

Podklauzula 20.6 Arbitraža

Ugovor bi trebalo da sadrži odredbe za rješavanje putem međunarodne arbitraže sporova koji ne budu riješeni na prijateljski način. U slučaju međunarodnih ugovora za izgradnju, međuarodna trgovačka arbitraža ima mnogo prednosti u odnosu na parnične postupke pred domaćim sudovima i ona može biti prihvatljivija stranama.

Potrebno je da se strogo vodi računa o tome da izabrana pravila međunarodne arbitraže budu u skladu sa odredbama klauzule 20 i ostalim elementima navedenim u Ugovoru. Pravila arbitraže Međunarodne trgovačke komore (čije je sjedište u 38 Cours Albert 1er, 75008 Pariz, Francuska) često se uključuju u međunarodne ugovore. U nedostatku dogovora o broju arbitara i mjestu arbitraže, Međunarodni arbitražni sud Međunarodne trgovačke komore odlučuje o broju arbitara (obično biva po tri u većim sporovima) i mjestu arbitraže.

U slučaju opredjeljenja za pravila UNCITRAL-a (ili neka druga pravila arbitraže), bilo bi potrebno da se u Posebnim uslovima navede institucija koja određuje arbitra ili koja će voditi

arbitražu, ukoliko takva institucija nije navedena (i njena uloga precizirana) u pravilima arbitraže. Takođe bi bilo potrebno prije određivanja institucije da se utvrdi spremnost za postavljenje.

U slučaju većih projekara za koje se tenderi podnose na medjunarodnom nivou, poželjno je da mjesto arbitraže ne bude u zemlji Investitora ili Izvođača. Ta zemlja bi trebalo da ima moderan i liberanan zakon o arbitraži i da je ratifikovala bilateralnu ili multilateralnu konvenciju (kao što je Njujorška konvencija o priznavanju i primjeni inostranih arbitražnih odluka) ili obje, što bi pospješilo primjenu arbitražne odluke u državama ugovornih strana.

U nekim slučajevima bilo bi poželjno da se i druge strane pridruže arbitraži između ugovornih strana, čime bi se stvorila višestrana arbitraža. Iako je to izvodljivo, višestrana arbitraža iziskuje stručno planiranje i obično se priprema od slučaja do slučaja. Za sada ne postoji zadovoljavajući standardni oblik klauzule o višestranoj arbitraži za međunarodnu primjenu.

ANEKSI - OBRASCI GARANCIJA

Potrebno je da se prihvatljivi obrazci unesu u tendersku dokumentaciju, i to: za Aneks A i/ili B, u uputstvima za podnosioce tendera, i za Anekse C do G, kao prilog posebnih uslova. Sledeći primjeri obrazaca koji su (izuzev Aneksa A) obuhvataju jedinstvena pravila koje je objavila Međunarodna trgovačka komora (čije je sjedište u ulici 38 Cours Albert 1er. 75008, Pariz, Francuska), možda bi morali da se izmjene radi usaglašavanja sa važećim zakonom. Iako Međunarodna trgovačka komora objavljuje priručnike za pomenuta jedinstvena pravila, bio bi potreban pravni savjet prije nego šro se pripreme garancije. Iznos garancije trebalo bi da se navede u svim valutama u kojim je ugovorom predviđeno da garanti plaćaju korisnicima.

Aneks A - PRIMJER OBRASCA GARANCIJE MATIČNE KOMPANIJE

(pogledati stranu 4. i komentare o podklauzuli 1.14)

Kratak opis ugovora.....

Naziv i sjedište kompanije.....

.....(sa pravnim sljedbenicima i cesionarima).

Obavješteni smo da.....(u daljem tekstu: izvođač) podnosi ponudu za pomenuti ugovor u odgovoru na vaš poziv i da je po uslovima vašeg poziva potrebno da njegova potvrda bude potkrijepljena garancijom matične kompanije.

U slučaju da u svojstvu investitora dodijelite izvođaču, mi (naziv matične kompanije)..... neopozivo i bezuslovno garantujemo, u prvom redu za valjano izvršavanje svih izvođačevih ugovornih obaveza i odgovornosti, uključujući i njegovo postupanje u skladu sa svim uslovima ugovora prema njihovoj stvarnoj svrsi i značenju.

Ukoliko izvođač ne izvrši svoje obaveze i ne postupi u skladu sa ugovorom, obavezujemo se da investitora obeštetimo za svu štetu, gubitke i troškove (uključujući sudske troškove) koji nastanu zbog neizvršavanja obaveza za koje je izvođač odgovoran investitoru, na osnovu ugovora.

Ova garancija postaje pravosnažna po potpunoj pravosnažnosti ugovora. Ukoliko ugovor ne postane pravosnažan u roku od godinu dana od dana izdavanja ove garancije ili ako pokažete da nemate namjeru da zaključite ugovor sa izvođačem, ova garancija će postati ništavna. Ova garancija ostaje na snazi sve dok izvođač ne izvrši sve svoje obaveze po ugovoru, nakon čega njena važnost ističe i ona se nama vraća, a naše obaveze po ovom poslu će se smatrati u potpunosti izvršenim.

Ova garancija se odnosi na ugovor i predstavlja prilog ugovoru sa svim svojim izmjenama i dopunama, koje investitor i izvođač budu izvršili u bilo kojem trenutku. Ovim ih ovlašćujemo da se dogovore o takvim izmjenama i dopunama i garantujemo za valjano izvršenje istih. Naše obaveze i odgovornosti, na osnovu ove garancije, ne mogu da prestanu zbog produženja roka ili drugih povlastica koje investitor bude dao izvođaču ili zbog izmjena ili obustavljanja radova koji se izvode po ugovoru ili zbog izmjena i dopuna ugovora ili ustrojstva izvođača ili investitora ili zbog drugih stvari, sa ili bez našeg znanja ili saglasnosti.

Mjerodavno pravo za ovu garanciju je ono pravo koje je mjerodavno i za ugovor, a bilo kakav spor po na osnovu ove garancije rješava se po pravilima arbitraže Međunarodne trgovačke komore od strane jednog ili više arbitara koji su postavljeni u skladu sa ovim pravilima. Potvrđujemo da se naknada iz ove garancije može prenijeti samo pod uslovima za prenos koji su ugovorom predviđeni.

Datum.....
Potpis.....

ANEKS B - PRIMJER OBRASCA GARANCIJE ZA TENDER

(pogledati stranu 4)

Kratak opis ugovora.....

Naziv i sjedište korisnika.....

.....(koji je u tenderskoj dokumentaciji definisan kao investitor).

Obavješteni smo da..... (u daljem tekstu: komitent) predaje ponudu za ugovor, kao odgovor na vaš poziv, i da uslovi vašeg poziva ("uslovi poziva", koji su objašnjeni u dokumentu, koji je naslovljen "uputstva podnosiocima tendera") zahtijevaju da njegova ponuda bude potkrijepljena garancijom za tender.

Na zahtjev komitenta, mi (naziv banke)..... se ovim neopozivo obavezujemo da vama, korisniku/investitoru, isplatimo bilo koji iznos, koji ne premašuje..... (i slovima)....., po prijemu vašeg zahtjeva u pisanoj formi i vaše pisane izjave u (u zahtjevu) u kojoj se navodi:

(a) da je komitent bez vaše saglasnosti povukao svoju ponudu po isteku posljednjeg roka za njeno dostavljanje i prije isteka roka važnosti ponude, ili
(b) da je komitent odbio da prihvati ispravku grešaka u svojoj ponudi, u skladu sa pomenutim uslovima poziva, ili
(c) da ste ugovor dodijelili komitentu i da on nije dostavio potvrdu o dobro izvršenom poslu, u skladu sa podklauzulom 4.2 uslova ugovora.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom, ovjerenim od strane vaših bankara ili notara. Ovjereni zahtjev i izjava moraju da nam se podnesu u našim prostorijama (do 35. dana po isteku važnosti tendera), kada ova garancija prestaje da važi i kada se nama vraća.

Ova garancija podliježe jedinsvenim pravilima o potražnim garancijama, koja su objavljena od strane Međunarodne trgovačke komore pod brojem 458, osim u gore navedenim slučajevima.

Datum.....
Potpis(i).....

ANEKS C - PRIMJER OBRASCA GARANCIJE ZA DOBRO IZVRŠENI POSAO

(vidjeti komentare o podklauzuli 4.2)

Kratak opis ugovora.....

Naziv i sjedište korisnika.....

.....(koji je u ugovoru definisan kao investitor).

Obavješteni smo da je..... (u daljem tekstu: komitent) vaš izvođač po pomenutom ugovoru, kojim je predviđeno da on podnese garanciju za dobro izvršavanje posla.

Na zahtjev komitenta, mi (naziv banke)..... se ovim neopozivo obavezujemo da vama, krisniku/investitoru, isplatimo bilo koji iznos ili iznose koji ne premašuju..... (i slovima.....) po prijemu vašeg zahtjeva u pisanoj formi i vaše pisane izjave (u zahtjevu) u kojoj se navodi:

(a) da komitent krši svoje ugovorne obaveze, i
(b) u kom pogledu komitent krši te obaveze.

(Po prijemu ovjerenog primjerka potvrde o prijemu svih radova, u skladu sa klauzulom 10. uslova ugovora, taj garantovani iznos se smanjuje za.....% i odmah ćemo vas obavijestiti da smo primili takvu potvrdu i da smo garantni iznos umanjili u toj mjeri)[1].

Svaki zahtjev za isplatu mora da bude sa vašim potpisom (potpisom ministra/direktora) koji je ovjeren od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se podnesu u našim prostorijama do (70 dana prije očekivanog isteka roka za prijavljivanje nedostataka radova).....(datum isteka), kada ova garancija prestaje da važi i kada se vraća nama.

Obavješteni smo da korisnik može da od komitenta traži produženje ove garancije ukoliko potvrda o valjanom izvršenju posla ne bude izdata najmanje 28 dana prije datuma isteka. Obavezujemo se da vam isplatimo takav garantni iznos u roku od 28 dana od prijema vašeg zahtjeva i izjave u pisanoj formi da potvrda o valjanom izvršenju posla nije izdata iz razloga koji se pripisuju komitentu i da ova garancija nije produžena.

Ova garancija podliježe..... i jedinstvenim pravilima o potražnim garancijama, koje je izdala Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima.

Datum.....
Potpis(i).....

[1] Prilikom izrade tenderske dokumentacije, lice koje priprema tendersku dokumentaciju bi trebalo da odluči da li da unese tekst, koji nije obavezan, u zagradi ().

ANEKS D - PRIMJER OBRASCA GARANCIJE ZA DOBRO IZVRŠENJE POSLA - ZA OBEZBJEĐENJE

(pogledati komentare o podklauzuli 4.2)

Kratak opis ugovora.....

Naziv i sjedište korisnika.....

.....(zajedno sa pravnim sljedbenicima i cesionarima, koji su u ugovoru definisani kao investitor).

Ovom garancijom, (naziv i sjedište izvođača).....(koji je izvođač po takvom ugovoru), kao komitent i (naziv i sjedište garanta).....kao garant se neopozivo obavezuju korisniku za ukupan iznos od.....(garantni iznos, i slovima.....) za valjano izvršavanje svih obaveza i odgovornosti komitenta. (Takav garantni iznos se umanjuje za.....% po izdavanju potvrde o prijemu radova u cjelini, u skladu sa klauzulom 10. uslova ugovora).[2]

Garancija postaje pravosnažna na datum početka, koji je preciziran u ugovoru.

Ako komitent ne izvrši bilo koju svoju ugovornu obavezu ili po nastanku bilo kog događaja ili okolnosti navedenih u podklauzuli 15.2 uslova ugovora, garant se obavezuje da namiri i nadoknadi štetu koju korisnik bude pretrpio zbog takvog neizvršavanja, događaja ili okolnosti.[3] Međutim, sveukupna odgovornost garanta ne premašuje garantni iznos.

Obaveze i odgovornosti garanta ne mogu da prestanu zbog produženja roka ili drugih povlastica koje korisnik bude dao komitentu, ili zbog izmjena ili obustavljanja radova koji se izvode po ugovoru ili zbog izmjena i dopuna ugovora ili ustrojstva komitenta ili korisnika ili zbog drugih stvari, sa ili bez znanja ili saglasnosti garanta.

Svako potraživanje po ovoj garanciji mora da se podnese garantu do (datum je šest mjeseci poslije očekivanog isteka roka za prijavu nedostataka radova).....(datum isteka), kada ova garancija prestaje da važi i kada se vraća garantu.

Naknada po ovoj garanciji može da se prenese, u skladu sa odredbama za prenos ugovora, pod uslovom da se garantu podnese dokaz o potpunom postupanju u skladu sa tim odredbama.

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[2] Prilikom izrade tenderske dokumentacije, lice koje priprema tendersku dokumentaciju bi trebalo da odluči da li da unese tekst, koji ne obavezan, u zagradi.

[3] Dodati: (i neće imati pravo da izvršava ugovorne obaveze komitenta.)

ili: (ili po izboru garanta, koji se iskazuje u pisanoj formi, u roku od 42 dana od prijema potraživanja, u kome se navodi takvo neizvršavanje, da izvršava ugovorne obaveze komitenta)

Garancija podliježe zakonima iste zemlje čijim zakonima podliježe i ugovor. Ova garancija obuhvata i podliježe jedinstvenim pravilima o potražnim garancijama koja je izdala Međunarodna trgovačka komora pod brojem 524 i riječi koje se koriste u ovoj garanciji imaju značenje koje im je dato u pomenutim pravilima.

Ovu garanciju su izdali komitent i garant dana.....

Potpisao u ime komitenta.....

Potpisao u ime garanta.....

Aneks E – UZORNI OBRAZAC GARANCIJE ZA AVANSNA PLAĆANJA

[vidjeti komentare o podklauzuli 14.2]

Kratak opis Ugovora _____

Naziv i sjedište Korisnika _____
_____(koji je u Ugovoru definisan kao Investitor).

Obaviješteni smo da je _____ (u daljem tekstu: Komitent) vaš izvođač po pomenutom Ugovoru i da želi da mu bude isplaćen avans, za šta je po Ugovoru obavezan da obezbijedi garanciju.

Na zahtjev Komitenta, mi (naziv banke) _____ se neopozivo obavezujemo da isplatimo vama, Korisniku/Investitoru, bilo koji iznos ili iznose koje sve skupa ne premašuju _____(garantni iznos, i slovima _____) po prijemu vašeg zahtjeva i izjave u pisanoj formi u kojoj se navodi:

(a) da Komitent nije izvršio povraćaj avansa u skladu sa uslovima Ugovora, i

(b) iznos koji Komitent nije vratio.

Ova garancija postaje pravosnažna kada Komitent primi (prvu tranšu) avansa. Pomenuti garantni iznos se umanjuje za iznose avansu koji vama budu vraćeni prema vašim obavještenjima izdatim u skladu sa podklauzulom 14.6 uslova Ugovora. Po prijemu (od Komitenta) primjerka svakog obavještenja, odmah ćemo vam saopštiti izmijenjeni saldo garantnog iznosa.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom koji je ovjeren od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se dostave do (*u roku od 70 dana o očekivanog isteka Roka za završetak*) _____ (datum isteka), kada ova garancija prestaje da važi i vraća se nama.

Obaviješteni smo da Korisnik može da od Komitenta traži produženje garancije, ako avans ne bude vraćen najmanje 28 dana pre pomenutog datuma isteka. Obavezujemo se da vam pomenuti garantni iznos isplatimo u roku od 28 dana od prijema vašeg zahtjeva i izjave u pisanoj formi da vans nije vraćen i da ova garancija nije produžena.

Ova garancija podliježe zakonima _____ i Jedinstvenim pravilima o potražnim garancijama koja je izdala Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima

Datum _____ Potpis(i) _____

Aneks F – UZORNI OBRAZAC GARANCIJE ZA GARANTNI DEPOZIT

[vidjeti komentare o podklauzuli 14.9]

Kratak opis Ugovora _____

Naziv i sjedište Korisnika _____
_____(koji je u Ugovoru definisan kao Investitor).

Obaviješteni smo da je _____ (u daljem tekstu: Komitent) vaš izvođač po pomenutom Ugovoru i da želi prevremenu isplatu garantnog depozita (ili njegovog dijela), za šta je po Ugovoru obavezan da obezbijedi garanciju.

Na zahtjev Komitenta, mi (naziv banke) _____ se ovim neopozivo obavezujemo da vama, Korisniku/Investitoru, isplatimo svaki iznos ili iznose koji skupa ne premašuju _____(garantni iznos, i slovima _____) po prijemu vašeg zahtjeva i izjave u pisanoj formi u kojoj se navodi:

(a) da Komitent nije izvršio svoju obavezu da otkloni nedostatke za koje je odgovoran na osnovu Ugovora, i

(b) priroda pomenutih nedostataka.

Naša odgovornost po ovoj garanciji ne može da bilo kada premaši iznos garantnog depozita koji je Komitentu prenet sa vaše strane, što se potvrđuje vašim obavještenjima izdatim u skladu sa podklauzulom 14.6 uslova Ugovora, čiji su primjerci nama proslijeđeni.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom ovjerenim od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se podnesu do (*u roku od 70 dana od očekivanog isteka Roka za prijavljivanje radova*) _____ (datum isteka), kada ova garancija prestaje da važi i vraća se nama.

Obaviješteni smo da Korisnik može da od Komitenta traži produženje ove garancije, ako Ugovorom predviđena potvrda o valjano izvršenom poslu ne bude izdata najmanje 28 dana pre pomenutog roka. Obavezujemo se da vam pomenuti garantni iznos isplatimo u roku od 28 dana od prijema vašeg zahtjeva i izjave u pisanoj formi da potvrda o valjanom izvršenju posla nije izdata iz razloga koji se ne mogu pripisati Komitentu i da ova garancija nije produžena.

Ova garancija podliježe zakonima _____ i Jedinstvenim pravilima o potražnim grancijama koja je izdala Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima.

Datum _____ Potpis(i) _____

Aneks G – **UZORNI OBRAZAC GARANCIJE ZA PLAĆANJE OD STRANE INVESTITORA**

[vidjeti str. 194: Finansiranje izvođača]

Kratak opis Ugovora _____

Naziv i sjedište Korisnika _____
_____(koji je u Ugovoru definisan kao Izvođač).

Obaviješteni smo da je _____ (koji je u Ugovoru definisan kao Investitor i koji se u daljem tekstu pominje kao Komitent) u obavezi da obezbijedi bankarsku garanciju.

Na zahtjev Komitenta, mi (naziv banke) _____ se neopozivo obavezujemo da vama, Korisniku/Izvođaču, isplatimo svaki iznos ili iznose koji skupa ne premašuju _____(i slovima: _____) po prijemu vašeg zahtjeva i izjave u pisanoj formi u kojoj se navodi:

(a) da Komitent nije isplatio u potpunosti iznos koji je dospio po Ugovoru u roku od 14 dana od isteka roka predviđenog Ugovorom za takvu isplatu, i

(b) iznos koji Komitent nije isplatio.

Uz svaki zahtjev za plaćanje prilaže se primjerak (spisak dokumenata koji dokazuju pravo na isplatu) _____, u vezi kojeg Komitent nije izvršio isplatu u potpunosti.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom ovjerenim od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se podnesu do (*u roku od 70 dana od očekivanog isteka Roka za prijavljivanje nedostataka*) _____, kada ova garancija prestaje da važi i vraća se nama.

Ova garancija podliježe zakonima _____ i Jedinstvenim pravilima o potražnim garancijama koja je objavila Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima.

Datum _____ Potpis(i) _____

Opšti uslovi

Savjeti za pripremu

posebnih uslova

Uslovi ugovaranja za PNI/ključ u ruke projekte

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

Međunarodna Federacija Konsalting Inženjera

PONUDA

NAZIV UGOVORA:

PRIMA:

Pregledali smo Uslove ugovora, Zahtjeve investitora, Planove i preglede, Prilog i Dodatke br. _____ za pomenute Radove. Pregledali smo, razumjeli i provjerili te dokumente i utvrdili da u njima nema grešaka i drugih manjkavosti. Stoga se nudimo da projektujemo, izvedemo i završimo Radove i da otklonimo njihove eventualne nedostatke u skladu sa ovom Ponudom koja sadrži sva ta dokumenta i ponudu za paušalni iznos od

(u valutama plaćanja) _____

Prihvatamo vaše predloge u vezi određivanja KRS, kako je predviđeno u planu _____

*[Plan smo kompletirali unošenjem naših predloga u vezi drugog Člana KRS, ali naši uslovi nisu i uslovi ove ponude]. **

Pristajemo da se držimo ove Ponude do _____ i on ostaje obavezujući za nas i može da bude prihvaćen bilo kada prije pomenutog datuma. Potvrđujem da Prilog sačinjava sastavni dio Ponude.

Ukoliko ova ponuda bude prihvaćena, obavezujemo se da obezbijedimo predviđenu garanciju za valjano izvršenje posla, da otpočnemo izvođenje Radova u što je moguće kraćem roku posle Datuma početka i da završimo radove u skladu sa gore pomenutim dokumentima u Roku za završetak. Garantujemo da će Radovi tada biti u skladu sa garancijama.

Sve do pripreme i zaključenja zvaničnog Ugovora, ova Ponuda skupa sa vašom potvrdom o prihvatanju istog sačinjavaće obvezujući ugovor između nas.

Poznato nam je da niste u obavezi da prihvatite najnižu ili bilo koju drugu ponudu koju budete primili.

Potpis _____ u svojstvu _____

Koji je ovlašćen za potpisivanje ponude u ime _____

_____

Adresa: _____

_____

Datum: _____

* Ako podnosilac tendera ne prihvata, ovaj se stav može brisati i zamijeniti sledećim stavom.

Ne prihvatamo vaše uslove za određivanje KRS. Mi smo unijeli naše predloge u plan, ali ti predlozi ne predstavljaju uslove ove ponude. Ako su vam naši predlozi neprihvatljivi, predlažemo da se KRS zajednički odredi u skladu sa podklauzulom 20.2 Uslova ugovora.

UGOVOR

Ovaj sporazum sačinjen dana.....20.....

Između.....(u daljem tekstu ,,Investitor") sa jedne strane

i.....(u daljem tekstu "Izvođač") sa druge strane

Pošto investitor želi da radovi, poznati kao.....treba da budu projektovani i izvedeni od strane izvođača i prihvatio je ponudu izvođača za projektovanje, izvođenje i kompletiranje radova i uklanjanje svih nedostataka na istim.

Investitor i izvođač su saglasni sa sledećim:

1. U ovom sporazumu, riječi i izrazi će imati ista značenja kao ona koja su im dodijeljena u uslovima ugovorau daljem tekstu.

2. Sledeća dokumenta ćine i biće shvaćena i tumačena kao sastavni dio ovog sporazuma:

    (a) Memorandumi koji su priloženi uz ovaj dokument (što uključuje i analizu ugovorne cijene po stavkama)
    (b) Dopune.....
    (c) Uslovi ugovora
    (d) Zahtjevi investitora, i
    (e) Ponuda izvođača

3. Uzevši u obzir plaćanja koja će biti izvršena izvođaču od strane investitora, kao što je u daljem tekstu pomenuto, izvođač se ovim ugovorom dogovorio sa investitorom da projektuje, izvede i kompletira radove i ukloni sve nedostatke u skladu sa odredbama ugovora
4. Investitor je saglasan da plati izvođaču, uzevši u obzir projektovanje, izvođenje, i kompletiranje radova i uklanjanje nedostataka, finalnu ugovornu cijenu, u rokovima i na način propisan ugovorom.
5. Ugovor stupa na snagu na dan kada su sledeći uslovi ispunjeni:
   (spisak preduslova)

   Investitor blagovremeno potvrđuje izvođaču datum kada su svi ovi uslovi ispunjeni. Ukoliko neki od ovih uslova nije ispunjen u roku od nekoliko dana u odnosu na gore navedeni datum kada je ovaj sporazum napravljen, ovaj Sporazum biće ništavan i neće proizvoditi pravno dejstvo i sve hartije od vrijednosti izdate u vezi sa radovima biće vraćene.

Kao svjedočanstvo o tome, strane su stavile svoje potpise na ovaj ugovor dana i godine, koji su na početku napisani, u skladu sa njihovim relevantnim zakonima.

Potpisano od strane:

U ime investitora i u prisutvu svedoka:

Svjedok:

Ime:

Adresa:

Datum:

Potpisano od strane:

U ime investitora i u prisutvu svedoka:

Svjedok:

Ime:

Adresa:

Datum:

SPORAZUM O RJESAVANJU SPOROVA

(za jednočlanu KRS)

Naziv i pojedinosti Ugovora _____

Naziv i sjedište Investitora _____

Naziv i sjedište Izvođača _____

Ime i adresa člana _____

Pošto su Investitor i Izvođač zaključili Ugovor i žele da zajednički odrede člana koji ce da djeluje kao jedini presuđivač u sporu pokrenutom u vezi _____.

Investitor, Izvođač i Član su se sporazumjeli kako slijedi:

1. Uslove ovog sporazuma o rješavanju sporova predstavljaju opšti uslovi sporazuma o rješavanju sporova, koji su dati u vidu dodataka opštih uslova 1. izdanja uslova ugovora za EPC/ključ u ruke projekte objavljenog od strane FIDIC-a 1999. godine i sledeće odredbe. Riječi i izrazi koji se koriste u pomenutim odredbama, koje uključuju Izmjene i dopune opštih uslova sporazuma za rješavanja sporova, imaju isto onakvo značenje kakvo im je pripisano u opštim uslovima sporazuma za rješavanje sporova.

2. (Pojedinosti vezane za izmjene i dopune opštih uslova sporazuma za rješavanje sporova, ukoliko su vršene.)

3. U skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, članu se isplaćuje dnevna naknada u iznosu od _____.

4. U zamjenu za pomenutu naknadu i ostala plaćanje koja ce investitor i izvođač vršiti u skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, član se obavezuje da djeluje kao presuđivač u skladu sa sporazumom o rješavanju sporova.

5. Investitor i Izvođač se solidarno obavezuju da plaćaju članu za pružanje pomenutih usluga u skladu sa klauzulom 6. Opštih uslova sporazuma o rješavanju sporova.

6. Ovaj sporazum o rješavanju podliježe zakonima _____.

POTPISAO:	POTPISAO:	POTPISAO:
za i u ime investitora u prisustvu	za i u ime investitora u prisustvu	član u prisustvu

Svjedok: _____	Svjedok: _____	Svjedok: ____
Ime: _____	Ime: _____	Ime: _____
Adresa: _____	Adresa: _____	Adresa: _____
Datum: _____	Datum: _____	Datum: _____

(Unijeti kratak opis ili naziv spora.)

SPORAZUM O KOMISIJI ZA RJESAVANJE SPOROVA

(za svakog člana KRS)

Naziv i pojedinosti Ugovora _____

Naziv i sjedište Investitora _____

Naziv i sjedište Izvođača _____

Ime i adresa člana _____

Pošto su Investitor i Izvođač zaključili ugovor i žele da zajednički odrede člana koji će da djeluje kao jedno od tri lica koja se zbirno nazivaju KRS (i žele da član djeluje u svojstvu predsedavajućeg) u rješavanju spora koji je nastao u vezi _____.

Investitor, Izvođač i član su se sporazumjeli kako slijedi:

1. Uslove ovog sporazuma o rješavanju sporova predstavljaju opšti uslovi sporazuma o rješavanju sporova, koji su dati u vidu dodataka opštih uslova 1. izdanja uslova ugovora za EPC/ključ u ruke projekte objavljenog od strane FIDIC-a 1999. godine i sledeće odredbe. Riječi i izrazi koji se koriste u pomenutim odredbama, koje uključuju Izmjene i dopune opštih uslova sporazuma za rješavanja sporova, imaju isto onakvo značenje kakvo im je pripisano u opštim uslovima sporazuma za rješavanje sporova.

2. (Pojedinosti vezane za izmjene i dopune opštih uslova sporazuma za rješavanje sporova, ukoliko su vršene.)

3. U skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, članu se isplaćuje dnevna naknada u iznosu od _____.

4. U zamjenu za pomenutu naknadu I ostala palacanje koja ce investitor i izvođač vršiti u skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, član se obavezuje da djeluje u skladu sa sporazumom o rješavanju sporova kao jedno od tri lica koja zajednički djeluju u svojstvu KRS.

5. Investitor i Izvođač se solidarno obavezuju da plaćaju clanu za pružanje pomenutih usluga u skladu sa klauzulom 6. Opštih uslova sporazuma o rješavanju sporova.

6. Ovaj sporazum o rješavanju podleže zakonima _____.

POTPISAO:	POTPISAO:	POTPISAO:
za i u ime investitora u prisustvu	za i u ime investitora u prisustvu	član u prisustvu
Svjedok: _____	Svjedok: _____	Svjedok: ____
Ime: _____	Ime: _____	Ime: _____
Adresa: _____	Adresa: _____	Adresa: _____
Datum: _____	Datum: _____	Datum: _____

(Unijeti kratak opis ili naziv spora.)

F. Project descriptions and procedures with technical requirements

F. Particular technical requirements

Issue and Revision Record				
No.	Date	Originator	Checker	Description
A	30/04/2014	Dj. Debljovic	U.Becker	-

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F4.1. Educational Building 1
Secondary Vocational School, Pljevlja

F4.1.1 Technical Description of Building and Trade Works

For Energy Efficiency Improvement in "Secondary Vocational School" Pljevlja, Montenegro

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	"Secondary Vocational School", Pljevlja
Doc. origin:	Final Architectural Design
Date:	May 2013

The purpose of reconstruction of the Secondary Vocational School in Pljevlja is implementation of Energy Efficiency Measures in the building, in line with the Design Brief and results of Detailed Energy Audit.

In terms of envisaged building and trade works, improvement of energy efficiency is achieved through application of following measures:

- Thermal insulation of facade walls,
- Thermal insulation of the ground floors in the buildings "B" and "C",
- Replacement of facade joinery,
- Thermal insulation and renovation of the roofs.

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities. Those works include:

- Removal and installation of vertical and horizontal rain gutters,
- Removal and installation of lightning system, cameras and antennas,
- Removal and production of new flashing sills, mortar repairs and paintwork repairs,
- Removal and production of new drips and metal sheet drips,
- Removal and installation of new steel bars on windows,
- Treatment of flashings of the roof edges made of wood of building "B" and garage/boiler room,
- Construction of the new pavement in not existing / partially damaged areas:
  -around the buildings "A" and "B",
  -new pavement around the building "C",
  -new pavement which connects external ramp for disabled persons and school yard.
- Cleaning by steam of the all external part of the main chimney within the boiler room, providing of the flexible building joint to the building "B".

Apart from the measures that directly affect Energy Efficiency Improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned:

- Repairs, cleaning, scraping and preparing of the facade for envisaged finishing layers,
- Renovation of damaged parts of the internal walls and ceiling, skimming and painting with semi-dispersed paint,
- Renovation of existing lavatories in the building "A" and in the boiler room,
- Construction of the toilet for disabled persons,
- Construction of the ramps (internal and external one) for disabled persons,

- Installation of the stair lift for disabled persons,
- Installation of the new floor layers in the buildings “B” and “C”,
- Construction of the last floor ceilings in the buildings “B” and “C”,
- Painting all internal walls and ceilings of the classrooms, corridors and offices in school buildings:
  -using oil based paint up to the height of 1.6 m,
  (including scraping of old paint, polishing and painting with oil-based paint the walls behind the radiators which will be dismantled, rinsed and re-installed),
  -using semi-dispersed paint for the wall areas higher than 1,6m and ceilings,
- Replacement of wooden doors on the basement in building B,
- Planting new trees in school courtyard,
- Reconstruction of the complete roof structure of the building “C”.

THERMAL INSULATION OF FACADE WALLS

Expanded polystyrene, having thermal conductivity coefficient of λmax = 0,037 W/mK, thickness 10cm, produced by relevant EN standards will be used for external insulation of facade walls. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.

The lower part of the facade walls in the ground floor level (all parapets in the ground floor, pillars and parts of the full wall), will be treated with harder insulating material XPS - extruded polystyrene, thickness d=10cm resilient to mechanical damages, with nominal thermal conductivity of λ=0,035-0,04 W/mK. The existing mortar plinths have to be removed where it is peeling off from the substructure and it shall be finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), using at the same time as splash guard and protection against vandalism.

Thermal panels with B1 flammability class (DIN 4102 B1 highly resistance to flammability, non-combustible and self-extinguishing) shall be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.

EPS/XPS pieces, thickness d=5cm, shall be used for treatment of jambs on external sides of openings.

Thermal plates are lap-joint, attached to the facade wall with an appropriate refined mineral adhesive and anchored with corresponding dowels. Surface of the plates is protected with fibrous plaster made of the following components:

* the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth. Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case an additional mechanical anchoring is are required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
* reinforcing mesh;
* the second layer of mortar is applied in the same way as the previous. This mortar is applied on a well settled first layer and floated with a screed afterwards;
* contact coating, made base on emulsion of synthetic resin and water glass, as an agent for impregnation of settled fibrous mortar;

* finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in colour selected by the Employer / Employer’s Representative fully in line with the Design details.

Before attaching the thermal plates, facade base needs to be cleaned, with no dust, greasiness or mortar.

Prior to installation of thermal plates, generally, the following works must be performed:

* all works on flat roof, including sheet metal works,

* finishing of flashings at the roof edges made of wood-trim covering either by special solvents or mechanically; paint shall be stripped up to the healthy layer of wood, where attention shall be paid to avoid wood damages; cleared wood-trim covering and strips shall be checked, obsolete elements shall be carefully removed, and by same type of wood the new elements shall be produced and installed according to the original ones; the wood shall be coated by minimum two layers of “Sandolin” varnish in colour chosen by the Employer / Employer’s Representative.
* construction of the new walls:
    -parapet walls beneath the windows on the ends of corridors on first and second floor-near the external staircase the building “A”,
    -wall that partially closes existing window marked as 26 in the basement of the building “B”,
    -beneath the windows of the first floor stairways in the building “C” (parapet walls shall be built of brick blocks 19x19x25 cm, laid in gauged mortar 1:2:6, d=25 cm),
*demolition of the existing walls:
    -provisionally built parapets beneath five basement windows marked as 3 and one marked as 26 in the basement of the building “B”,
    -the boiler room and garage wall due to installation of new double-leaf door and provisionally built parapets in the staircases of the buildings “A” and “B”,
    -existing parapet walls in hallways in the building “B”,
    -provisionally built at the main staircase landing in the building “A”.
* replacement of facade joinery (including internal benches made of the same materials as windows),
*installation of all facade installations,
* covering and protection of all the surfaces that remained untreated – glass, stone...
* checking existing cradling on the building.

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm shall be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand. If, during separation of polystyrene, only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.
If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the selected adhesive is adequate and firm.

If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.

Corners and jambs of wall openings shall be installed with reinforcing mesh or angle profiles. During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.

As level of the building “A” will be changed by thermal insulation layer, the unit price shall include installation of the new maintenance doors sampled and approved by the Employer / Employer's Representative.
Thermal insulation works include construction of thermal insulated panels made of extruded polystyrene boards, d=2 cm, thermal conductivity of λ=0,04 W/mK, with the layer made of reflecting Al sheet metal d=0,70 mm, painted in the same colour as the internal walls (paint must be thermal resistant). These panels shall be installed under the windows, behind radiators in line with parapet walls and inside of the facade walls of the building “C”.

The final color of facade walls of all three buildings shall match one another, as these three buildings shall present one urban unit. Existing obsolete facade decorations shall not be preserved, except on the Building “C.”

Façade Scaffolding

For execution of described works for application of Energy Efficiency Measures in Secondary Vocational School in Pljevlja, it is necessary to install adequate facade scaffold.

Facade scaffold shall be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It shall be used throughout the whole

execution of works. Platforms or scaffold to be used primarily to ensure safety of workers, and then ensure quality execution of required works.

Depending how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.
NOTE: As per available equipment and works execution technology prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

THERMAL INSULATION OF THE FLOORS IN THE BUILDINGS "B" AND "C"

Within the implementation of EE measures in Secondary Vocational School in Pljevlja, new thermal insulation is designed in case of basement floor in the building "B" and ground floor in the building "C".

These works include:
* Demolition of existing floors with all the floor layers in the basement of building "B" and in the ground floor in the building "C".
* Repair works- plastering of the parts of the walls damaged due to the terrazzo plinth removal from the basement wall in the building "B" and from the ground floor wall in the building "C".
* Construction of the compacted crushed stone layer (d=60-80 cm), used for filling the space beneath the floor in the building "C".
* Construction of the compacted crushed gravel layer, d=10 cm, for the building "B" and layer of crushed gravel d=20 cm for the building "C".
* Construction of the reinforced concrete slab using MB20 concrete, d=10 cm as the base for all other layers (waterproofing, thermal insulation, cement screed, parquet-floor, granite tiles, ceramic tiles),
* Setting up of horizontal waterproofing under the flooring in following layers (from the bottom up):
- bitulith + poly asbestos + glass mesh,
- polyasbestos + glass mesh,
- polyasbestos,
* Setting up thermal insulation of the floor using extruded polystyrene boards d=4 cm,
* Setting up a base for the parquet floors, granite and ceramic tiles floors and cement screed 1:3, d=4 cm, with mechanical injection of the tying fibres at the same time.
Existing floors in the classrooms of the buildings "B" and "C" and the corridors of the building "C" shall be replaced with new parquet. Terrazzo tiles in the corridors of the ground floor and the first floor of the building "B" shall not be changed because of their good condition.

REPLACEMENT OF FACADE JOINERY

The following measure for improvement of energy efficiency in Secondary Vocational School in Pljevlja includes replacement of facade joinery, windows, doors and skylights.

New façade joinery shall be made of PVC and Al profiles as well as of wood.

New windows in Buildings "A"(1980) and "B" (1970) will be made of high quality 6-chamber PVC profiles which need to have appropriate thickness (3.5 mm) and reinforced with galvanized steel profiles. Total U-value shall be up to 1,5 W/m2K, and solar energy transmittance of glass (solar factor g) shall be $g \leq 65\%$. Anti-burglary protection shall be class 3 in line with DIN V ENV 1627, air permeability in line with EN 12207, Wind resistance EN 12210 and weather elements in line with class 9A/E750 (DIN EN 12208).

The joinery must be fitted with high-quality removable gaskets, high-quality accessories made of nickel and AL-alloys, knobs, i.e. locks with keys. All windows and doors must be fitted with opening mechanism in line with set joinery scheme.

Entire PVC joinery must be installed in line with schemes in white color.
Natural air-streaming at closed window is envisaged through for that purpose specially installed elements in the window frame type "Regel air", or in some other way, in line with DIN and EU standards. Number and size of these elements depend on the size of the window – given minimum per 2 pieces. These elements shall not be installed in fixed windows and fan lights.

For windows exceeding 2.2 m, window leaves are opened using mechanism on rail with opening, using a handle that turns by 360 degrees. “Tilt-and-turn” mechanism is operated via steel rail on a spindle that allows opening on “tilt-and-turn” up to minimum 20 degrees.
Windows need to be fixed with anchors at 50mm depth into the walls i.e. existing structure.
Windows need to be placed so that the external side is at the same level as the previous windows.
Drips are made ready-made galvanized plastic-laminated steel metal sheets or PVC (if technically feasible) so called “solbank“(window sill) shall be installed on the external side of the windows. These are placed along the entire window with set overhang over newly fitted thermal façade.
On the internal side of the window, it is necessary to place window sills made of the same materials as the windows, along the entire width of the window, depth depending on the depth of the existing parapet wall.
Quality certified accessories must ensure opening according to the given joinery schemes.
Already installed windows which will not be replaced need to be fitted with new window sills, drips made of ready-made galvanized plastic-laminated steel metal sheets.
The windows on the south facade of the buildings shall have one glass coated with low emission coating.
Lower parts of the certain windows (as indicated on the joinery schemes annexed) shall be covered with white foil.
Facade doors and skylights in the western and eastern facades of the building “A” (1980) and the skylight on the building “B” (1970) are made of plastic-coated aluminium profiles with thermal-break, according to joinery schemes and details.
When installing the doors, use certified, quality fittings in order to provide the opening by the given scheme, also install a self-closing mechanism, cylinder lock with three keys and door rubber stoppers.
Glass system 4+16+4mm with hermetically sealed gas argon between two glass panes and tightened with permanently elastic EPDM gaskets areas used for glazing. Part with aluminium infill must be made of sandwich panel with infill from extruded polystyrene.
Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.
Thermal conductivity must be maximally U=2,8 W/m² and solar energy transmittance factor (solar factor) g≤65%.
Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.
A vestibule area shall be constructed in the interior of the main entrance of the building “B”, and it shall include two double wing swinging doors. The item also includes production and assemblage of plastic coated aluminium profiles without thermal-break, single glazed-thickness of the glass 4mm, including metal supporters, required hanging and closing set.
Complete facade joinery of the building “C” shall be made of wood with the exception of the skylights.
According to joinery schemes and details, skylights shall be Al framed, equipped with high-quality mechanism, hinges and metal support for opening. Wire-reinforced glass system 4+16+4mm with hermetically sealed gas argon between two glass panes and tightened with permanently elastic EPDM rubber is used for glazing. Part with aluminium infill must be made of sandwich panel with infill from extruded polystyrene.
Thermal conductivity must be maximally U=2,8 W/m² and solar energy transmittance factor (solar factor) g≤65%. On the internal side of the window, it is necessary to place window sills made of the same materials as the windows, along the entire width of the window, depth depending on the depth of the existing parapet wall.

For installation of doors, quality certified metal window support needs to ensure opening in line with set scheme and installation of self-closing mechanism, cylinder lock with three keys and floor rubber stoppers.

Selection of facade joinery color or possible changes in details (elevation) can be determined either by Client or Supervisor, with previously obtaining Employer/Employer’s Representative permission.

Attests the manufacturer – contractor shall provide for all the joinery are:

- System window testing in line with 14351-1 and B 5300,
- Air permeability attest EN 12207 - Class 4,
- Water resistance attest EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,

- Mechanical requirements EN 12400 - Class 2,
- Sound proofing attest up to protection class 5,
- Heat transfer coefficient attest DIN EN 12412-2,
- Glass attest EN 673,
- Metal supporters attest V ENV 1627-1630, resistance class 3.

In the process of bids evaluation, it is advisable to provide typical drawings of angle types of windows and doors, as well as other catalogue and presentation material. In process of joinery production, it is necessary to enable Supervisor to inspect the products.
Prior to starting major production of joinery, the Contractor must prepare and install typical widow, complete with joinery set, which will, after removal of all possible defects, be recorded and approved by the Employer/ Employer's Representative or the Supervisor.

THERMAL INSULATION AND RENOVATION OF THE ROOFS

Within application of one of the EE measures in the Secondary Vocational School in Pljevlja, the Final Design is prepared for the new horizontal waterproofing over the entrance canopy, in the building „A", and the new structure, thermal insulation and roof covering in buildings „A" and „C", as well as thermal insulation over ceiling in building „B".

Within preliminary works, it is designed to remove the existing waterproofing from canopy in building „A", as well as the complete roof structure and coverings from the roofs in buildings „A" and „C".

It is also foreseen the complete replacement of the existing roof and roof structure in building „C". The new designed roofs have identical shape, looking from outside and there is no any difference between new designed roofs and existing ones. Another words, the existing will be kept as it is, and the same case is with the building itself.

Upon removal of the existing layers, on previously prepared bedding on the canopy, the new waterproofing will be completed with the following layers:
a) Vapor barrier of polyethylene foil,
b) Layer of the light concrete with" Perlite" added, minimal thickness 3cm in a declination, in line with project,
c) Geotextile layer for protection of waterproofing layer,
d) Mounting of multilevel PVC waterproofing membrane, reinforced by polyester net, installed on the wall and attic, at the height of 35cm. It is resistant to an aging, weather conditions and UV rays. The joining shall be performed by hot welding. The membrane has to be vapor permeable. During the mounting works, the Contractor is obliged to follow the manufacturers' instructions.

Upon removal of the existing roof covering, the following layers shall be laid down over leveled concrete ceiling in building „A":

a) Vapor barrier of polyethylene foil,
b) Thermal insulation of mineral wool under the roof, d=10cm thickness,
c) OSB boards over rafters,
d) Installation of multilayer vapor permeable waterproofing membrane on the roof, reinforced by polyester net,
e) Battens 5/8cm,
f) Battens 5x5cm,
g) Mounting of TR Al painted sheets 40/230/0,8mm as the final layer.
The color of the new roof must match the color of the existing roof of the building B-1970.
Upon removal of the existing ceiling, on the first floor in building "B", the new monolith suspended ceiling is planned to be mounted, made of fire resistant plaster boards on metal substructure. The following layers are planned to be laid down over suspended ceiling:
a) Vapor barrier of polyethylene foil over ceiling,
b) Thermal insulation of mineral wool over the ceiling, d=10cm thickness,
c) Installation of multilayer of vapor permeable waterproofing membrane, reinforced by polyester net,

d)Installation of the plasterboards 1.2cm,
Upon completion of the new roof structure in building "C", the following layers shall be laid down:
a) Vapor barrier of polyethylene foil over ceiling,
b) Thermal insulation of mineral wool over the ceiling, d=10cm thickness,
c) OSB boards over rafters,
d) Mounting of multilayer vapor permeable waterproofing membrane, on the roof reinforced by polyester net,
e) Mounting of flat seamed galvanized and plastic coated metal sheet.
Due to the works on the roof and inclined roof drips, it will be necessary to remove the lightning rods, and after completion of works the lightning rods shall be installed again.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Dismantling and Installation of Rain Downpipes and Horizontal Rain Water Gutters

Installation of new facade thermal insulation causes dismantling of vertical rain water downpipes. Due to the bad condition of old rain water downpipes, dismantling and installation of the same rain water downpipes over again is not applicable, therefore installation of the new ones is foreseen. Rain water downpipes of the buildings "A","B" and "C" shall be produced by readymade galvanized plastic-laminated steel metal sheets d=0,70 mm.
New rain water downpipes shall be made completely as the old ones and shall be placed at the same items where the old ones used to be.
The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works.
Certificates must be issued by relevant institute for referred type of works.
Certificates cannot be older than a year, commencing from certificate issuing date to the day of starting the works.

Dismantling and Installation of Air Conditioning Units, Cameras, Antennas, Lights

The Design envisages dismantling of all AC units, cameras, antennas, facade lights their storing away to a place set by the Employer / Employer's Representative to enable their re-installation upon facade installation.

Dismantling and Preparation of New Dripping Eaves, Mortar and Paintwork Repairs

The design envisages dismantling and installation of new dripping eaves and window benches. Dripping eaves are made of readymade galvanized plastic-laminated steel metal sheets d=0, 70 mm, fully in line with the design. Window benches are installed together with windows and are made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm, except at the positions where it is not applicable due to the technical conditions, where they shall be made of PVC.
Mortar and paintwork repair around windows are result of wall damages due to dismantling of existing windows. This item is made with gauged mortar in two layers, fully in line with BoQ.
The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting the works.
Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year, commencing from attests issuing date to the day of starting the works.

Dismantling and Installation of New Metal Sheet Flashings

Application of this measure is directly related to the planned installation of new thermal insulation on facade walls. In the buildings "A", "B" and "C" planned works are executed using readymade galvanized plastic-laminated steel metal sheets d=0, 70 mm. In the buildings "A" and "B", removal of all existing flashings from the roofs and preparation of new ones, of larger developed width, is planned as result of increased cross-cut section of external walls. During installation of these works, special attention must be

paid to installation of flashings, fully in line with special conditions, which are composite part of this Design.
The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works.
Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year commencing from certificate issuing date to the day of starting the works.

Dismantling and Installation of New Bars on Windows

Dismantling and painting of existing bars is planned as well as refitting of these in their previous positions. The bars shall be perfectly cleaned, including removal of existing coatings, repaired if required and painted with new layers fully in line with joinery schemes.

Existing protective bars the positions of the five basement windows marked as 3 and one marked as 26 in the basement of the building "B" shall be dismantled, and after the demolition of the recently added parapets and installation of the new ETICS façades with adapted dimensions shall be mounted.

Renovation /Construction of the Pavement Around the Buildings "A", "B' and Construction of the New Pavement Around Building

The following works shall be performed, where necessary:
*Clearing up and removing layer of humus d=10 cm, and planning of the terrain for sidewalk preparation, Preparing the layer of compacted gravel, d=10 cm,
*Concreting of sidewalk around the building "A","B" and "C" using compacted concrete, type MB20, of 10 cm thickness, along with simultaneously prepared floated surface of d=2cm thickness (in total of 12cm), preparation of border curb (dim. 10/20cm). Pavement has to be strained into the fields cca 1,5m2. Expansion joints shall be filled with bitumen.
*Sidewalks shall have the same width as the existing ones around the buildings "A" and "B", and 80cm around the building "C".
*Construction of concrete surface drain structure in the uphill area of connection of the buildings "A" and "C". Unit price shall also include cleaning of the drain pipe which crosses underground of the school building.

The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works.
Certificates must be issued by relevant institute for referred type of works.
Certificates cannot be older than a year commencing from certificate issuing date to the day of starting the works.

RENOVATION MEASURES, AIMING TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS IN THE BUILDING

In addition to measures directly impacting Energy Efficiency Improvement, the Design Brief envisages reconstruction measures aiming to enable higher comfort and better working conditions in the building.

Repairs, Cleaning, Scraping and Preparation of the Facade for Envisaged Finishing Layers:

These measures include cleaning and degreasing of all existing facade areas, as well as preparation of those areas for applying thermal insulation layer. These measures also include scraping of existing damaged facade final layer in order to enable applying of designed final layers on the facade.

Renovation of Damaged Parts of Internal Walls and Ceilings, Skimming and Painting with Semi-dispersed and Oil-based paint.

Following works need to be performed:
*Reparation-plastering of damaged walls of the last floor in the buildings "B" and "C" due to the dismantling of existing ceiling,
*Fitting of monolith ceiling on the last floor in the buildings "B" and "C". New monolith ceiling shall be made of fireproof plasterboards d=1,2 cm, fire resistance30 min.

*Scraping of existing internal walls and ceilings preparation of base for skimming and painting with semi-dispersed paint.

Renovation of Lavatories (Lavatories in the Building "A" and Boiler Room)

The lavatories are situated in the basement of the building "A" (toilet 1), ground floor of building "A" and boiler room area (toilets 2 and 3), and first floor of building "A" (toilet 4).

The other toilets (toilets for professors) have been already reconstructed, and therefore they are not in the scope of the works.

Following works need to be performed:
*Removal of existing doors, all the layers of existing floor and wall tiles,
*Plastering walls where tiles were removed using gauged cement plaster, followed by fitting of all floor layers (cement screed, waterproofing, thermal insulation and acoustic insulation),
*Coating walls and floors with wall and floor ceramic tiles I class, size, color and tone selected by the Employer / Employer's Representative. Tiles are laid in layer of adhesive joint bonding manner, with joints pointing using pointing compound. Wall tiles are laid up to 220cm height. Coating of jambs and niches shall not be subject to separate calculation.

Installation of new PVC joinery and painting of all remaining areas with semi-dispersed paint

Construction of the Toilet for Disabled Persons (Toilet 5)

Existing preparation room next to the toilet in the ground floor of the building "A" shall be split in two parts. Part next to the main corridor shall be toilet for disabled persons, and part next to the window shall remain as preparation room.
Toilet for disabled persons shall be constructed fully in line within annexed drawing SS-ARH-18.
Installation of new vinyl floor, skimming, painting of walls and ceiling in new preparation room shall be done.

Construction of the Ramps for Disabled Persons

Installation of the two ramps is planned:
-External ramp on the main entrance of the building "C". Works on installation of this ramp shall include: preparation of the terrain, gravel filling and concrete works.
-Internal ramp in the connection area of the buildings "B" and "C". Construction of the ramp shall be made of the wood. Surface of the ramp shall be made of embossed galvanized metal sheet.

Installation of the Stair lift for Disabled Persons

Purchase and installation of a wall mounted platform stair lift for disabled persons, with the following characteristics:
- minimum loading capacity max 300 kg,
- speed approx. 0,10 m/s,
- power approx. 0,5 kW.
The lift shall be positioned in the connection zone of the main entrance hall to the building "A", as indicated in drawing SSS-01-ARH-10.
Total height difference of the two levels is approx. one meter. The unit price shall comprise the bearing connection devices to the walls, all necessary accessories ready to use the lift, and the electrical installations at the lift itself, the on wall supply cabling in PVC ducts connecting to the nearest switch board and the adjustments of the electrical switch board.
All damages occurred during the installation of the lift shall be remediated and the working areas shall be restored to their original condition.

Preparation Works for Installation of New Floor Layers in the Buildings "B" and "C"

These works include:
*Preparation of layer consisting of compacted crushed stone used for filling of air area under the floor in the building "C", d=60-80 cm,

*Preparation of layer of compacted gravel, 10 cm thickness within building "B", and 20 cm thickness within the building "C",
*Preparation of reinforced concrete slab, thickness d=10 cm, as a base for all other layers (waterproofing, thermal insulation, cement screed, parquet floor, granite tiles, ceramic tiles).

Painting of all Internal Walls and Ceilings

Painting of all internal walls and ceilings of the classrooms, corridors and offices in school buildings:
-using oil based paint up to the height of 1,6 m, (including scraping of old paint, polishing and painting with oil-based paint the walls in the areas of the radiators which will be dismantled, rinsed and re-installed),
-using semi-dispersed paint for the wall areas higher than 1,6m and ceilings.

Semi-dispersed paint and oil based paint are used, in tone as selected by the Employer/ Employer's Representative. Smoothening, plastering, neutralization, impregnation, pre-painting, corrections with toned dispersive putty or skimming compound is foreseen. Finishing paint is applied twice.

Replacement of Wooden Doors on the Basement in Building "B"

New doors shall be made of a sturdy, heavy duty wooden unit with smooth surface. This item includes a new frame exactly adapted new laminated tubular chip board door leaf, the change of the door lock, the door handle set, the locking plate, the hinges and coating of frame and wing (process: grinding, primer, grinding, two layers of synthetic resin paint).

Planting New Trees in School Courtyard

New trees shall be planted in school courtyard in front of the building "A" as a sun protection measure and measure for improvement of general working conditions.

Prior to commencement of works, the Contractor is obliged to provide the Employer/ Employer's Representative with samples of materials and certificates for all the materials to be used during the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

Reconstruction of the Roof Construction of the Building "C"

Within the Project of EE in Secondary Vocational School in Pljevlja, it will be necessary to make reconstruction of the existing roof structure on one part of the school building. That building part is the oldest, within the whole complex and dates from 1903.

After visits to the site, it was found out that the roof structure is over aged and that it shall be necessary to replace its elements. It was also concluded that the existing elements of the roof structure originate from the time when the machining was very poor and as the result, dimensions on some elements, vary even up to 2cm. In order to avoid distortion of the existing school building architecture and additionally load the bearing capacity of the school building structure, what would cause an additional checking of statics system, it was decided to respect and leave the existing roof shape and appearance, but with minimum modifications, using sophisticated materials and joining systems, without changes of statics system. Dimensions of elements are accepted to be the same as the existing ones, but only bearing capacity control was performed in accordance with the valid regulations.

Because of the school location and existing roof structure, it was decided to use the second class conifer massive timber of 18% humidity, as the basic materials for the roof structure, for all the elements of roof structure, designed to be made of wooden materials.

As the roof coverage, one layer metal sheets over batten system 5/3cm are used, mounted on the wooden boards of 2,4cm thickness. Over wooden boards and under batten system, tar paper shall be laid down.

In addition to the roof loads, due to its own weight and roof covering, the wind and snow loads are taken into consideration. The wind loads are calculated according to regulations for the school location. Upon recommendation of the Montenegrin Engineering Chamber, the basic snow load is 1,00kN/m², plus an additional increase, depending upon the height above sea level.

„Tower “software was used to analyze the most extreme load combinations.

The roof inclination is 31 degrees, as a statics system, the roof on the queen posts.

The wooden beams 14/16cm will be used for rafters, mounted at each 95cm distance, +/- 5%, depending upon local mounting conditions.
Distortion of rafters, at the roof level, was not considered, as the boarded cover protects rafters from distortion.
The wooden beams 14/16 cm will be used for the roof valleys and hips.

The roof purlins consist of simple beams with struts supported by columns and used only in the structure with posts. The purlin dimensions are 16/16cm. As the additional supports, the roof braces of 10/10cm are used.

The columns accept load from the purlins and in some places from the straining beams and according to this arrangement, a proper dimensions are obtained i.e. 16/16cm for type 1 and 14/16cm for type 2. It was aimed to arrange beams position so that the loads shall be mostly transferred to the existing supporting walls. Under the columns, timber bolsters shall be mounted for even load distribution of 20/22cm (or 2x16/22) and 26/16 cm (or 14+16/16), depending upon column type. For columns struts the elements of 14/16cm are accepted.

The ceiling joists (tie beams) are calculated as the “simple beam with overhang” in statics, which accept the loads from columns on the certain places and shall also accept the load from the suspended ceiling, mineral wool thermal insulation and wooden boards within attic. The beams dimensions are 16/18cm at mutual distance of 85cm. Steel nails, bolts M12 and traverse will be used for joining all the elements.

Even though it was possible for some elements to use even smaller dimensions, in the calculation, the attention was paid to making minimal changes to the existing roof. Also, if thickness of certain elements in the existing roof varied by ± 1 cm, bigger dimensions were used. Due to all this, the Contractor is advised to check positions of roof elements onsite once again prior to beginning of works and in agreement with the Employer and Employer’s Representative to replace parts of the elements of the roof structure or the entire roof structure.

As tying elements the steel nails and screws M12 are used.

F4.1.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in Secondary Vocational School in Pljevlja

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	Secondary Vocational School Pljevlja
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	30 May 2013

The purpose of reconstruction of Secondary Vocational School in Pljevlja is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management
2. Thermal efficiency of the system replacement of coal-fired boilers with pellet-fired boilers
3. Efficiency of the distribution system

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, ultrasonic heat flow meter at feeding pipe of the boiler group, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system. Both pellet storages next to boilers will be fitted with electronic meter for solid materials in storage silo for metering fuel, pellet consumption.
All obtained data shall be processed in computer with designated software and, based on these, any problem that occurs in the heating system at the entire school will be timely resolved.

HEATING SYSTEM THERMAL EFFICIENCY AND REPLACEMENT OF COAL-FIRED BOILERS WITH PELLET-FIRED BOILERS

Dismantling of existing boiler room equipment

It is planned to dismantle existing boiler room equipment. Old coal-fired boiler needs to be dismantled together with open expansion vessel attached to it. Feed and return pipes, pumps, valves and entire fitting in basement premises shall be dismantled.

Construction and specialist trade's preparation works of boiler room for new boilers

Boiler room needs to be adjusted to the new equipment; therefore, structural part shall be reconstructed. Walls and floors shall be washed using high-pressurized pump to remove coal dust deposits. Walls need to be plastered, floors flattened and tiled. Openings in chimney necessary for fitting of new funnels for remediation of existing concrete shall be made in accordance with recommendations of manufacturer of new prefabricated chimneys.
Coal shed needs to be prepared for pellet. In addition to installation of new doors and windows according to architectural design, walls shall be washed using highly pressurized water pump or equivalent.
Pellet will be purchased in 15 kg (or 1000 kg) nylon bags and directly loaded into pellet storage-bunker.
External doors of the boiler room will be made to meet requirements for bringing in the equipment and wall opening shall be adjusted to these.

Installation of new equipment in the boiler room

Installation of new pellet-fired boilers is planned, two boilers rated thermal effectiveness of 250kW, range from 76.8 to 256kW. Designed boilers shall be delivered as a set with boiler pumps, mixing valves for cold water in boiler and safety valves. Boilers are dimensioned according to overall heating requirement, increased by future gym heating demands according to school administration requirements. One boiler can cover 65% of overall heat requirements at extreme conditions, so throughout most of the year, the boilers will operate independently, and at higher loads they will work together.

Boilers will be fired manually. Device for pellet transportation through flexible pipe is fitted onto the burner which is delivered together with the boiler. Pellet storage-bunker is fitted in the adjoining room next to the boiler room, where coal-shed is currently accommodated. Openings need to be made in the wall between the boiler room and the coal-shed through which transportation screw for pellet delivery from the bunker to the burner will go.
The bunker is made of wood – boards and impregnated chipboard (coated multi-layer plywood), where the inside needs to be smooth to allow pellet to slide. Bottom side of the hopper is funnel-shaped, tilted at 45° angle. At the bottom of the hopper, there is auger in which pellet falls in pulled by force of gravity. Hoppers are filled manually and by turning auger – dossier pellet is supplied to the burner.

Boilers will have it’s own automatic control. Automatic control is ready-made, manufactured by the same manufacturer as for the boilers. It will control operation of the burner, automatic pellet supply, automatic ashes removal, setting feeding water temperature from the boilers and return water temperature into the boilers, operation of both heating circuits (circulation pumps and mixing valves), as well as safety equipment. Temperature sensors at the accumulation vessels will send signals to the automatic control to increase or reduce water heating and in that way balance operation of the system. Automatic control will set feeding water temperatures for the heating circuits depending on outdoor temperature. Temperature sensors will be mounted on the external wall of the boiler room.

Burners are fitted with safety switches to terminate operation in case of overheating, and switches for prevention of back-flame from boiler to pellet hopper. Also, the boiler shall be fitted with sprinkler system for extinguishing possible fire in the pellet supply system.

Ashes are automatically removed from the boilers. The unit packs it in boxes on the front side of the boilers, which occasionally needs emptying by their dismounting from the boilers and emptying them outside.

Entire boiler room equipment will be powered by the new electric power wiring.

Equipment for chemical water treatment at the manifold from the town mains is envisaged. Compact softener of water from town mains is chosen, for heating systems with installed boiler power up to 1000 kW. Its basic function is to protect the heating system from boiler scale and other deposits in water. Along with the device, it is necessary to use protective backwash pre-filter, which is made of a casing with permanent mesh. Compact softener casing contains ion-exchange resin which is automatically regenerated once its capacity is spent. Regeneration is automatic and is carried out without the supervision, at in advance programmed time.

Water softener is attached to the manifold with appropriate hose.

On the town water mains, in front of the softener, water flow meter – water gauge shall be installed. Softened water is injected into the system through automatic water fill valve, which reacts mechanically to the previously set pressure level in the system.

Capacity of the expansion vessel is determined depending on the total capacity of the system and static water pressure of the system. Self-supporting expansion vessel is envisaged, with compressor for precise pressure control in the network and safety valve at the safety feeder.

To ensure even feeding water temperature towards heat emitters, it is envisaged to fit accumulation vessel that splits the boiler room system to primary boiler circuit and secondary circuit from manifold. Capacity of accumulation (inertial) tank is determined as per recommendations, depending on capacity of the boilers and the network and it is planned to connect to it 2 temperature sensors at the bottom and at the top, which will send signals to automatic control for starting pumps in the secondary circuit.

It is planned to fit self-supporting prefabricated insulated stainless steel chimney system. Funnel is made of twin-wall stainless steel with insulation between the walls and is connected to the fans that extract smoke from the boiler.
Vertical part of the chimney is made of elements with single wall and insulation on the external side, up to the exit from the building. These elements of the chimney are designated for repair of existing concrete chimneys.
Chimney is fitted with condensation vessel, cleaning eye, and safety back burn flap.

Frequency controlled circulation pumps will be used for feeding two branches of the entire heating system in the school (one for building A and the other for buildings B and C). The pumps can operate with the option of automatic control (self-control from “one to the other proportional pressure curve”) or by maintaining proportional pressure, by maintaining constant pressure or in compliance with constant curve. Frequency controlled circulation pumps are selected due to installation of radiator valves with thermostatic heads that cause changes in the flow during operation of the heating system.
Mixing valves shall be installed on distribution branches, which control feeding water temperature and are also operated by boiler automatic control.

Heating system in future gym can be supplied from a spare connection point planned at the feeding and return pipe. New wiring will be used for power supplying of future equipment, and remaining equipment shall be installed once the gym is functional. Boiler automatic control was selected with possibility to expand it so as to control operation of additional two heating circuits of which one is for domestic hot water.

The amount of air required for fuel – pellet combustion can be provided with air injected through air grates on doors, sized according to amount of air required for combustion and injection is achieved via fans on burners.
Since boiler room is mainly exposed to outdoor impacts, temperature in the boiler room may drop below 0°C, therefore to prevent freezing, installation of new equipment is planned. Electric air convector will be activated in the boiler room when temperature drops below 2°C, and it is mounted on the wall of the school at 2.5m height from the floor. It is also planned to ensure that one boiler works at minimal load when outdoor temperature drops below 0°C on days when the school is not being used, to prevent freezing in the piping.

Feeding and return pipes are dimensioned depending on the water flow through them, and distance between the connection points is defined depending on dimensions of equipment which will be connected to the feeding and return pipe. At the highest points of feeding and return pipe from the boilers, it is planned to fit air-release vessels with overflow pipes.
Prior to connecting return pipes from heating circuits to manifold, both pipes will be fitted with Y-strainer. Y strainers will be also fitted before the connection from return manifolds to boilers.

Entire new equipment in the boiler room shall be insulated. Pipes and equipment shall be insulated with mineral wool in aluminium sheet metal coating. Pipes in the basement can be insulated with prefabricated pipe insulation made of mineral wool with aluminium foil.

Entire boiler room equipment shall be powered by new electric power wiring.

EFFICIENCY OF THE DISTRIBUTION SYSTEM

Preliminary works

To ensure proper functioning of heating system in future, all radiators will be dismantled and highly pressurized pump will be used to flush deposits settled in the radiators during their usage. Piping will also be flushed as well as air-extraction network on the second floor that exists within limited range. Certain radiators are out of function, so after the dismounting and remounting, they will be put into function. After mounting of all the valves, it is necessary to test the piping for tightness and if required, replace certain pipes.

Fitting of thermostatic radiator valves with thermal heads

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermal heads. Selected thermostatic heads are convenient for buildings, planned to be used by a large number of users, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermal head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.
Due to dismantling of all the radiators for their flushing, during dismantling of existing radiator valves, it is also necessary to dismantle radiator sub-valves.

Installation of balancing valves

Balancing of the pipework will be realized with fitting pairs of balancing valves in positions marked in the drawings, so as to separate certain parts of the pipework.
Return pipe will be fitted with differential pressure controllers without additional power supply, with the option of precise continuous pressure difference setting. The feeding pipe will be fitted with riser pipe control valves with linear properties and meter gauges and the option of setting reading on a display of hand-wheel.
These two valves are mutually connected with capillary pipe up to 1m length and as a pair balance pressure variations.

Installation of new piping in building C

New floor is foreseen in building C (the oldest part of the school). Current state does not offer comfort, and beneath the wooden floor, there is an empty space to the ground level. Beneath the floor, there are pipes that feed radiators in building C.
Space beneath the floor shall be filled and floor made with single slab, waterproofing, thermal insulation and cold cover.
Pipe network shall be relocated, because it would be impractical if it stayed beneath the floor. It is planned to fit two new pipe branches, which would run vertically upwards from the basement of building B to the ceiling of ground floor of building B, from where these would go along facade walls and would feed all the radiators with risers on same positions as existing. The pipes would be fitted in the heated space so they do not need to be insulated. Radiators at the ground floor in building C and in the main lobby of the school shall be connected with risers that descend from the horizontal pipe branches, and radiators in the upper floor shall be connected to the existing routes from the lower level.

F4.1.3 Technical description of electrical services

for energy efficiency improvement in Secondary Vocational School in Pljevlja

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	Secondary Vocational School Pljevlja
Doc. origin:	Final Design of Electrical Services
Date:	30 May 2013

The purpose of reconstruction of Secondary Vocational School in Pljevlja is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.
Vocational Secondary School consists of three buildings, as follows:

- Building “C” which was built in year 1900.
- Building “B” which was built in year 1970.
- Building “A” which was built in year 1980.

The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Power supply and electrical installation for boiler room and new heating equipment
- Installation of energy efficient lighting systems
- Replacement of lightning protection system

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building is also planned. In building “C” complete electrical installations for general consumption and electrical lighting installations are made of cables with two wires (cables are without protective conductor PE), and therefore replacement of electrical installations in building “C” is envisaged. Similar case is in building “B” where electrical lighting installations are also made of cables with two wires (cables are without protective conductor PE), while the cables for general consumption have PE conductor, therefore only replacement of lighting cables is foreseen in building “B”.

In building “A” electrical installations are made of cables with PE conductor and therefore only replacement of luminaries shall be done.

POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND NEW HEATING EQUIPMENT

It is envisaged to mount new distribution RT-KO board within boiler room, in place of the existing one. This board will be supplied with existing cable PP00 5x6 mm2 mm2 and it will provide electrical supply to heating equipment, lighting and general consumption (burner, circulator pumps, air convectors, axial fan, water softeners, general consumption and lighting and cabinets for automatic control).

Cabinets for automatic control of operation of new heating equipment shall be delivered within the scope of heating services. Inside the boiler room, power supply is envisaged using electrical cables type PP-y and

cross section 3x1,5 mm2; 3x2,5 mm2, 5x2,5 mm2 and 5x4 mm2 through rigid installation conduits OBO Betterman or similar.
The proposed electrical power supply from existing main distribution board GRT does not affect total power consumption, and the existing cables are preserved.
It is envisaged to install inner circle of deep galvanized tape Fe Zn 25x4 mm2 on prefabricated tape carriers for potential equalization JUS N.B4.925 P, connected to the existing output from foundation grounding unit. Within this circle, each conductive element shall be connected inside the boiler room using yellow-green conduit P/F 1x16 mm2.

INSTALLATION OF ENERGY EFFICIENT LIGHTING SYSTEMS

Replacement of old and non-functional lamps within the facility is envisaged. The newly designed lamps will make it possible to reach the illumination level of more than 300 lx, which is consistent with European standards for particular uses for schools and as required by Detailed Energy Audits. The selected lamps are with bright parabolic grid, of exceptional photometric properties and with one light source (T16 1x54 W) 840 (neutral white source color), with an electronic ballast for which a photometric calculation was prepared in specialized lighting software program. As an alternative, it is possible to install lamp type 2x28W, with a bright parabolic grid and T16 840 tubes (neutral white source color) with electronic ballast. The proposed lamps have slightly higher installed power, and about the same photometric properties, so the Designer opted for the model 1x54W. However, as the requirements were met and confirmed by photometric calculation in both cases, the other solution is also possible. When positioning the newly designed lamps, special attention was paid to the existing electric feeders, so that the reconstruction is not expected to involve any extra work for the relocation of existing lighting in order to keep the designed array. For this purpose it is planned to move one power outlet in each classroom. Switches for lamps remain the same.
For the purposes of lighting the blackboard, two lamps are envisaged per each classroom (where there is only one board, only one lamp will be installed), i.e. lamps with parabolic asymmetric grid 1x80W grid, with an electronic pre-connection device and a lamp of 840 T16 color. Power supply for these lamps will come from the nearest junction box, to be switched on from any of the existing command centers in the classroom or from the gate in case of centralized solution.
For the reading room and classrooms in old part of building, where the room heights are more than 4 m, lighting fixtures 2x35W are foreseen with shining parabolic raster, electric power supply and tubes T16, 840 (the color of light source is neutrally white).
In the toilets, luminaries with IP 54 protection degree shall be installed with 1x28 W T5 840 lamps with electronic ballast and opal protector, and in the hallways 2x28W T16 840 with high frequency electronic ballast with PMMA BIVERGENZ dark light diffuser or similar technology which eliminates glare. In toilets for handicapped persons, light fittings with IP 54 index of mechanical protection are envisaged, with fluorescent tubes T16 1x28W equipped with electronic ballast, which has to be powered by cable PPy 3x1,5 mm2 from the nearest junction box of aside toilet room.
In cabinets for practice which are located in basement of building “A” lighting fixtures with IP 65 protection, 2x35W are foreseen, they are controlled locally and lighting fixtures are designed in a way that the working surface reaches illumination of 500 lx.
In the new boiler room, luminaries with IP 65 protection degree shall be installed with 2x35 W T16 840 and these luminaires are commanded localy with one way switches and on-wall instalation.
Bearing in mind type of the building, emergency escape and anti-panic lighting system is designed according to the EN 1838, LED 5W, 1h light fittings. Light fittings which are envisaged enable safe escape from the building with luminance level on the escape route 1 lx and anti-panic luminance of 0.5 lx. in case of total black out. For supply of emergency lights, cables PP-y 3x1,5 mm^2 shall be installed from the nearest switchboard.

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and replacement of roof cover on main school building and gym hall, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, layed down in foundations of the building and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. It is foreseen to install air terminal, 4 meters high, with device for early streamer emission, type Interceptor SI 60, producer ERITECH-ERICO or similar with equal or even better technical characteristics.
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quanitites for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.
New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

NEW ELECTRICAL SERVICES IN BUILDINGS "B" AND "C"

Low voltage cable connection

The building is powered from near electrical substation through cable PP00 4x95 mm2. Cable is placed in the trench together with FeZn 25x4mm strip, all the way to main distribution board GRT, which is positioned in the basement of the building "A".

Distribution boards and power supply cables

Measuring equipment of electrical energy consumption is positioned in main distribution board GRT. According to TP2 ED, measuring of electrical consumption is half-direct (low voltage, three phase, two phase, +A, +R, +Pmax, +LP, Kom) .
Main distribution board (junction box) GRT is made of double pickled metal sheet 2mm thick. Junction box is divided in three sections: measuring section, section with fuses and switches and distributions section. PP00 cable is laid from GRT to junction boxes inside the building and further distributed to end-users in the building.
In building "C" two new junction boxes are planned. Junction box RT-C1 (old junction box position) is on the ground floor, the second one RT-C2 is on first floor. Junction box RT-C1 is connected to junction box RT BP placed on ground floor of "B" building. Junction box RT C1 is wall recessed type, with doors and lock and junction box RT-C2 is connected with it by cable PPY 5x4 mm2 (that is positioned in building "C"). Junction box RT C2 is apartment type, wall recessed type, similar to Schneider Electric - Mini pragma.
New junction box RT-ST is planned for printing room, in the basement of the building "B". RT-ST is connected and powered from junction box RT-BT by cable PP00-y 5x6 mm2. Junction box RT ST is wall mounted, similar to Schneider Electric – Mini pragma.
As installed power isn't higher, power cable for RT-BP is the same (PP00 4x35 mm2). Due to poor condition of equipment in junction box RT-BP, equipment inside is planned to be replaced. Remaining junction boxes stays the same and also power cables inside building.
New junction boxes shall be made according to enclosed drawings and Bill of Quantities.

Electrical installations for general consumption and power supply of heating equipment

For the purposes of power supply for general consumption and power supply of heating equipment, appropriate number of single phase and three phase outlets and connecting points is foreseen, in line with the purpose of this building. Outlet arrangement is planned according to equipment arrangement. In the case of any changes of equipment arrangement, position of the outlets should align with these changes.

Modular type of installation accessory is foreseen. Electrical installations for general consumption shall be made of conductors type PPY 3x2.5mm2 and PPY 5x2.5mm2. Cable shall be laid in walls/ceilings and covered with plaster.
Installation heights on which the outlets shall be executed (with number of current circuit), are marked on the drawings annexed herewith.
The protection from indirect contact is made by system of protection TN-S and with using single phase protection devices with differential current, with automatic switch function.

Electrical installations of interior lighting

Appropriate lighting installation is foreseen in all rooms of the building and in line with the purpose and conditions for mounting of lighting fixtures. Luminaries with appropriate level of protection are selected according to the purpose and position of rooms. The proposed luminaries are specified on the drawings and in Bill of Quantities. The light sources must be energy saving with designed power and luminous flux.
In rooms, luminaries are locally controlled with ordinary switches and two way switches, while the control of luminaries in hallways is centralized and shall be done from reception desk at entrance of the building.
The switches shall be modular type with decorative mask. The switches shall be mounted at height of 1.2 meters from the finished floor level. Electrical installation shall be made of conductors type PPY 3x1.5mm2 and PPY 4x1.5mm2. Cables shall be laid in walls/ceilings and covered by plaster.

Emergency lighting

Emergency lighting is planned according to the purpose of the building. It is planned to be installed in entrance hall, stairs and stair halls.
Planned emergency light fixtures are envisaged for 1h autonomous operation in case of power cut.
Emergency lighting fixtures shall be part of separate electrical circuit, powered by PP-y 3x1,5mm2 cables, laid in walls/ceilings and covered by plaster.
Anti panic light fixtures with Ni-Cd batteries and AC adapter are planned in all corridors and stairways.
These luminaries are envisaged for 1h autonomous operation in case of power cut and they are directly connected over fuse to the nearest junction box. These luminaries shall provide a minimum level of light for safe evacuation.
Type of luminaries, method of installation and class of insulation for electrical equipment and materials shall be in line with nominal voltage levels and environmental conditions

F4.1.4 Technical description of sanitary (water supply and sewerage) services

in "Secondary Vocational School", Pljevlja

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	S.S Secondary Vocational School, Pljevlja
Doc. origin:	Final Design of Water Supply and Sewerage Services
Date:	May 2013

Apart from the measures that directly affect energy efficiency improvement in "Secondary Vocational School ", in Pljevlja, in terms of water supply and sewerage services, it is envisaged to reconstruct four toilets (toilets 1,2,3 and 4) and to construct new toilet No 5-toilet for disabled persons. The toilets are situated in the basement of the school building (toilet 1), ground floor of the school building (toilet 2.3 and 5) and on the first floor (toilet 4).The other toilets (toilets for professors) have been already reconstructed, and therefore they are not within the scope of the works.
The reconstruction of water supply installations implies replacement of indoor pipes network made of zinc-plated steel pipes. The replacement shall be performed from an entry point of pipeline into the building, so that the complete replacement of network is foreseen in the renovated toilets.
In addition to replacement of water supply installations, a replacement of sanitary units has been also foreseen. The existing sanitary sewerage is made of cast iron pipes. The sewerage installations are in rather good conditions and there is no need to for renovation. The existing sewerage outputs from the building and exhaust pipes to the manholes shall be used and are not subject to any changes.
The construction of the toilet No 5 (toilet for disabled persons) implies installation of new water pipeline and foul drainage pipes and their connection to the existing water riser and soil vent pipe in the next door toilet.

DESCRIPTION OF EXISTING SITUATION

Sewerage Installations

The existing toilet sewerage installations, of "Secondary Vocational School ", in Pljevlja, is manufactured of zinc plated steel pipes, sealed by hemp with cast iron plug. The toilets are equipped with squat toilets and lavatories.

Water Supply Installations

The water supply installations are constructed of zinc-plated steel pipes. There are no visible points of leakages; one may expect an incrustation on the inner surface of the pipes.

WATER SUPPLY INSTALLATION

Solution Concept

The water supply installation is designed in accordance with standard solutions except that water supply pipes are envisaged to be manufactured of polypropylene (PP) to withstand the operation pressures of 10 bars and mutually joined by fusion process. The cold water has to be connected to the existing water

connections to the assumed positions according to visual toilet preview and then distributed to the outflow point. It has not been foreseen to provide hot water in the new toilets, except in the toilets with showers, where water heater shall be installed.
Installation is equipped with required switch valves enabling an independent operation of each water supply branch. In front of each outflow, point installing of an adequate switch valve is foreseen to allow for intervention in case of a failure or replacement of sanitary equipment.
Water supply pipes are laid into the wall. Thermal insulation of the pipes is not necessary since polypropylene is a poor conductor of temperature.
Upon completion of work, water supply installations shall be checked for test pressure of 12 bars.

After the testing, it is necessary to perform rinsing and disinfection of complete water supply installation Disinfection must be performed by a certified firm issuing adequate written certificate.

Analysis of water requirement

Water requirements do not change in regards to the present needs and do not affect the size of connection to the school building.

Available quantities of water

Available quantities of water do not change in regards to the existing state.

Quality of water at spring sources

Since the building is connected to the public water supply system, the quality of water has to be guaranteed by the public local PE “Vodovod i kanalizacija”, Pljevlja.

Procedure of preparing drinking water

Since the building is connected to the public water supply system, the quality of water shall be guaranteed by the public local PE “Vodovod i kanalizacija”, Pljevlja.

Solution for transport and water distribution to final user

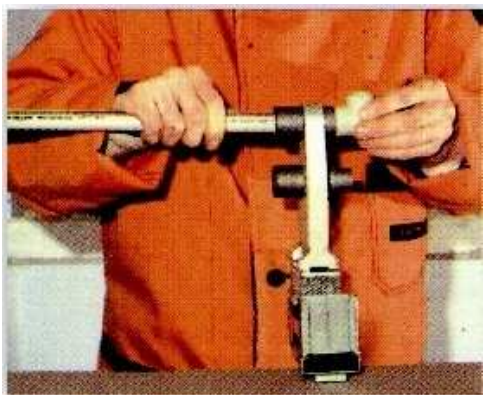
Water is distributed through water supply installations. No hydraulic calculation is necessary because the quantity of water does not change, and the position of outflow points does not change significantly.

Stages of construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Materials used in constructing the water supply system

Assembling of PP water supply pipelines for interior installation implies installing PP lines in the sanitary facilities. The pipe length is not supposed to exceed 2m, works include bringing pipes to the bench from the distance of max.50m of horizontal or vertical route, taking measure, cutting pipes, installing with all necessary cross-sections of welding by poly-fusion weld. Welding shall be performed in the following way: Pipes and cross-section pieces to be welded must be cut under straight angle and cleaned from dirt and grease. The parts to be welded are placed at the welding unit simultaneously (thorn and bushing) to the limit stop.



When the welding temperature is achieved, which can be shown either by the lamp or timer, depending upon the type of the welding unit, the elements are taken off the unit and impress into each other. They are retained in that position without movement until they get cold. It is very important not to exceed the limit of depth of inserting one element into the other.

Other specifics, manual instruction with human resources

This water supply installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for rehabilitation of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the community network.

SEWERAGE INSTALLATION

Solution concept

Toilets 1, 2, 3 and 4:
The existing sewerage installations are made of cast iron pipes. The installations are in rather good condition and there is no need for its reconstruction, but only to sporadic single repairs However, if the contractor finds out any damages during removals and replacements of existing water supply installations and sanitary equipment, these damages shall be repaired upon supervisor's prior consent.

Toilet 5 (toilet for disabled persons):
Sewage from toilet No.5 shall be connected to closest soil vent pipe in the neighboring toilet. Horizontal pipeline shall be mounted on the ceiling of the basement floor. Newly designed sewage is foreseen from PP sewerage pipes and profile pieces.



Stainless steel couplings for connecting the new sewage to the existing CI (cast iron) installation.

Stages in construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Other specifics, manual instruction with human resources

This sewage installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for reconstruction of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the town community network.

SANITARY EQUIPMENT

The existing sanitary equipment in toilets shall be replaced by the new one. The lavatory taps are wall mounted, for cold water only. Hot water for showers is provided from electric water heaters mounted next to it. . Toilet bowls shall be completely made of ceramics, type "Simplon", with plastic low mounted water tank. The concrete lavatory in toilet 1 will be kept, but with small repairs and tiles enveloping.

F4.2. Educational Building 2
“Ristan Pavlović”, Primary School, Pljevlja

F4.2.1 Technical description of building and trade works

for energy efficiency improvement in ''Ristan Pavlović" primary school in Pljevlja

1. INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P.S "Ristan Pavlović", Pljevlja
Doc. origin:	Final Architectural Design
Date:	30 February 2014

The purpose of reconstruction of ''Ristan Pavlović'' Primary School in Pljevlja is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

In terms of envisaged building and trade works, improvement of energy efficiency is achieved through application of following measures:

- Setting up Demit thermal facade (External thermal insulation),
- Thermal insulation and construction of the new roof of the main school building,
- Replacement of facade joinery,

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities. Those works include:

- Removal and installation of vertical rain conductors and horizontal rainwater downpipes,
- Removal and installation of lightning system, cameras and antennas,
- Removal and production of new flashing sills, mortar repairs and paintwork repairs,
- Removal and installation of new steel bars on windows,
- Construction of the new pavement around the building, in places where it was not built already,
- Works related to the creating an opening for expanding the boiler room door,
- Removal of the existing brick chimneys.

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned, whereat:

- Reconstruction of dressing rooms in the gym,
- Repair, skimming and painting works of all internal walls and ceiling in the school building and in the gym, including: stripping of decayed plaster from the ceiling and walls (10%), removal of old skimming compound layers on places directly exposed to moisture and on other places where the skimming is in really poor condition, applying new layer of skimming compound and painting of the ceiling and walls (use semi-dispersed water-based paint).
- Installation of the metal fences on the ends of the main corridors of the school building,
- Partial repairing of the existing parquet floor,
- Renewal of the old metal stair (8 steps) inside of the boiler room,
- Installation of new canopy above western entrance in the dentist area.

THERMAL INSULATION OF FAÇADE WALLS

Expanded polystyrene EPS boards, having thermal conductivity coefficient λmax = 0,037 W/mK, thickness 10cm, produced in line with relevant EN standards, will be used as external thermal insulation of facade walls. External thermal insulation composite system (ETICS) needs to have ETAG 004 certificate.

Facade walls on the gym stone claded facade walls of the ground floor of the main school object shall be treated with harder insulating material XPS - extruded polystyrene, thickness d=10cm resilient to mechanical damages, with nominal thermal conductivity of λ=0,035-0,04 W/mK. The existing mortar shall be finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), using at the same time as splash guard and protection against vandalism.

Thermal panels with B1 flammability class (DIN 4102 B1 highly flammable, non-combustible and self-extinguishing) shall be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.

Use EPS, thickness d=3cm to treat jambs on external side of the openings.

Thermal plates are lap-joint and fixed to the facade wall with adequate enriched mineral adhesive and anchored with adequate screw anchor. Plate surface is protected with fibrous plaster made of following components:
* the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth. Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case additional mechanical anchoring is required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
* reinforcing mesh;
* the second layer of mortar is applied in the same way as the previous. This mortar is applied on a well settled first layer and smoothened with a screed afterwards;
* contact coating, made base on emulsion of synthetic resin and water glass, as agent for impregnation of settled fibrous mortar;
* finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in color selected by the Employer / Employer's Representative, fully in line with the Design details.

Prior to installation of thermal plates, following works must be performed:
* all the works on flat roof, including sheet metal works,
* replacement of facade joinery,
* installation of envisaged installations and equipment on the façade,
* covering and protection of all the surfaces that remained untreated – glass, stone...
*making the larger opening for exterior door of the boiler room to allow putting in of necessary equipment. The opening shall be expanded within the wall of 55cm thickness, where attention shall be paid in order to avoid shattering of the wall body.
* checking existing cradling on the building.

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm shall be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand.

If during separation of polystyrene only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.

If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.

If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.

Corners and jambs of wall openings shall be installed with reinforcing mesh or angle profiles. Facade finishes along the plinth are made with installation of U profile strips adjusted to the thickness of thermal plate.

Prior to installation of plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates shall be additionally anchored using adequate bolts.

During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.

Window benches are also being thermally insulated. Drips made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm are placed over newly fitted window benches. Drips are placed along the entire width of windows and skylights with overhangs.

Facade scaffolding

For execution of described works for application of energy efficiency measures in “Ristan Pavlović’’ Primary School in Pljevlja, it is necessary to install adequate facade scaffold.

Facade scaffold shall be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It shall be used throughout the whole execution of works. Platforms or scaffold to be used primarily to ensure safety of workers, and then ensure quality execution of required works.

Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.
Note: As per available equipment and works execution technology, prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

THERMAL INSULATION AND CONSTRUCTION OF THE NEW ROOF

Within application one of the EE measures in „Ristan Pavlović“ Primary School, the construction of the new roof on the main school building, are designed. After inspection of the existing conditions of the gym hall roof, it was concluded that recovery of this roof is not necessary.

In order to construct new roof with all layers of thermal insulation, it shall be necessary to remove the existing roof substructure and roof cover and demolish small parapet walls together with all horizontal and vertical RC-beams, up to the existing concrete slab (ceiling of the last floor). The new designed roof is hip roof, with wooden bearing substructure, carefully calculated in structural analysis.

After dismantling the existing roof structure, it is necessary to build a concrete grille reinforced with RA and GA reinforcement, at the last ceiling, designed to spread across side and internal walls, fully in accordance with the drawings.

Coniferous wood of II class made of massive wood moisture 18% will be used for all elements inside the timber structure envisaged to be made of wood.
The roof cover shall be made of painted trapezoid Al metal sheet, Tr 40x230x0,7 mm, with snow hurdles and all necessary joining material, stainless steel bolts, washers and EPDM sealing. The roof cover shall be fixed to the metal purlins.

In addition to the constant load from the roof covering and its own weight, wind and snow loads were also taken into consideration. Wind load was calculated in compliance with valid regulations for the subject site. For the basic snow load, value of 1.00kN/m2 was used as recommended by the Chamber of Engineers of Montenegro, to which increase, depending of height above the sea level, was added.

„Tower "software was used to analyze the most extreme load combinations.

Roof pitch is 30, 33, 34 degrees, retrospectively in accordance with the adequate side of the building.

Purlin is a system of simply supported beams, span 2m, metal "Z" profiles 100x50x50x0.5, resting against timber substructure. In case it is necessary to build timber purlins, profiles b/h-10/12 cm could be used alternatively.

Timber grating span 17.75 and height 5.45 at mutual distance of 2 m, will be used as main girders. Total of 15 pieces will be used. Their design is such that can be made in a workshop and mounted on the building with a crane. Because of the transportation, they can be divided into half. Total weight of the grating is around 1200 kg.
For elements in the upper zone, timber cross sections of b/h-16/20cm are adopted, for elements of the lower zone b/h-16/18cm, and elements for the infill are b/h-14/16cm, turned so that the thickness of the grating is always 16 cm.
Joints within the grating are in accordance with the regulations for the timber structure i.e. on notch for pressure elements and reinforced with metal plates with steel nails or metal bolts M12 when there is tension force in the knots.
Gratings are fitted on concrete beams which need to casted in a way that achieves minimal deviation in horizontal plain.

Supporters for the grating are designed in such way to use bearing walls on the brim and inside the building, without burdening the existing ceiling.

On the lateral sides of the roof, rafters and angle ridge dimensions b/h-16/20cm are envisaged.
For this timber structure, two bracings for bridging are envisaged. These can be made of wood, using boards, thickness 2.5 cm, width min 10 cm or of steel wire. Both bracings are connected to the grating to tie every second grate.

Nails d/l = 38/100 or alternatively bolts M12 will be used as joining pieces in the elements.

Prior to beginning of casting concrete elements of the grating, the Contractor is recommended to check deviations from the design in regards to the dimensions and horizontality, with the assistance of the geometer.

The new thermal insulation material shall be mineral wool of 10 cm thickness, with declared thermal conductivity λ= 0,037 W/mK or less (EN 12667).
New roof is designed with inclination of 30° and 33°, while the inclination of the lateral sides is 34°.
The rain water shall be drained by the system of new vertical downpipes and "hanging" horizontal gutters.
New lightning system is foreseen as described in the Final Electrical Design.
New roof shall meet Class 1 requirements in terms of fire resistance, according to international firefighting standards (proper fire resistant coating).

NOTE: New roof cover shall be painted trapezoid Al sheet metal instead of flat sheet metal, as proposed by the Design Brief. Flat sheet metal roof cover would require previous wooden sheathing, which would significantly increase investment costs, without reasonable reasons (price of material, workmanship...).
For roof eave flashing use flat painted Al sheet metal, d=0,7 mm, together with all necessary joining material.
Horizontal gutters, with square cross-section 150/150 mm and vertical downpipes of D=160 mm, shall be made of pre-painted galvanized plastic coated sheet metal d=0,68 mm. Rain water pipes shall be mounted using all necessary anchor bolts, holding clips, joining and bonding material.

REPLACEMENT OF FACADE JOINERY

Replacement of the entire facade joinery is the next measure to improve energy efficiency in "Ristan Pavlović" P.S. Only the recently installed new toilet windows, made of white, coated aluminium, shall be kept.
New windows will be made of high-quality 6-chamber PVC profiles which need to have appropriate thickness (3.5 mm) and reinforced with galvanized steel profiles. The profiles shall be fully in line with RAL

quality standard. Heat transfer coefficient, for package of profiles with metal reinforcement (in line with DIN EN 12412-2), shall be less than 1.4 W/m²K.
Use double low-emission glass 4 +16 +4 mm, and solar energy transmittance factor g≤65%, with the sealed argon or dry air in-between for the infill. Epoxy rubber (according to EN410 and EN 673, Ug = 2.0 and W / m² K) is used for the sealing. Total windows U-value shall be up to 1,5 W/m2K
Outer glass at the south part of façade has to be coated with low-emission coating as a protection from sunlight.
Provide high-quality interchangeable gaskets, high-quality fittings of nickel and aluminium alloys, handles, locks and keys.
Entire PVC joinery must be installed in line with drawings – joinery schemes, in white colour.
Natural air-streaming at closed window is envisaged through elements in the window frame type “Regel air”, which need to be specially installed for that purpose, or in some other way in line with DIN and EU norms. Number and size of these elements depend on the size of the window – given minimum per 2 pieces. These elements shall not be installed in fixed windows and fanlights.
For windows exceeding 2.2 m, window leaves are opened using “tilt and turn” mechanism on rail with opening, using a handle that turns by 360 degrees. “Tilt and turn” mechanism is operated via steel rail on a spindle that allows opening by “tilt and turn” up to minimum 20 degrees.
Windows need to be installed through previously installed blind frames, fixed with anchors at 50mm depth into the walls i.e. existing structure.
Windows need to be placed so that the external side is at the same level as the previous windows.
Drips made of ready-made galvanized plastic-laminated steel metal sheet are installed on the external side of the windows. These are placed along the entire window and skylight width with set overhang over newly fitted thermal façade.
On the internal side of the window, it is necessary to place PVC window sills, along the entire width of the window, depth depending on the depth of the existing parapet wall.
Quality certified shackle must ensure opening according to the given joinery schemes. Special attention must be paid to shackles for ““tilt and turn” windows to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window sashes.
New external doors shall look the same as the existing ones (single and double doors, opening outwards), with fanlights just like the existing glazed with thermal insulated glass system 4+16+4 on three hinges.
When installing the doors, use certified, quality fittings in order to provide the opening by the given scheme, also install a self-closing mechanism, cylinder lock with three keys and door rubber stoppers.
Entrance portals into buildings and all tall items, with small parapet walls, need to be replaced with new facade aluminium joinery, with thermal break, double glazing 4+16+4mm and heat transfer coefficient Umax = 2,3 W/m²K.
Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.
Include everything from the description: purchase of material, production, transportation and installation with hinges and blind frame, as well as aluminium board of required width. Measures shall be taken onsite.
The item includes production and assemblage of plastic coated aluminium profiles fitted with thermal-break, heat transfer coefficient Umax = 2,3 W/m²K, metal supporters, required hanging and closing set.
A vestibule area shall be constructed at the interior of the main entrance and it shall include two double wing swinging doors. The area opposite of the entrance to the basement shall be amended as a lodge for the doorkeeper, with a small sliding window to the vestibule for easier communication. The item includes production and assemblage of plastic coated aluminium profiles without thermal-break, metal supporters, required hanging and closing set.
Opening is done as shown on graphical appendix – joinery scheme. The item shall also include aluminium bench of required width. Profiles shall be in colour of natural aluminium.
Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.

Selection of facade joinery colour or possible changes in details (elevation) can be determined either by Client or Supervisor, with previously obtaining Employer/ Employer’s Representative permission.

A supplier has to submit the following certificates for all the joinery:

- Systematic window testing, in line with14351-1 and B 5300,
- Certificate for air permeability. EN 12207 - Class 4,
- Certificate to water resistance EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,
- Mechanical requirements EN 12400 - Class 2,
- Certificate for sound protection up to class 5,
- Certificate for heat energy transfer coefficient DIN EN 12412-2,
- Glass Certificate EN 673,
- Fittings Certificate V ENV 1627-1630, resistance class 3.

In the process of bids evaluation, the Contractor is obliged to prepare typical drawings for angles of standard windows and doors and other catalogue and presentation material. Upon preparation of shop documentation for certain structures, Designer's approval needs to be obtained. In the process of production of joinery, the Supervisor shall be allowed to carry out inspection during the production process.

Prior to starting major production of joinery, it is necessary to prepare and install typical widow complete with metalwork set, which will be recoded and accepted by the Employer/ Employer's Representative or the Supervisor, after removal of all possible complaints.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Dismantling and installation of air conditioning units, cameras, antennas, lights

The Design envisages dismantling of all AC units, cameras, antennas, facade lights their storing away to a place set by the Employer / Employer's Representative and their re-installation upon facade installation.

Dismantling and preparation of new dripping eaves and mortar and paintwork repairs

The design envisages dismantling and installation of new dripping eaves and window benches. Dripping eaves are made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm, fully in line with the design. Window benches are installed together with windows and are made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm, except at the positions where it is not applicable due to the technical conditions, where they shall be made of PVC.
Mortar and paintwork repair around windows are result of wall damages due to dismantling of existing windows. This item is made with gauged mortar in two layers, fully in line with BoQ.
The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works.
Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year since the day of issuing attests to the day of starting the works.

Dismantling and installation of new bars on windows

Dismantling and painting of existing bars is planned as well as refitting of these in their earlier positions. The bars shall be scraped for existing coatings, repaired if required and painted with new layers fully in line with joinery schemes.

Demolishing of the collapsed plateau and pavement making

Beside preliminary works on clearing the field for pavement making and partial demolishing of the collapsed plateau made of reinforced concrete demolishing (between the main school building and gym's entrance, these works include:

*The concrete structure at the coal reception shall be removed and replaced by concrete pavement.
*Gravel filling and compression of it beneath the floor of the pavement, d=10 cm.
* Concrete work which includes putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm.
New pavement has to have inclination of 1,5% compared to the building.

Prior to commencement of works, the Contractor is obliged to provide the Employer/ Employer's Representative with samples of materials and certificates for all the materials to be used during the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

Works Related to the Creating an Opening for Expanding the Boiler Room Door

There is need for the larger opening for exterior door of the boiler room to allow putting in of necessary equipment. The opening should be expanded within the wall of 55cm thickness, where attention shall be paid in order to avoid shattering of the wall body.

Removal of the existing brick chimneys

Four unused brick chimneys shall be dismantled up to the slab level.

RENOVATION MEASURES, AIMING TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS IN THE BUILDING

In addition to measures directly impacting energy efficiency improvement, the Design Brief envisages reconstruction measures aiming to enable higher comfort and better working conditions in the building.

Reconstruction of dressing rooms in the gym

These works include: painting works and installation of new internal doors.
Apart from the preliminary works on dismantling and demolition, the following works enable implementation of this measure:
* Installation of the new internal single-leaf door made of PVC.
* Plastering of the parts of internal dressing rooms walls and ceiling applying double layer of cement mortar 1:2:6, after spraying the walls with cement milk. Plastered areas need to be flat, with no fractures and bumps, and with sharp and strait edges too.
* Painting of the walls with double layer of oil based paint, up to the height of h=1,5 m (colour shall be selected by the Employer / Employer's Representative).
* Painting of the walls with double layer of semi dispersed paint, in the areas higher than 1,5 m (colour shall be selected by the Employer / Employer's Representative).
* Polishing and painting of the ceilings.
The tone of a semi-dispersed paint will be selected by the Employer / Employer's Representative. The works include: grinding, plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive putty or joint powder. Final painting shall be applied twice.

Repair, skimming and painting works of all internal walls and ceiling in the school building and in the gym

These works include, beside stripping dilapidated plaster of the ceiling (10%), removal of old skimming compound layers of places directly exposed to moisture and on other places where the skimming is in really poor condition, on the second floor, allow realization of this measure:
* Plastering parts of internal walls and ceiling with double layer of gauged mortar 1:2:6, previously treating the walls and ceiling with cement milk.
* Applying new layer of skimming compound,
* Painting of the walls with double layer of oil based paint, up to the height of h=1,4 m (colour shall be selected by the Employer / Employer's Representative).
* Painting of the walls with double layer of semi dispersed paint, in the areas higher than 1,4 m (colour shall be selected by the Employer / Employer's Representative).
* Polishing and painting of the ceilings.

Works also include: grinding, stuccowork, neutralizing, impregnating, pre-painting, corrections using dispersed putty or skimming compound, and applying double-layer of finishing paint.

Montage of the metal fences on the ends of the main corridors of the school building

New metal fences shall be installed on the ends of the main corridors on the ground, first and second floor. Fences shall be 3 m long and 1.10m and fixed to the floor. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, determined by Employer/ Employer's Representative.

Partial repairing of the existing parquet floor

These works include:

Machine sanding and varnishing of the parquet. Conduct these procedures three times by using color free lacquer. Before varnishing, thoroughly clean the surface from dust. Conduct varnishing with a brush, to avoid bubbles. The item includes installation and processing of the angular parquet batten.

Areas of the floor which shall be treated shall be determined on the construction site by the Employer/ Employer’s Representative.

Installation of New Canopy Above Western Entrance in the Dentist Area

New canopy shall have dimension 300/120cm. Construction of the canopy shall be made of the box steel profiles dimension 40*40 mm and polycarbonate plate "Lexan" as a canopy cover. "Lexan" shall be fixed to the structure with screws on rubber washers .All materials shall be sampled and approved by Employer / Employer's Representative. The unit price includes removal of the old canopy and its transportation to the town landfill. Canopy shall be installed, in line with the ETICS facade.

Prior to commencement of works, the Contractor is obliged to provide the Employer/ Employer’s Representative with samples of materials and certificates for all the materials to be used during the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

F4.2.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in "Ristan Pavlović" Primary School in Pljevlja

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	"Ristan Pavlović" Primary School in Pljevlja
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	30 May 2013

The purpose of reconstruction of ''Ristan Pavlović'' Primary School in Pljevlja is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management
2. Heating system efficiency and replacement of coal-fired boilers with pellet-fired boilers
3. Efficiency of the distribution system

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, ultrasonic heat flow meter at feeding pipe of the boiler group, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system.

Both pellet storages next to boilers will be fitted with electronic meter for solid materials in storage silo for metering fuel, pellet consumption.
All obtained data shall be processed in computer with designated software and, based on these, any problem that occurs in the heating system at the entire school will be timely resolved.

HEATING SYSTEM EFFICIENCY AND REPLACEMENT OF COAL-FIRED BOILERS WITH PELLET-FIRED BOILERS

Dismantling of existing boiler room equipment

It is planned to dismantle existing boiler room equipment. Old coal-fired boiler shall be dismantled with open expansion vessel attached to it. Feed and return pipes, pumps, valves and entire manifold in basement premises shall be dismantled. Pipes are impractically insulated with gypsum compound, so it is planned to replace these pipes with new pipes with more suitable insulation.

Construction and specialist trade's preparation works of boiler room for new boilers

Boiler room needs to be adjusted to the new equipment therefore; structural part needs to be reconstructed. Walls shall be plastered, flattened and tiled. Passage between the boiler room and coal shed shall be bricked as shown in the drawings and metal doors installed. In front of those doors, pellet storage bins will be located.
Coal shed needs to be prepared for pellet. In addition to installation of new windows, according to architectural design, walls shall be washed using highly pressurized water pump or equivalent.
Pellet will be purchased in 15 kg nylon bags, stored on wood pallets. Space for pellet storing has floor area of 34m², height of 2.6m, which allows for accommodation of large amount of pellet. Pellet shall be taken in through windows which have been used so far to bring the coal in, and then placed manually on palettes.
Holes in walls, where previous services were laid through, will not be used for this new equipment, so these shall be closed and plastered.
For the purpose of usage of external doors, stairs will be made of steel profiles which will not be fixed stairs, but they can be removed when required. Concrete stairs are not practical due to lack of space in the boiler room, so it would pose disturbance. External doors of the boiler room shall be such to enable equipment to be taken in and opening in the wall shall be adjusted to that purpose.

Installation of new equipment in the boiler room

Installation of new pellet-fired boilers (two boilers rated thermal effectiveness of 150kW, operating range from 42 to 155kW) is planned. Designed boilers are delivered as a set with boiler pumps, mixing valves for cold water in boiler and safety valves. Boilers are dimensioned according to overall heating requirements increased by heating of fresh air at intake into the gym. One boiler can cover 65% of overall heat requirements at extreme conditions, so throughout most of the year, the boilers will operate independently, and at higher loads they will work together.

Boilers will be fired manually. Device for pellet transportation through flexible pipe is fitted onto the burner - which shall be delivered together with the boiler. Indoor pellet hopper will be placed in front of the boilers. The hoppers are handmade as indicated in the drawings. Hoppers are made of wood – board or univare, where the inside needs to be smooth for better pellet sliding. Lower side of the bins is funnel-shaped, tilted at 45° angle. At the bottom of the hopper, there is auger in which pellet falls in, pulled by force of gravity. Hoppers are filled manually and by turning auger – dossier pellet is supplied to the burner.

Boilers will have it’s own automatic control. Automatic control is ready-made, manufactured by the same manufacturer as for the boilers. It will control operation of the burner, automatic pellet supply, automatic ashes removal, setting feeding water temperature from the boilers and return water temperature into the boilers, operation of both heating circuits (circulation pumps and mixing valves), as well as safety equipment. Temperature sensors at the accumulation vessels will send signals to the automatic control to increase or reduce water heating and in that way balance operation of the system. Automatic control will set feeding water temperatures for the heating circuits depending on outdoor temperature.

Burners are fitted with safety switches to terminate operation in case of overheating, and switches for prevention of back-flame from boiler to pellet hopper. Also, the boiler shall be fitted with sprinkler system for extinguishing possible fire in the pellet supply system.

Ashes are automatically removed from the boilers. The unit packs it in boxes on the front side of the boilers, which occasionally needs emptying by their dismounting from the boilers and emptying them outside.

Entire boiler room equipment will be powered by the new electric power wiring.

Equipment for chemical water treatment at the manifold from the town mains is envisaged. Compact softener of water from town mains is chosen, for heating systems with installed boiler power up to 500 kW. Its basic function is to protect the heating system from boiler scale and other deposits in water. Along with the device, it is necessary to use protective backwash pre-filter, which is made of a casing with permanent mesh.

Compact softener casing contains ion-exchange resin which is automatically regenerated once its capacity is spent. Regeneration is automatic and is carried out without the supervision, at in advance programmed time. Water softener is attached to the manifold with appropriate hose.

On the town water mains, in front of the softener, water flow meter – water gauge shall be installed. Softened water is injected into the system through automatic water fill valve, which reacts mechanically to the previously set pressure level in the system.

Capacity of the expansion vessel is determined depending on the total capacity of the system and static water pressure of the system. Self-supporting membrane expansion vessel with safety valve at feeding pipe is selected.

To ensure even feeding water temperature towards heat emitters, it is envisaged to fit accumulation vessel that splits the boiler room system to primary boiler circuit and secondary circuit from manifold. Capacity of accumulation (inertial) tank is determined as per recommendations, depending on capacity of the boilers and the network and it is planned to connect to it 2 temperature sensors at the bottom and at the top, which will send signals to automatic control for starting pumps in the secondary circuit. Due to low ceiling in the boiler room, 2 accumulation vessels will be installed, being heated per layers simultaneously.

It is planned to fit self-supporting prefabricated insulated stainless steel chimney system. Due to position of boilers in the building basement, it is envisaged to put the funnel beneath the ceiling, to the existing bricked chimney in which it will be inserted and then raised vertically through bricked chimney to the roof. Funnel is made of twin-wall stainless steel with insulation between the walls and is connected to the fans that extract smoke from the boiler.
Vertical part of the chimney is made of elements with single wall and insulation on the external side, up to the exit from the building.
Chimney is fitted with condensation vessel, cleaning eye, and safety back burn flap.

Frequency controlled circulation pump will be used for feeding the entire heating system in the school. The pump can operate with the option of automatic control (self-control from “one to the other proportional pressure curve”) or by maintaining proportional pressure, by maintaining constant pressure or in compliance with constant curve. Frequency controlled circulating pump is selected due to installation of radiator valves with thermostatic heads that cause changes in the flow during operation of the heating system.
Gym heating system shall be fed by three-speed pump with fixed number of revolutions. The pump will be controlled by boiler automatic control.
Mixing valves shall be installed on distribution branches, which control feeding water temperature and are also operated by boiler automatic control.

The amount of air required for fuel – pellet combustion can be provided with air injected through air grates on doors, sized according to amount of air required for combustion and injection is achieved via fans on burners.
Since the boiler room is below ground, i.e. in the basement, and there is only small wall facing the external space, no additional equipment to prevent freezing is envisaged. It is also planned for one boiler to run on minimal load when outdoor temperature drops below 0°C on days when school is closed, to prevent freezing of the piping.

Feeding and return pipes are dimensioned depending on the water flow through them, and distance between the connection points is defined depending on dimensions of equipment which will be connected to the feeding and return pipe. At the highest points of feeding and return pipe from the boilers, it is planned to fit air-release vessels with overflow pipes.
Prior to connecting return pipes from heating circuits to manifold, both pipes will be fitted with Y-strainer. Y strainers will be also fitted before the connection from return manifolds to boilers.

Entire new equipment in the boiler room shall be insulated, in particular, parts of pipe branches that transfer water towards the consumers, pipes that go through pellet storage room, and pipes of the branch that feeds gym heating system. Pipes and equipment will be insulated with mineral wool in aluminium sheet metal coating. Pipes in the basement can be insulated with prefabricated pipe insulation made of mineral wool with aluminium foil.

Entire boiler room equipment shall be powered by new electric power wiring.

EFFICIENCY OF THE DISTRIBUTION SYSTEM

Preliminary works

To ensure proper functioning of the heating system in future, all radiators will be dismantled and highly pressurized pump will be used to flush deposits settled in the radiators during their usage. Piping will also be flushed as well as air-extraction network on the second floor in the old section of the building.

Existing piping will be kept with certain interventions on some points where radiators previously have been removed. Certain radiators are not in function, so after their dismantling and re-mounting, they will be capacitated for work.
New radiators will be fitted instead of dismounted radiators in sanitary blocks to reduce the risk of water and sewer pipes freezing.

Fitting of thermostatic radiator valves with thermal heads

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermal heads. Selected thermostatic heads are convenient for buildings, planned to be used by a large number of users, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermal head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.
Due to dismantling of all the radiators for their flushing, during dismantling of existing radiator valves, it is also necessary to dismantle radiator sub-valves.

Installation of balancing valves

Balancing of the pipework will be realized with fitting pairs of balancing valves in positions marked in the drawings, so as to separate certain parts of the pipework.
Return pipe will be fitted with differential pressure controllers without additional power supply, with the option of precise continuous pressure difference setting. The feeding pipe will be fitted with riser pipe control valves with linear properties and meter gauges and the option of setting reading on a display of hand-wheel. These two valves are mutually connected with capillary pipe up to 1m length and as a pair balance pressure variations.

Existing piping is built into the walls, which makes it completely inaccessible, so balancing can be made solely at the beginning of manifolds. Hot water is planned to be transferred towards classrooms via solely one manifold from the boiler room, which will further branch towards parts of the school. Those branches will be fitted with balancing valves at the beginning, before branching towards risers.

New feed branch for gym heating system feeding

New piping is planned for gym heating, however, given that the entire equipment is in poor state, the design envisaged fitting of new heating system for the entire gym and ancillary premises.

A special pipe will lead from the manifold, which will be used solely for feeding gym heating system. Pipes shall be fitted beneath the ceiling of the boiler room and exit outside through the external wall into free space. Then pipes are fitted vertically along the school building façade up to the ceiling of eaves between the school and the gym. Beneath the ceiling, pipes are fitted horizontally up to the entrance into the corridor of the gym above the doors. Insulation made of mineral wool in AL sheet metal coating will be fitted at entire length of the pipes. After the pipes enter the gym building, they split into branch that feeds the radiators in ancillary premises and branch that feeds air convectors in the gym

Existing radiators in ancillary facilities, which are in poor condition, are planned to be replaced with steel cast radiators. These radiators will be also fitted with thermostatic valves. New piping will be completely visible and accessible. Gym will be fitted with four hot water air convectors, capacity of 18 kW, supplied with hot water temperature 90/70°C (80/60), from the heating system. The air convectors will be fitted in the corners of the gym. Fresh air from the facade is injected through the facade grate into mixing box, where the fresh air is mixed with return air. Ratio of fresh and return air is set on the mixing box. The air is then filtered and supplied into air convectors, where it is heated and supplied into the gym space.

Operation of the air convectors is controlled through change in number of fan revolutions via five-stage speed controller and wall-mounted thermostat for setting desired temperature in the gym.
To prevent freezing of water in air convectors at very low outdoor temperatures, fresh air ducts shall be fitted with motor-driven control jealousies which will close when temperature sensor at the entrance signals that temperature reached critical values

To ensure supply of fresh air into every air convector, new openings size 50x50cm need to be made on the facade while excess air is extracted from the room through overpressure grille fitted with light flaps that open when internal pressure increases. To install this grille, it is necessary to make an opening in the gym wall beneath the roof.

Testing state of piping

Since piping is concealed, after installation of the equipment in the classrooms, entire piping shall be tested for tightness in case it proves that certain pipes need to be replaced.

F4.2.3 Technical description of electrical services

for energy efficiency improvement in ‘’Ristan Pavlović’’ Primary School in Pljevlja

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	‘’Ristan Pavlović’’ Primary School in Pljevlja
Doc. origin:	Final Design of Electrical Services
Date:	30 April 2014

The purpose of reconstruction of ‘’Ristan Pavlović’’ Primary School in Pljevlja is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.
The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Power supply and electrical installation for boiler room and new heating equipment
- Installation of energy efficient lighting systems
- Replacement of lightning protection system

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building is also planned. Complete existing electrical installations are made of cables with two wires (cables are without protective conductor PE), existing electrical distribution boards are wooden and therefore, replacement of electrical installations is envisaged.

POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND NEW HEATING EQUIPMENT

It is envisaged to mount new distribution RT-KO board within boiler room, in place of the existing one. This board will be supplied with existing cable PPY 5x6 mm2 mm2 and it will provide electrical supply to heating equipment, lighting and general consumption (burner, circulator pumps, water softeners, general consumption and lighting and cabinets for automatic control).

Cabinets for automatic control of operation of new heating equipment shall be delivered within the scope of heating services. Inside the boiler room, power supply is envisaged using electrical cables type PP-y and cross section 3x1,5 mm2; 3x2,5 mm2 and 5x2,5 mm2 through rigid installation conduits OBO Betterman or similar.
The proposed electrical power supply from existing main distribution board GRT does not affect total power consumption, and the existing cables are preserved.
It is envisaged to install inner circle of deep galvanized tape Fe Zn 25x4 mm2 on prefabricated tape carriers for potential equalization JUS N.B4.925 P, connected to the existing output from foundation grounding unit. Within this circle, each conductive element shall be connected inside the boiler room using yellow-green conduit P/F 1x16 mm2.

INSTALLATION OF ENERGY EFFICIENT LIGHTING SYSTEMS

Replacement of old and non-functional lamps within the facility is envisaged. The newly designed lamps will make it possible to reach the illumination level of more than 300 lx, which is consistent with European standards for particular uses for schools and as required by Detailed Energy Audits. The selected lamps are with bright parabolic grid, of exceptional photometric properties and with one light source (T5 1x54 W) 840 (neutral white source color), with an electronic ballast for which a photometric calculation was prepared in specialized lighting software program. As an alternative, it is possible to install lamp type 2x28W, with a bright parabolic grid and T5 840 tubes (neutral white source color) with electronic ballast. The proposed lamps have slightly higher installed power, and about the same photometric properties, so the Designer opted for the model 1x54W. However, as the requirements were met and confirmed by photometric calculation in both cases, the other solution is also possible. When positioning the newly designed lamps, special attention was paid to the existing electric feeders, so that the reconstruction is not expected to involve any extra work for the relocation of existing lighting in order to keep the designed array. For this purpose it is planned to move one power outlet in each classroom. Switches for lamps remain the same.
For the purposes of lighting the blackboard, one lamp is envisaged per each classroom (where there are two boards, two lamps will be installed), i.e. lamps with parabolic asymmetric grid 1x80W grid, with an electronic pre-connection device and tubes 840 T5 color. Power supply for these lamps will come from the nearest junction box, to be switched on from any of the existing command centers in the classroom or from the gate in case of centralized solution.
In the toilets, luminaries with electronic ballast and IP 54 protection degree shall be installed and in the hallways 2x28W T5 840 with opal diffuser made of polycarbonate.
Within the gym, light fittings with special net cover for mechanical protection are envisaged with fluorescent tubes 4x80W, also with electronic ballast and tubes 840T5.
In the new boiler room, luminaries with IP 65 protection degree shall be installed with 2x35 W T16 840 and these luminaires are commanded localy with one way switches and on-wall instalation.
Bearing in mind type of the building, emergency escape and anti-panic lighting system is designed according to the EN 1838, LED 5W, 1h light fittings. Light fittings which are envisaged enable safe escape from the building with luminance level on the escape route 1 lx and anti-panic luminance of 0.5 lx. in case of total black out. For supply of emergency lights, cables PP-y 3x1,5 mm^2 shall be installed from the nearest switchboard.

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and new roof on main school building, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, layed down in foundations of the building and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. It is foreseen to install air terminal, 4 meters high, with device for early streamer emission, type Interceptor SI 60, producer ERITECH-ERICO or similar with equal or even better technical characteristics.
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quanitites for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.
New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

NEW ELECTRICAL SERVICES IN THE BUILDING

Low voltage cable connection

The building is connected to LV network in a measurement and distribution switch board, marked as PMO, mounted on a nearby post, next to the school building. This PMO distribution board is connected to LV network via cable as per requirements of PE EES ED Pljevlja. Main distribution board in the building GRT, located in the ground floor of the school, is connected to PMO via cable PP0-y0 5x16 mm2, placed in the trench together with FeZn 25x4mm strip, which shall be connected to existing foundation grounding outlet.

Distribution boards and power supply cables

Measuring equipment of electrical energy consumption shall be installed in measurement and distribution switch board, marked as PMO. According to TP2 ED, measuring of electrical consumption is direct (low voltage, three phase, two phase, +A).
Main distribution board (junction box) GRT shall be installed in the ground floor of the building and made of double pickled metal sheet 2mm thick. This junction box is divided in two sections: section with fuses and switches and distribution section. PP00 and PP-y cables are laid from GRT to junction boxes inside the building, from which the electric power is distributed further to the end-user points in the building.
New distribution boards/ junction boxes are wall recessed type, with lock, similar to Schneider Electric – Pragma. These junction boxes are divided in properly dimensioned sections with fuses and switches and distribution sections.
All new junction boxes shall be made according to enclosed drawings and Bill of Quantities.

Electrical installations for general consumption and power supply of heating equipment

For the purposes of power supply for general consumption and power supply of heating equipment, appropriate number of single phase and three phase outlets and connecting points is foreseen, in line with the purpose of this building. Outlet arrangement is planned according to equipment arrangement. In the case of any changes of equipment arrangement, position of the outlets should align with these changes.
Modular type of installation accessory is foreseen. Electrical installations for general consumption shall be made of conductors type PPY 3x2.5mm2 and PPY 5x2.5mm2. Cable shall be laid in walls/ceilings and covered with plaster.
Installation heights on which the outlets shall be executed (with number of current circuit), are marked on the drawings annexed herewith.
The protection from indirect contact is made by system of protection TN-S and with using single phase protection devices with differential current, with automatic switch function.

Electrical installations of interior lighting

Appropriate lighting installation is foreseen in all rooms of the building and in line with the purpose and conditions for mounting of lighting fixtures. Luminaries with appropriate level of protection are selected according to the purpose and position of rooms. The proposed luminaries are specified on the drawings and in Bill of Quantities. The light sources must be energy saving with designed power and luminous flux.
In rooms, luminaries are locally controlled with ordinary switches and two way switches, while the control of luminaries in hallways is centralized and shall be done from reception desk at entrance of the building.
The switches shall be modular type with decorative mask. The switches shall be mounted at height of 1.2 meters from the finished floor level. Electrical installation shall be made of conductors type PPY 3x1.5mm2, PPY 4x1.5mm2 and PPY 5x1.5mm2. Cables shall be laid in walls/ceilings and covered by plaster.

Emergency lighting

Emergency lighting is planned according to the purpose of the building. It is planned to be installed in entrance hall, stairs and stair halls.
Planned emergency light fixtures are envisaged for 1h autonomous operation in case of power cut.
Emergency lighting fixtures shall be part of separate electrical circuit, powered by PP-y 3x1,5mm2 cables, laid in walls/ceilings and covered by plaster.
Anti panic light fixtures with Ni-Cd batteries and AC adapter are planned in all corridors and stairways. These luminaries are envisaged for 1h autonomous operation in case of power cut and they are directly connected over fuse to the nearest junction box. These luminaries shall provide a minimum level of light for safe evacuation.
Type of luminaries, method of installation and class of insulation for electrical equipment and materials shall be in line with nominal voltage levels and environmental conditions

F4.3. Educational Building 3
"Miloje Dobrašinović" Secondary School, Bijelo Polje

F4.4.1 Technical description of building and trade works

For Energy Efficiency Improvement in ''Miloje Dobrašinović" Secondary School in BijeloPolje

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	S.S. "Miloje Dobrašinović", Bijelo Polje
Doc. origin:	Final Architectural Design
Date:	30 February 2014

The purpose of reconstruction of "Miloje Dobrašinović" Secondary School in Bijelo Polje is implementation of Energy Efficiency Measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

In terms of envisaged building and trade works, improvement of Energy Efficiency is achieved through application of following measures:

- Thermal insulation of façade walls,
- Thermal insulation and waterproofing of the roof,
- Replacement of façade joinery.

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities. Those works include:

- Dismantling and installation of vertical rain gutters and horizontal rainwater downpipes,
- Dismantling and installation of air-conditioning units, cameras, facade lighting and other existing equipment and installations on facade,
- Removal of windows entailing construction of new metal sheet drip caps, mortar and jamb repairs and paintwork around joinery, etc.,
- Dismantling and construction of new metal sheet drips on roofs,
- Renovation of the existing steel bars on ground floor windows. If applicable, the bars shall be removed from the windows, cleaned, repainted with proper rust protection and put back or new bars shall be mounted on ground floor windows in the same position,
- Cleaning of whole surface draining system in order to get an overflow to the old entrance area.
- Partial repairing of the surrounding external concrete pavements,
- Covering of the expansion joints in the building sections by wooden elements.

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned, whereat:

- Renovation of sanitary rooms:
  Two toilets on the ground floor built in 1980, under the stairway and two toilets on the second floor in the building built in 1980 shall be renovated.
- Repair and painting works of the ceilings and walls, in the school building except administrative rooms, gym, and locker rooms.
- Partial renewal of the floors.
- Planting new trees in school courtyard.

THERMAL INSULATION OF FAÇADE WALLS

Expanded polystyrene EPS boards, having heat transfer coefficient λmax = 0,037 W/mK, thickness 10 cm, produced in line with relevant EN standards, will be used as external thermal insulation of facade reinforced concrete (hereinafter RC) and brick walls. External thermal insulation composite system (ETICS) needs to have ETAG 004 certificate.

The lower part of the facade walls in the ground floor level (all parapets in the ground floor, pillars and parts of the full wall), will be treated with harder insulating material XPS - extruded polystyrene, thickness d=10cm resilient to mechanical damages, with nominal thermal conductivity of λ=0,035-0,04 W/mK. Existing facade plinth shall be removed and the lower parts of façade walls shall be finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), using at the same time as splash guard and protection against vandalism.

Thermal panels with B1 flammability class (DIN 4102 B1 highly resistance to flammability, non-combustible and self-extinguishing) shall be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20 m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.

EPS/XPS pieces, thickness d=3cm, shall be used for treatment of jambs on external sides of openings.

Thermal plates are lap-joint and fixed to the facade wall with adequate enriched mineral adhesive and anchored with adequate screw anchor. Plate surface is protected with fibrous plaster made of following components:
* the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth. Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case additional mechanical anchoring is required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
* reinforcing mesh;
* the second layer of mortar is applied in the same way as the previous. This mortar is applied on a well settled first layer, smoothen with a screed afterwards;
* contact coating, made base on emulsion of synthetic resin and water glass, as agent for impregnation of settled fibrous mortar;
* finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mold. This layer is made in fine grained and smooth structure, painted in color selected by the Designer, fully in line with the Design details.

Prior to installation of thermal plates, following works must be performed:
* all the works on flat roof, including sheet metal works,
* replacement of facade joinery,
* installation of envisaged installations and equipment on the façade,
* covering and protection of all the surfaces that remained untreated – glass, stone...
*reduction of windows/glazed areas is foreseen in two areas of old building: building parapets in the old staircases, partial closing of the doors and windows in the old main entrance area, window opening to the lavatory area below the staircase shall be closed. One ventilation opening with fly screen shall be inserted on the façade in that area. New walls shall be built by gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics), plastered from the inner side of walls with lime-cement plaster 1:2:6, and finally paint (item No3 shall be only bricked without processing the inner side of the wall). Outer side of the new parapets shall be prepared for installation of the ETICS facade.
* checking existing cradling on the building.

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm shall be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand.

If during separation of polystyrene only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.

If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.

If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.

Corners and jambs of wall openings shall be installed with reinforcing mesh or angle profiles. Facade finishes along the plinth are made with installation of "U" profile strips adjusted to the thickness of thermal plate.

Prior to installation of plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates shall be additionally anchored using adequate bolts.

During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.

Window sills shall be also thermally insulated. Drips made of ready-made galvanized plastic-laminated steel metal sheets will be installed over newly fitted window benches (sills). Drips are placed along the entire width of windows and skylights with overhangs.

On the lateral walls of the gym existing "Y" supporters shall be coated with "Demit" thermal façade, consisting EPS boards 10cm thick.

Facade Scaffolding

For execution of described works for application of Energy Efficiency Measures in "Miloje Dobrašinović" Secondary School, Bijelo Polje it is necessary to install adequate facade scaffold.

Facade scaffold shall be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It shall be used throughout the whole execution of works. Platforms or scaffold to be used primarily to ensure safety of workers, and then ensure quality execution of required works.

Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.

Note: As per available equipment and works execution technology. prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

ROOF THERMAL INSULATION AND WATERPROOFING

Within application one of the measures for EE in "Miloje Dobrašinović" Secondary School, it was designed to make new waterproofing and thermal insulation of the existing roofs and replacement of the existing roof coverings, both on the Main School Building and Gym Hall.

Regarding preliminary works, it is planned to remove the existing roof coverings on the following roofs:

Removal of the existing roof covering from the Main School Building, made of "Mediteran" tiles and battens 4/6cm, up to the existing wooden roof structure including replacement of over aged parts (roof posts, columns, rafters, struts…), which have to be of the same shapes and dimensions as the existing ones, and in total 10% of the whole roof area.

Removal of the existing roof covering from the canopies over main and auxiliary entrances. These roof coverings are made of zinc-plated metal sheets and tar-paper placed over cantilever boards (these details are from design documentation).

Removal of the existing roof covering from the Gym Hall made of arched trapezoid metal-sheets. The removal shall be performed up to the reinforced concrete "Y" supporters.

Upon removal of the existing roof coverings, new roof covering shall be mounted on the prepared sheathing:

Hipped roof structure on the Main School Building and Gym Hall Annex, shall be covered by painted Al sheets Al.Tr.40/230/0.7mm. The next operation, after covering, is flashing of all roof and wall valleys, ridges, hips and gutters with mounting of snow shields, using all necessary joining materials. Thermal insulation has to be performed within attic, made of expanded polystyrene EPS d=10 cm, 20kg/m³, laid down over reinforced concrete slab and vapor barrier, with PVC foil protection and overlaps of 10-15cm.

On Gym Hall roof, the new covering shall be performed with the roof polyurethane composite panels, d=10cm thickness, heat transfer coefficient λmax = 0.025 W/mK, of standard modular width 1000mm. The panels are fastened to the steel "U" profiles 60/40/3mm, placed at 60-150cm distance, over reinforced concrete "Y" supporters.
The upper metal-sheet of panel is of unique trapezoid shape d = 0.5 mm, and the lower one is standard SNV d = 0.5mm. After mounting of composite panels, the next operation is flashing of all wall valleys and corners, gable edges and gutters, using all joining bits and pieces (stainless steel screws, washers and EPDM sealing).

Front masks of the "Y" supporters on the roof of the Gym shall be dismantled and eave shape shall be redesigned by installation of the thermal insulation plates EPS 10 cm thick installed on the base made of plasterboards 1.25 cm thick on metal sub-construction (galvanized steel profiles). Thermal plates are attached to the wall with appropriate enriched mineral adhesive and anchoring with appropriate bolts.

Thermal insulation of the school attic and Gym Hall's Annex using expanded polystyrene EPS d=10cm, laid down over reinforced concrete slab and vapor barrier, with PVC foil protection and overlaps of 10-15cm. Thermal plates are attached to the wall with appropriate enriched mineral adhesive and anchoring with appropriate bolts.

New Waterproofing Including New Flashings at the Porches

New waterproofing including and new flashings shall be installed at the porches of the main and side school entrances. New thermal insulation shall be installed on the section above the Reading Room.

Dismantling of Old Chimney

Dismantling of old chimney in the building built in 1980. This includes: dismantling of old chimney which is not functioning, parts through the attic and above the roof, while part of chimney that is on the ground floor and on the upper floors shall remain.

Prior to commencement of works, the Contractor is obliged to provide the Employer/ Employer's Representative with samples of materials and certificates for all the materials to be used during the works. Certificates must be issued by relevant institute for referred type of works.

REPLACEMENT OF FACADE JOINERY

Replacement of the entire facade joinery is the next measure to improve Energy Efficiency in "Miloje Dobrašinović" S.S.

New windows will be made of high quality 6-chamber PVC profiles which need to have appropriate thickness (3.5 mm) and reinforced with galvanized steel profiles. The profiles shall be fully in line with RAL quality standard. Heat transfer coefficient, for package of profiles with metal reinforcement (in line with DIN EN 12412-2), shall be less than 1.4 W/m²K.

Infill is made of double layer low glass 4 +16 +4 mm, of heat transfer coefficient U = 1.5 W / m² K and solar energy transmittance factor g≤65%, with the hermetically sealed argon or dry air in-between two glazing. Epoxy rubber (according to EN410 and EN 673, Ug = 2.0 and W / m² K) is used for the sealing.

Outer glass at the south part of façade has to be coated with low-emission coating as a protection from sunlight.
The joinery must be fitted with high-quality interchangeable gaskets, high-quality fittings of nickel and aluminium alloys, handles, locks and keys.
Entire PVC joinery must be installed in line with drawings – joinery schemes, in white colour.
Natural air-streaming at closed window is envisaged through elements in the window frame type "Regel air", which need to be specially installed for that purpose, or in some other way in line with DIN and EU norms.

Number and size of these elements depend on the size of the window – given minimum per 2 pieces. These elements shall not be installed in fixed windows and fanlights.
For windows exceeding 2.2 m, window leaves are opened using “tilt and turn” mechanism on rail with opening, using a handle that turns by 360 degrees. “Tilt and turn” mechanism is operated via steel rail on a spindle that allows opening by “tilt and turn” up to minimum 20 degrees.
Windows need to be installed through previously installed blind frames, fixed with anchors at 50mm depth into the walls i.e. existing structure.
Windows need to be placed so that the external side is at the same level as the previous windows.
Drips, made of ready-made galvanized plastic-laminated steel metal sheets, are installed on the external side of the windows. These are placed along the entire window and skylight width with set overhang over newly fitted thermal façade.
On the internal side of the window, it is necessary to place PVC window sills, along the entire width of the window, depth depending on the depth of the existing parapet wall.
Quality certified shackle must ensure opening according to the given joinery schemes. Special attention must be paid to shackles for “tilt and turn” windows to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window sashes.
New external doors shall look the same as the existing ones (single and double doors, opening outwards), with fanlights just like the existing glazed with thermal insulated glass system 4+16+4 on three hinges.
When installing the doors, use certified, quality fittings in order to provide the opening by the given scheme, also install a self-closing mechanism, cylinder lock with three keys and door rubber stoppers.
Entrance portals into buildings and all tall items with small parapet walls, shall be performed as new facade aluminium joinery, fitted with thermal break, double glazing with glass panels system 4+16+4mm and heat transfer coefficient Umax = 2,8 W/m²K.
Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.
Include everything from the description: purchase of material, production, transportation and installation with hinges and blind frame, as well as aluminium board of required width. Measures shall be taken onsite.
The item includes production and assemblage of galvanized aluminium structure fitted with thermal-break, heat transfer coefficient Umax = 2,8 W/m²K, metal supporters, required hanging and closing set. Opening is done as shown on graphical part – joinery scheme. The item shall also include inner aluminium bench of required width. Profiles shall be in color of natural aluminium.
A vestibule area shall be constructed the interior of the main entrance, and it shall include two double wing swinging doors. The item also includes production and assemblage of plastic coated aluminium profiles without thermal-break, metal supporters, required hanging and closing set.
Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.

Selection of facade joinery color or possible changes in details (elevation) can be determined either by Client or Supervisor, with previously obtaining Employer/ Employer’s Representative permission.

A supplier has to submit the following certificates for all the joinery:

- Systematic window testing, in line with14351-1 and B 5300,
- Certificate for air permeability. EN 12207 - Class 4,
- Certificate to water resistance EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,
- Mechanical requirements EN 12400 - Class 2,
- Certificate for sound protection up to class 5,
- Certificate for heat energy transfer coefficient DIN EN 12412-2,
- Glass Certificate EN 673,
- Fittings Certificate V ENV 1627-1630, resistance class 3.

In the process of bids evaluation, it is advisable to provide typical drawings of angle types of windows and doors, as well as other catalogue and presentation material. In process of joinery production, it is necessary to enable Supervisor to inspect the products.

Prior to starting major production of joinery, the Contractor must prepare and install typical window, complete with joinery set, which will, after removal of all possible defects, be recorded and approved by the Employer/ Employer's Representative or the Supervisor.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Dismantling and Installation of Rain Downpipes and Horizontal Rain Water Gutters

Installation of new facade thermal insulation causes dismantling of vertical rain water downpipes. Due to the bad condition of old rain water downpipes, dismantling and installation of the same rain water downpipes over again is not applicable, therefore installation of the new ones is foreseen. Rain water downpipes of the school building shall be produced of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm.

The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works. Certificates must be issued by relevant institute for referred type of works.

Certificates cannot be older than a year since the day of issuing attests to the day of starting the works.

Dismantling and Installation of Air Conditioning Units, Cameras, Antennas, Lights

The Design envisages dismantling of all AC units, cameras, antennas, facade lights their storing away to a place set by the Employer / Employer's Representative and their re-installation upon facade installation.

Dismantling and Preparation of New Dripping Eaves, Mortar and Paintwork Repairs

The design envisages dismantling and installation of new dripping eaves and window benches. Dripping eaves are made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm, fully in line with the design. Window benches are installed together with windows and are made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm, except at the positions where it is not applicable due to the technical conditions, where they shall be made of PVC.
Mortar and paintwork repair around windows are result of wall damages due to dismantling of existing windows. This item is made with gauged mortar in two layers, fully in line with BoQ.
The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year commencing from attest issuing date to the day of starting the works.

Renovation of the Pavement Around the School Building

Partial repair of pavement in court corner of old building, back side of the Gym, shall be done. These works include:

*Demolition of old concrete slabs,
*Concreting of sidewalk around the building "A", "B" and "C" using compacted concrete, type MB20, of 10 cm thickness, along with simultaneously prepared floated surface of d=2cm thickness (in total of 12cm), preparation of border curb (dim. 10/20cm). Pavement has to be strained into the fields CCA 1,5m2. Expansion joints shall be filled with bitumen.

Cleaning of whole surface drainage system around school building in order to get an overflow to the old entrance area is foreseen. The unit price shall also include cleaning of canals for the rainwater from leaves and dirt.

Improvement of Inner Expansion Joints

Smooth wooden boards for covering the expansion joints inside the building, shall be placed along the walls and ceilings.

The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year since the day of issuing attests to the day of starting the works.

RENOVATION MEASURES, AIMING TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS IN THE BUILDING

Renovation of Sanitary Facilities in the School Building

In addition to measures directly impacting Energy Efficiency Improvement, it is envisaged to renovate the following sanitary facilities in the school.

- two toilets on the ground floor built in 1990, under the stairway,
- two toilets on the second floor in the building built in 1990.

This reconstruction includes: demolition and dismantling works, new waterproofing, ceramic and painting works. Other works on the reconstruction of sanitary facilities (replacement of old sanitary equipment, water and sewerage pipes, and installation of a combined boiler for the preparation of hot sanitary water (hereinafter HSW) are defined in a separate discipline of design documentation - installation of water and sewerage pipes.
Apart from the preliminary works on dismantling and demolition, the following works enable implementation of this measure:
* Making of the scrimmed cement screed for a sloping layer in the toilets, including setting up of the mesh (1kg/m2). The mesh shall be done with an overlap of 5 cm (1.08 m2/m2). Floating is the final treatment. Screed thickness is d = 4 cm.
* Setting up of horizontal waterproofing under the flooring in the toilets in following layers (from the bottom up):
- bitulith + polyasbestos + glass mesh,
- polyasbestos + glass mesh,
- polyasbestos.
Put the waterproofing at least 10 cm up the walls.
*Installation of vertical waterproofing on walls in the shower booths, from floor to ceiling covering height of h=3,30m using ''Texaspenetrat''
*Plastering of internal toilet walls applying double layer of cement mortar 1:3, after spraying the walls with cement milk to prepare the wall for ceramic tiles.
*Covering of the toilet walls with the class I ceramic tiles. The size, color and tone will be selected and sample approved by the Employer/ Employer's Representative. Line the tiles in adhesive layer in joint bonding manner, by using the joint powder. Set up ceramic tiles up to the ceiling height (h=2,75m). Coating of the jambs and niches won't be calculated separately.
* Covering floors in the toilets and other premises with the class I anti-slip tiles. The size, color and tone will be selected sample approved by the Employer/ Employer's Representative. Line the tiles in a waterproof adhesive layer in "joint to joint" manner, by using the joint powder.
In the toilets, where there is a grate in the floor, sloping towards the grid is at least 1% (regulate the sloping with the cement screed thickness).
* Polishing and painting of the ceilings.
The tone of a semi-dispersed paint will be selected by the Employer/ Employer's Representative. The works include: grinding, plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive putty or joint powder. Final painting shall be applied twice.

Repair and Painting Works of the Ceiling and Parapet Walls

Beside implementation of Energy Efficiency Measures presented in Design Brief, repair and painting ceilings and walls, in the School Building except the Administrative Rooms, Gym, and Locker Rooms are foreseen too.

Following works, beside stripping dilapidated plaster off parapet walls and ceiling (20%), removal of old skimming compound layers on places directly exposed to moisture and on other places where the skimming is in really poor condition, on the second floor, allow realization of this measure:
* Plastering parts of internal parapet walls and ceiling with double layer of cement-lime plaster 1:2:6, previously treating the walls with cement milk.
* Applying new layer of skimming compound on majority of parapet walls and ceilings,
* Walls up to 1,4 m shall be paint with oil-based paint.
* Ceilings and walls in the areas higher than 1,4m shall be paint using semi-dispersed water-based paint.
*Scraping of old paint, polishing and painting with oil-based paint the walls in the areas of the radiators which will be dismantled, rinsed and re-installed.
The color of the semi-dispersed water-based paint and oil-based paint will be selected by Employer / Employer's Representative. Works also include: grinding, stuccowork, neutralizing, impregnating, pre-painting, corrections using dispersed putty or skimming compound, and applying double-layer of finishing paint.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

Renewal/Completion of the Floors where Necessary

Machine sanding and varnishing of the parquet floor, and treatment with color free lacquer is planned in the classroom areas determined on the site by Employer / Employer's Representative.

Planting New Trees in School Courtyard

New trees shall be planted in school courtyard as a sun protection measure and measure for improvement of general working conditions.

Prior to commencement of works, the Contractor is obliged to provide the Employer/ Employer's Representative with samples of materials and certificates for all the materials to be used during the works.
Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

F4.3.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in ‘’Miloje Dobrašinović’’ Secondary School in Bijelo Polje

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	‘’Miloje Dobrašinović’’ Secondary School in Bijelo Polje
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	30 May 2013

The purpose of reconstruction of ‘’Miloje Dobrašinović’’ Secondary School in Bijelo Polje is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management
2. Installation of thermostatic and balancing valves
3. Measures for comfort improvement and better functionality

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system.
Fuel flow meter shall be installed at the oil feeding pipe, before the pipe enters the burner, and ultrasonic calorimeter shall be fitted at the main return pipe from manifold towards the boiler.
All obtained data shall be processed in computer with designated software and, based on these, any problem that occurs in the heating system at the entire school will be timely resolved.

INSTALATION OF THERMOSTATIC AND BALANCING VALVES

Fitting of Thermostatic Radiator Valves with Thermal Heads

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermal heads. Selected thermostatic heads are convenient for buildings, planned to be used by a large number of users, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermal head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.
Due to dismantling of all the radiators for their flushing, during dismantling of existing radiator valves, it is also necessary to dismantle radiator sub-valves.

Installation of balancing valves

Due to earlier extension of the school, pipework is not suitable for balancing, so new sets of balancing valves will be fitted only on certain branches.
Balancing of the pipework will be realized with fitting of pairs of balancing valves in positions marked in the drawings, so as to separate certain parts of the pipework, and lateral branches that come from the main branch are planned to be fitted with control valves on return pipes to dampen part of the pipes.
Return pipe will be fitted with differential pressure controllers without additional power supply, with the option of precise continuous pressure variation setting. The feeding pipe will be fitted with valves for risers control with linear properties and meter gauges and option of pre-setting and reading on a display at hand wheel. These two valves are mutually connected with capillary pipe up to 1m length and as a pair balance pressure variations.

MEASURES FOR COMFORT IMPROVEMENT AND BETTER FUNCTIONALITY

Dismantling of existing boiler room equipment

It is planned to dismantle existing boiler room equipment. Old coal-fired boiler shall be dismantled, together with open expansion vessel attached to it. Even though the boiler will be removed, the pipes that transfer hot water from it to the feeding and return manifolds will be kept.
Circulation pumps used in heating systems in the old and the new part of the school will also be dismantled for installation of frequency-controlled pumps.
Y-strainer on the return pipe from return manifold to coal-fired boiler shall be removed, only the block valve shall be kept.

Construction and specialist trade's works for the new boiler

Part of the boiler room that presently accommodates coal-fired boiler shall be adapted for installation of the new boiler.
Holes made on the external wall, to lay through electric power wiring and oil pipes, need to be patched.
Single-leaf metal doors shall be fitted in the door opening behind the boiler, to allow access to the premises behind the boiler room, through which the pipes for the school heating are fitted.
Concrete screed and tiles shall be fitted on the floor and the tiles fitted on the wall up to 20 cm height.
The area (basis) beneath the new boiler has to be higher and raised up to 10 cm from the finished floor level in the rest of the room.

Installation of new equipment in the boiler room

It is planned to install new three-way boiler, rated thermal effectiveness of 263kW at running mode 50/30°C and 245kW at running mode 80/60°C. Boiler is sized to cover overall school heating requirements with back-up power of 15%.
The boiler planned to be fitted is condensing boiler, made by the same manufacturer and of same type as the existing, which is installed in the heating system of neighboring Electrical and Business High School.
Condensing boiler was also selected as it provides high degree of efficiency (103%), which is relevant for lower consumption of light distillate oil, given that the new boiler is to be connected to the existing tank together with two other boilers, each of 335kW power.
Works on reconstruction of the boiler room in 2011 left the option of connecting the third boiler and a set of pipes for light distillate oil had already been installed. Burner of the new boiler will be connected to those pipes.
Pipes which were used to connect coal-fired boiler, which are new and installed when the boiler room was reconstructed, will be used to distribute water from the boiler and to return water to the boiler. Since pipes diameter is bigger than the required, portion of those pipes that can be used will be kept, and set of new pipes leading to the boiler, with the flow (DN65) and diameter suitable for the boiler, shall be connected to the existing pipes.

Designed boiler will have its own digital control which will manage operating of the burner and the boiler and two heating loops with circulation pumps and mixing valves, regardless of the work of cascade control on existing boilers. Boiler digital automatic control shall control functioning of the boiler and the burner in accordance with variations of outdoor temperature.

Water expansion that appears during heating of the system shall be resolved with new membrane expansion vessel with fixed air ‘’cushion’’, which will be placed behind the boiler and connected to the return pipe towards the boiler.

Existing circulation pumps on two branches of the Gymnasium heating system will be replaced with dual frequency controlled pumps. Circulation pumps are selected based on calculated amount of flow through heating system branches and estimated pressure drop on pipe branches, increased by pressure drop through boilers and boiler room equipment.
Circulation pumps can operate with the option of automatic control (self-control from “one to the other proportional pressure curve”) or by maintaining proportional pressure, by maintaining constant pressure or in compliance with constant curve. Running of these pumps will be managed through boiler automatic control system.
Three-way mixing valve for variable control of feeding water temperature shall be fitted in front of the pump, with connection to the cold water pipe at inlet into the feeding manifold.
Prior to connection to feeding manifold, both branches will be fitted with Y-strainer.

Entire boiler room equipment shall be powered by new electric power wiring.

It is planned to erect self-supporting prefabricated chimney system made of stainless steel sheet metal. Flue will be placed through existing bricked wall. It is made up of elements which are used at the same time to repair existing old chimneys. Funnels from the boiler to the riser are comprised of elements made of twin-wall sheet metal and “supercool” insulation. Part of the flue that goes through existing chimney will be made of elements meant for installation in existing flues – used to repair old chimneys and made of single sheet metal layer and externally fixed insulation.

Existing axial fan, fitted in the window of the section of the boiler room that feeds Electric and Business High School, will be used for boiler room ventilation.
Amount of fresh air required for fuel combustion shall be injected through that same window and suction is achieved via burners’ fans.

Feeding and return manifold will remain as they are. They are fitted with intention of separating heating systems of Gymnasium and Electric and Business High School, after the extension of the boiler room. Previously, butterfly valves DN200 in the middle of the feeding and return manifolds shall be closed.

Entire new equipment in the boiler room will be insulated, in particular parts of manifolds that transfer water towards new and old parts of the school, which presently are not insulated. Those are parts of pipes that go through adjoining room, which at present is nearly inaccessible. However, with removal of coal-fired boiler and installation of the door, it could be easily made accessible. Material selected for insulation of equipment shall be the same as already fitted insulation.

Preliminary works on installation of new equipment

To ensure proper functioning of heating system in future, all radiators will be dismantled and highly pressurized pump will be used to flush deposits settled in the radiators during their usage. Piping will also be flushed, as well as air-extraction network on the second floor in the old section of the building.

Existing piping will be kept with certain interventions on some points where radiators were removed. Certain radiators are not in function so, after their dismantling and re-mounting, they will be capacitated for work. In the upper floor of the building, in the office in one of the premises with area of 16 m2, there are 3 radiators,

each of 19 ribs, which is too much and, under current conditions, without wall insulation. Therefore, one radiator will be dismounted and mounted into the hallway on the ground floor of the old section of the school, instead of the removed radiators.

In the hallway on the second floor, 2 radiators were removed earlier and new radiator shall be installed at the location of one of them.

F4.3.3 Technical description of electrical services

for energy efficiency improvement in ‘’Miloje Dobrašinović’’ Secondary School in Bijelo Polje

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	Secondary School ‘’Miloje Dobrašinović’’ in Bijelo Polje
Doc. origin:	Final Design of Electrical Services
Date:	30 May 2013

The purpose of reconstruction of ‘’Miloje Dobrašinović’’ Secondary School in Bijelo Polje is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Power supply and electrical installation for boiler room and new heating equipment
- Installation of energy efficient lighting systems
- Replacement of lightning protection system

POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND NEW HEATING EQUIPMENT

Installation of new boiler and heating equipment in the existing boiler room is proposed as one of the measures to improve energy efficiency in Secondary School ‘’Miloje Dobrašinović’’ in Bijelo Polje. Boiler room for Secondary School “Miloje Dobrašinović” and neighboring Electrical and Business High School is located in common room in the basement floor of Electrical and Business High School. Heating equipment, which belong to Electrical and Business High School, is already changed. There is certain reserve left in existing electric distribution panel RT (“RT-KO”) in boiler room, for power supply of equipment designated for Secondary School “Miloje Dobrašinović”. Therefore, some new electrical equipment and material shall be added in RT-KO, as specified in electrical diagram of the boiler room switch box and bill of quantities. Control panel for automatic control of operation of new heating equipment shall be delivered within the scope of heating services. Inside the boiler room, new power supply is envisaged using electrical cables type PP-y and cross section of 3x1,5 mm2; 3x2,5 mm2 and 5x2,5 mm2 through rigid installation conduits OBO Betterman or similar. The proposed new electrical power supply from existing main distribution panel GRT does not affect total power consumption and the existing cables are preserved.
It is envisaged to install inner circle of deep galvanized tape Fe Zn 25x4 mm2 on prefabricated tape carriers for potential equalization JUS N.B4.925 P, connected to the existing output from foundation grounding unit. Within this circle, each conductive element shall be connected inside the boiler room using yellow-green conduit P/F 1x16 mm2. Near the fuel tank, it is necessary to mount cabinet or pillar for discharge of static electricity, which shall be connected by means of tape Fe/Zn 25x4mm to foundation grounding unit (electrode) of the building.

INSTALLATION OF ENERGY EFFICIENT LIGHTING SYSTEMS

Replacement of old and non-functional lamps within the school and the gym is envisaged. The newly designed lamps will make it possible to reach the illumination level of more than 300 lx, which is consistent with European standards for particular uses for schools and as required by Detailed Energy Audits.
The selected lamps are with bright parabolic grid, of exceptional photometric properties and with one light source (T16 1x54 W) 840 (neutral white source color), with an electronic ballast for which a photometric calculation was prepared in specialized lighting software program. As an alternative, it is possible to install lamp type 2x28W, with a bright parabolic grid and T16 840 tubes (neutral white source color) with electronic ballast. The proposed lamps have slightly higher installed power, and about the same photometric properties, so the Designer opted for the model 1x54W. However, as the requirements were met and confirmed by photometric calculation in both cases, the other solution is also possible. When positioning the newly designed lamps, special attention was paid to the existing electric feeders, so that the reconstruction is not expected to involve any extra work for the relocation of existing lighting in order to keep the designed array. For this purpose it is planned to move one power outlet in each classroom. Switches for lamps remain the same.
For the purposes of lighting the blackboard, two lamps are envisaged per each classroom (where there is only one board, only one lamp will be installed), i.e. lamps with parabolic asymmetric grid 1x80W grid, with an electronic pre-connection device and a lamp of 840 T16 color.
Power supply for these lamps will come from the nearest junction box, to be switched on from any of the existing command centers in the classroom or from the gate in case of centralized solution.
Within the gym, light fittings with special net cover for mechanical protection are envisaged with fluorescent tubes 4x80W, also with electronic ballast and tubes T16 840.
In the toilets, luminaries with IP 54 protection degree shall be installed with 1x28 W T5 840 lamps with electronic ballast and opal protector, and in the hallways 2x28W T16 840 with high frequency electronic ballast with PMMA BIVERGENZ dark light diffuser or similar technology which eliminates glare.
In the new boiler room, luminaries with IP 65 protection degree shall be installed with 2x35 W T16 840 and these luminaires are commanded localy with one way switches and on-wall instalation.
Bearing in mind type of the building, emergency escape and anti-panic lighting system is designed according to the EN 1838, LED 5W, 1h light fittings. Light fittings which are envisaged enable safe escape from the building with luminance level on the escape route 1 lx and anti-panic luminance of 0.5 lx. in case of total black out. For supply of emergency lights, cables PP-y 3x1,5 mm^2 shall be installed from the nearest switchboard.

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and replacement of roof cover on main school building and gym hall, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, layed down in foundations of the building and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. New roof cover on the main school building shall be made of plastic-coated colored aluminum metal sheet Al.Tr.40/230/0,7mm, with waterproofing and thermal insulation layers beneath, on a wooden sub construction. New roof cover on the gym shall be ribbed roof thermal sandwich panels (TRIMO).
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quanitites for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.
New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

F4.3.4 Technical description of sanitary (water supply and sewage) services

for energy efficiency improvement in "Miloje Dobrašinović" Secondary School in Bijelo polje

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	S.S. "Miloje Dobrašinović", Bijelo polje
Doc. origin:	Final Design of Water Supply and Sewage Services
Date:	May 20 2013

Apart from the measures that directly affect energy efficiency improvement in of "Miloje Dobrašinović" Secondary School in Bijelo Polje in terms of water supply and sewage services, it is envisaged to perform a reconstruction of two toilets. One of them is on the ground floor (Toilet 2), and the second one is on the second floor (Toilet 5). The other toilets have been already reconstructed, and therefore they are not subject of this project. The reconstruction of water supply installations implies replacement of indoor pipes network made of zinc-plated steel pipes. The replacement should be performed from an entry point of pipeline into the building, so that the complete replacement of network is foreseen in the renovated toilets.
In addition to replacement of water supply installations, a replacement of sanitary units has been also foreseen.
The existing sanitary sewage is made of cast iron pipes. The sewage installations are in rather good conditions and there is no need for renovation. The existing sewage outputs from the building and exhaust pipes to the manholes should be used and are not subject to any changes.

DESCRIPTION OF EXISTING SITUATION

Sewage installation

The existing toilet sewerage installation, in "Miloje Dobrašinović" Secondary School, in Bijelo Polje, is made of zinc plated steel pipes, sealed by hemp with cast iron plug. The toilets are equipped with squat toilets and lavatories.

WATER SUPPLY INSTALLATIONS

The water supply installations are constructed of zinc-plated steel pipes. There are no visible points of leakages, but after long term use, one may expect an incrustation on the inner surface of the pipes.

Solution concept

The water supply installation is designed in accordance with standard solutions except that water supply pipes are envisaged to be manufactured of polypropylene (PP) to withstand the operation pressures of 10 bars and mutually joined by fusion process. The cold water has to be connected to the existing water connections to the assumed positions according to visual toilet preview and then distributed to the outflow point. It has not been foreseen to provide hot water in the new toilets.

Installation is equipped with required switch valves enabling an independent operation of each water supply branch. In front of each outflow, point installing of an adequate switch valve is foreseen to allow for intervention in case of a failure or replacement of sanitary equipment.
Water supply pipes are laid into the wall. Thermal insulation of the pipes is not necessary since polypropylene is a poor conductor of temperature.
Upon completion of work, water supply installations should be checked for test pressure of 12 bars. After the testing, it is necessary to perform rinsing and disinfection of complete water supply installation Disinfection must be performed by a certified firm issuing adequate written certificate.

Analysis of water requirement

Water requirements do not change in regards to the present needs and do not affect the size of connection to the school building.

Available quantities of water

Available quantities of water do not change in regards to the existing state.

Quality of water at spring sources

Since the building is connected to the public water supply system, the quality of water has to be guaranteed by the public PE “Vodovod i kanalizacija”, Bijelo Polje.

Procedure of preparing drinking water

Since the building is connected to the public water supply system, the quality of water should be guaranteed by the public PE “Vodovod i kanalizacija”,, Bijelo Polje.

Solution for transport and water distribution to final user

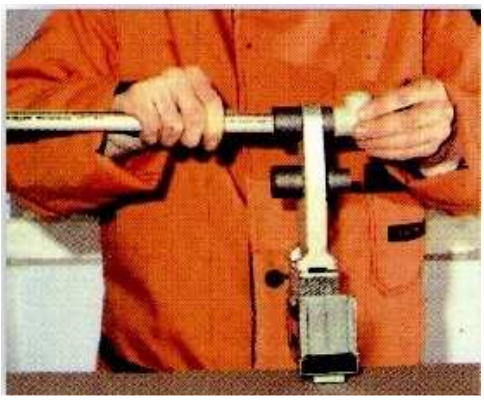
Water is distributed through water supply installations. No hydraulic calculation is necessary because the quantity of water does not change, and the position of outflow points does not change significantly.

Stages of construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Materials used in constructing the water supply system

Assembling of PP water supply pipelines for interior installation implies installing PP lines in the sanitary facilities. The pipe length is not supposed to exceed 2m, works include bringing pipes to the bench from the distance of max.50m of horizontal or vertical route, taking measure, cutting pipes, installing with all necessary cross-sections of welding by poly-fusion weld. Welding shall be performed in the following way: Pipes and cross-section pieces to be welded must be cut under straight angle and cleaned from dirt and grease. The parts to be welded are placed at the welding unit simultaneously (thorn and bushing) to the limit stop.



When the welding temperature is achieved, which can be shown either by the lamp or timer, depending upon the type of the welding unit, the elements are taken off the unit and impress into each other. They are retained in that position without movement until they get cold. It is very important not to exceed the limit of depth of inserting one element into the other.

Other specifics, manual instruction with human resources

This water supply installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for sanation of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the community network.

SEWERAGE INSTALLATION

Solution concept

The existing sewerage installations are made of cast iron pipes. The installations are in rather good conditions and there is no need for its reconstruction. However, if the contractor finds out any damages during removals and replacements of existing water supply installations and sanitary equipment, these damages shall be repaired upon supervisor's prior consent.

Sanitary equipment

The existing sanitary equipment in toilets should be replaced by the new one. The lavatory taps are wall mounted, for cold water only. The concrete lavatories in toilet 5 will be kept, but with small repairs and tiles enveloping.

F4.4. Educational Building 4
"Mustafa Pećanin" Primary School, Rožaje

F4.3.1 Technical Description of Building and Trade Works

for Energy Efficiency Improvement in "Mustafa Pećanin" Primary School in Rožaje

1. INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P. S. "Mustafa Pećanin",Rožaje
Doc. origin:	Final Architectural Design
Date:	Mart 2014

The purpose of reconstruction of "Mustafa Pećanin" Primary School in Rožaje is implementation of Energy Efficiency Measures in the building in line with the Design Brief and results of Detailed Energy Audit Report.
In terms of envisaged building and trade works, improvement of Energy Efficiency is achieved through application of following measures:

- Thermal insulation of façade walls of the Main school building and Administrative building,
- Replacement of the thermal insulation and waterproof layers of the roof of the main school building, placement of facade joinery of the Main school building and Administrative building.

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities.

- Removal and reproduction of vertical rain conductors and horizontal gutters,
- Removal and reproduction of installations on facade,
- Assemblage of new drips, repair of walls damaged in the process of replacement of facade joinery with plaster and paintwork corrections,
- Removal, assemblage and installation of new bars on the ground floor windows,
- Renewal of concrete pavement around the Main and Administration buildings. Additionally, the concrete pavement for both rear school yards shall be renewed with reinforced concrete of 12 cm thickness with proper surface drain structure,
- Production and installation of meshes manufactured from ropes, as a glass protection for the windows in the gym.

Apart from the measures that directly affect Energy Efficiency Improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned, whereat:

- Renovation of sanitary facilities in the school and gym,
- Construction of the toilet for disabled persons,
- Painting of the walls and ceilings of the whole school building, (except the Gym and Administrative Building.
- Protection for the steel columns in the Gym,
- Planting new trees in school courtyard.
- Reconstruction of the school's wooden roof, replacement of all structural elements (ceilings, trusses and other elements of the roof), therefore complete reconstruction of the suspended plaster ceilings

that were carried by the referred wooden ceiling, as well as the replacement of the roof cover with assemblage of snow guards.

THERMAL INSULATION OF FACADE WALLS

Expanded EPS polystyrene, having thermal conductivity coefficient of λmax = 0,037 W/mK, thickness 10 cm, produced by the relevant EN standards will be used for external insulation of stone / brick facade walls. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.

The lower part of facade walls in the ground floor, i.e. parapet walls, will be treated with harder insulating material, XPS extruded polystyrene, thickness d=10 cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK. The lower parts of façade walls shall be finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), using at the same time as splash guard and protection against vandalism.

Thermal panels with B1 flammability class (DIN 4102 B1 anty flammable, non-combustible and self-extinguishing) should be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20 m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks should be made of pressed mineral wool reaching A1 flammability class.

Use EPS/XPS, thickness d=3cm to treat jambs on external side of the openings.

Thermal plates are lap-joint and fixed to the facade wall with adequate enriched mineral adhesive and anchored with adequate screw anchor. Plate surface is protected with fibrous plaster made of following components:
* the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth. Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case additional mechanical anchoring is required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
* reinforcing mesh;
* the second layer of mortar is applied in the same way as the previous. This mortar is applied on a well settled first layer and smoothened with a screed afterwards;
* contact coating, made base on emulsion of synthetic resin and water glass, as agent for impregnation of settled fibrous mortar;
* finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in color selected by the Employer / Employer's Representative, fully in line with the Design details.

Prior to installation of thermal plates, the following works must be performed:
* all the works on flat roof, including sheet metal works,
* replacement of facade joinery,
* installation of envisaged installations and equipment on the façade,
* covering and protection of all the surfaces that remained untreated – glass, stone...
* checking existing cradling on the building.

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm should be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand.

If during separation of polystyrene only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.

If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.

If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.

Corners and jambs of wall openings should be installed with reinforcing mesh or angle profiles. Facade finishes along the plinth are made with installation of U profile strips adjusted to the thickness of thermal plate.

Prior to installation of plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates should be additionally anchored using adequate bolts.

During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.

Window sills should be also thermally insulated. Drips made of ready-made galvanized plastic-laminated steel metal sheets will be installed over newly fitted window benches (sills). Drips are placed along the entire width of windows and skylights with overhangs.

Facade Scaffolding

For execution of described works for application of Energy Efficiency Measures in ‘‘Mustafa Pećanin’’ P.S. in Rožaje, it is necessary to install adequate facade scaffold.
Facade scaffold should be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It should be used throughout the whole execution of works. Platforms or scaffold to be used primarily to ensure safety of workers, and then ensure quality execution of required works.
Depending how equipped, the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.
Note: As per available equipment and works execution technology, prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

REPLACEMENT OF THERMAL INSULATION AND WATERPROOFING ON THE ROOF

Roof rain leakages occur in spite of the fact that roof covering of the Main School Building was recently reconstructed. This reconstruction was done without installation of the thermal insulation.
Having in mind the existing roof conditions, it is necessary to undertake very urgent roof reconstruction, because the wooden parts are damaged by wood worms. Another words, all the works on the roof and within attic space shall be again completed, what means that together with new ceiling and roof, new plaster suspended ceiling will be mounted. From safety reasons, the attic space will be laid down with wooden boards and mineral wool of 10 cm thickness. The roof covering will be completely replaced, including all layers and referred installations like snow shields, lighting rods, etc.

Reconstruction of the Existing Roof Structure of the Main School Building

For implementation and improvement of EE in „Mustafa Pećanin“ Primary School, in Rožaje, it will be necessary to make reconstruction of the existing roof structure on the Main School Building. In order to avoid distortion of the existing school building architecture and additionally load the bearing capacity of the school building structure, what would cause an additional checking of statics system, it was decided to respect and leave the existing roof shape and appearance, but with minimum modifications of the heights and general outlook, using sophisticated materials and joining systems. It is also decided to provide attic space within the roof area.

Because of the school location and existing roof structure, it was decided to use the second class conifer massive timber of 18% humidity, as the basic materials for the roof structure, for all the elements of roof structure, designed to be made of wooden materials.
As the roof coverage, metal sheets over batten system 5/3cm are used, mounted on the wooden boards of 2,4cm thickness. Over wooden boards and under batten system, tar paper should be laid down.

In addition to the roof loads, due to its own weight and roof covering, the wind and snow loads are taken into consideration. The wind loads are calculated according to regulations for the school location. Upon

recommendation of the Montenegrin Engineering Chamber, the basic snow load is 1,25kN/m², plus an additional increase, depending upon the height above sea level. „Tower "software was used to analyze the most extreme load combinations.

As the spans and roof heights are different in the certain parts of the Main School Building, three basic statics system are used. On the side and lower part of the roof, the saddle roof with straining beam is adopted.
On the side, middle and central part of the roof, the gabled roof is also foreseen, but mounted with the king post in the lower and queen post in the higher part of the roof.
The wooden beams 14/20cm will be used for rafters, mounted at each 85cm distance, +/- 5%, depending upon local mounting conditions.
Distortion of rafters, at the roof level, was not considered, as the boarded cover protects rafters from distortion.
The wooden beams 14/22cm will be used for the roof valleys and hips.
The roof purlins consist of simple beams with struts supported by columns and used only in the structure with posts. The purlin dimensions are 14/20cm. As the additional supports, the roof braces of 10/10cm are used.
For easier mounting purposes, double collar tie is adopted, where of 5/15 cm for smaller span of 350mm and 8/20cm for larger one of 700cm. Between double collar tie, timber beam pieces (cubes) should be fitted in order to prevent an additional distortion, to prevent distortion orthogonally to the roof level system, "V" bracing should be used, made of two battens of 2,4cm thickness and proper length in accordance with drawing.
The columns accept load from the purlins and in some places from the straining beams and according to this arrangement, a proper dimensions are obtained i.e. 14/14cm for type 1 and 14/14cm for type 2. It was aimed to arrange beams position so that the loads should be mostly transferred to the existing supporting walls.
Under the columns timber bolsters should be mounted for even load distribution of 16/14 and 20/14cm, depending upon column type.
The ceiling joists (tie beams) are calculated as the "simple beam" in statics, which accept the loads from columns on the certain places and shall also accept the load from the suspended ceiling, mineral wool thermal insulation and wooden boards within attic. There is also some spear bearing, as the roof might be used as an attic space. The beams dimensions are 14/22cm at mutual distance of 85cm.
As tying elements, the steel nails and screws M12 are used.

REPLACEMENT OF FACADE JOINERY

Replacement of the entire facade joinery is the next measure to improve Energy Efficiency in "Mustafa Pećanin" P.S. in Rožaje.

New windows will be made of high-quality 6-chamber PVC profiles which need to have appropriate thickness (3.5 mm) and reinforced with galvanized steel profiles. The profiles shall be fully in line with RAL A quality standard. Heat transfer coefficient, for package of profiles with metal reinforcement (in line with DIN EN 12412-2), should be less than 1.5 W/m²K.

Infill is made of double low-emission glass 4 +16 +4 mm, with heat transfer coefficient U = 1.5 W / m² K and solar energy transmittance factor g≤65%, with the hermetically sealed argon or dry air in-between two glazing Sealing should be done using epoxy rubber (in compliance with EN410 and EN 673, Ug = 2.0 and W / m² K).

The joinery must be fitted with high-quality interchangeable gaskets, high-quality fittings of nickel and aluminium alloys, handles, locks and keys.

Entire PVC joinery must be installed in line with drawings – schemes, in white colour, with the exception of doors and windows at the part of School Building which is made of stone where new joinery has to be in the colour of wood, similar to the colour of existing joinery. New flashing sills have to be installed too, in the colour that matches the colour of new installed joinery.

Natural air-streaming at closed window is envisaged through elements in the window frame type "Regel air", which need to be specially installed for that purpose, or in some other way in line with DIN and EU

standards. Number and size of these elements depend on the size of the window – given minimum per 2 pieces. These elements should not be installed in fixed windows and fanlights.
For windows exceeding 2.2 m, window leaves are opened using “tilt and turn” mechanism on rail with opening, using a handle that turns by 360 degrees. “Tilt and turn” mechanism is operated via steel rail on a spindle that allows opening tilt up to minimum 20 degrees.

Windows need to be installed over previously installed blind frames, fixed with anchors to 50 mm depth to existing walls, i.e. existing structure.

Windows need to be placed so that the external side is at the same level as the previous windows.

Drips made of ready-made galvanized plastic-laminated steel metal sheets are installed on the external side of the windows. These are placed along the entire window and skylight width with set overhang over newly installed thermal facade.

On the internal side of the window, it is necessary to place PVC window sills, along the entire width of the window, depth depending on the depth of the existing parapet wall.

Quality certified shackle must ensure opening according to the given joinery schemes. Special attention must be paid to shackles for “tilt and turn” to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window sashes.

New external doors Main school entrances (POS 1 and 1*), two entrances on the side (POS 8) and two entrances on the gym (POS 12 and 15), as well as the doors at the auxiliary facility (POS 30) shall be performed as new facade aluminium joinery, fitted with thermal break, double glazing with glass panels system 4+16+4 mm and heat transfer coefficient Umax = 2,8 W/m²K.

When installing the doors, use certified, quality fittings in order to provide the opening by the given scheme, also install a self-closing mechanism, cylinder lock with three keys and rubber door stoppers.

Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.

Include everything from the description: purchase of material, production, transportation and installation with hinges and blind frame, as well as aluminium sill of required width. Measures should be taken onsite.

Also, the doors of the technical part of the building will be made of aluminium profiles without thermal break, produced in accordance to schemes of joinery (POS 31).

A vestibule area shall be constructed the interior of the main entrance, and it shall include two double wing swinging doors. The item also includes production and assemblage of plastic coated aluminium profiles without thermal-break, metal supporters, required hanging and closing set.

Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.

Opening is done as shown on graphical appendix – joinery scheme.

Selection of facade joinery colour or possible changes in details (elevation) can be determined either by Client or Supervisor, with previously obtaining Employer/ Employer’s Representative permission.

A supplier has to submit the following certificates for all the joinery:

- Systematic window testing, in line with14351-1 and B 5300,
- Certificate for air permeability. EN 12207 - Class 4,
- Certificate to water resistance EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,
- Mechanical requirements EN 12400 - Class 2,
- Certificate for sound protection up to class 5,
- Certificate for heat energy transfer coefficient DIN EN 12412-2,
- Glass Certificate EN 673,
- Fittings Certificate V ENV 1627-1630, resistance class 3.

In the process of bids evaluation, it is advisable to provide typical drawings of angle types of windows and doors, as well as other catalogue and presentation material. In process of joinery production, it is necessary to enable Supervisor to inspect the products.

Prior to starting major production of joinery, the Contractor must prepare and install typical window, complete with joinery set, which will, after removal of all possible defects, be recorded and approved by the Employer/ Employer's Representative or the Supervisor.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Dismantling and Installation of Rain Downpipes and Horizontal Rain Water Gutters

Installation of new facade thermal insulation causes dismantling of vertical rain water downpipes. Due to the bad condition of old rain water downpipes, dismantling and installation of the same rain water downpipes over again is not applicable, therefore installation of the new ones is foreseen. Rain water downpipes of the Main and Administrative Buildings shall be made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm.

The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works. Certificates must be issued by relevant institute for subject type of works. Certificates cannot be older than a year since the day of issuing attests to the day of starting the works.

Dismantling and Installation of Air Conditioning Units, Cameras, Antennas, Lights

The Design envisages dismantling of all AC units, cameras, antennas, facade lights their storing away to a place set by the Employer / Employer's Representative and their re-installation upon facade installation.

Dismantling and Installation of New Bars on Windows

Installation of safety meshes, previously dismantled from the object. There is a possibility of reduction of mesh dimensions, so they could fit into the new windows. Meshes shall be colored in white.

Renovation / Construction of the Pavement Around the Main Building and Administrative Building

Renovation / construction of the pavement around school and administrative building and construction of the new pavement of the rear school yards shall be performed.

These works include, where necessary:
*Clearing up and removing layer of humus d=10 cm, and planning of the terrain for sidewalk preparation, Preparing the layer of compacted gravel, d=10 cm,
*Concreting of pavement using compacted concrete, type MB20, of 10 cm thickness, along with simultaneously prepared floated surface of d=2cm thickness (in total of 12cm), preparation of border curb (dim. 10/20cm). Pavement has to be strained into the fields CCA 1,5m2. Expansion joints shall be filled with bitumen.

The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year since the day of issuing attests to the day of starting the works.

RENOVATION MEASURES, AIMING TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS IN THE BUILDING

Reconstruction of Sanitary Facilities in the School Building and the Gym

In addition to measures directly impacting energy efficiency improvement, it is envisaged to renovate the sanitary facilities in the school.

This reconstruction includes new waterproofing, ceramic and painting works. Other works on the reconstruction of sanitary facilities (replacement of sanitary equipment, water and sewerage pipes, and

installation of a combined boiler for the HSW treatment) are defined in a separate discipline of design documentation - installation of water and sewerage pipes.

Apart from the preliminary works on removal and demolition, the following works enable implementation of this measure:

* Making of the scrimmed cement screed for a sloping layer in the toilets, including setting up of the mesh (1kg/m2). The mesh should be done with an overlap of 5 cm (1.08 m2/m2). Floating is the final treatment. Screed thickness is d = 4 cm.
* Setting up of horizontal waterproofing under the flooring in the toilets in following layers (from the bottom up):
- bitulith + poly asbestos + glass mesh,
- polyasbestos + glass mesh,
- polyasbestos.
Put the waterproofing at least 10 cm up the walls.
*Installation of vertical waterproofing on walls in the shower baths, from floor up to height of h=3,30m using ''Texaspenetrat''.
*Plastering of interior walls of sanitary facilities with cement plaster1:3 (two layers), including previous spraying with cement paint as a preparation for covering of the walls with ceramic tiles.
* Covering of the toilet walls with the class I ceramic tiles. The size, colour and tone will be selected and sample approved by the Employer/ Employer's Representative. Line the tiles in adhesive layer in joint bonding manner, by using the joint powder. Set up ceramic tiles up to the ceiling height, h=2.00m. Coating of the jambs and niches won't be calculated separately.
* Covering floors in the toilets and other premises with the class I anti-slip tiles. The size, colour and tone will be sampled and approved by the Employer/ Employer's Representative. Line the tiles in a waterproof adhesive layer in joint bonding manner, by using the joint powder.
In the toilets, where there is a grate in the floor, sloping toward the grid is at least 1% (regulate the slop with the cement screed thickness).

Construction of the Toilet for Disabled Persons

Existing storage room in the area of lateral entrance to the school building near the gym shall be split in the two parts. Part next to the main corridor shall be toilet for disabled persons, and part next to the window shall remain as storage.
Toilet for disabled persons shall be constructed fully in line with detail 10 in annexed drawings.
Installation of new vinyl floor, skimming, painting of walls and ceilings in new storage room shall be done.

Painting all Internal Walls and Ceilings

Painting all internal walls and ceilings of the classrooms, corridors and offices in school buildings:
-using oil based paint up to the height of 1,6 m,(including scraping of old paint, polishing and painting with oil-based paint the walls in the areas of the radiators which will be dismantled, rinsed and re-installed),
-using semi-dispersed paint for the wall areas higher than 1,6m and ceilings.

Semi-dispersed paint is used, in tone as selected and sample approved by the Employer/ Employer's Representative. Smoothening, plastering, neutralization, impregnation, pre-painting, corrections with toned dispersive putty or skimming compound is foreseen. Finishing paint is applied twice.

Planting New Trees in School Courtyard

New trees shall be planted in school courtyard as a sun protection measure and measure for improvement of general working conditions.

Prior to commencement of the works, the Contractor is obliged to provide the Employer/ Employer's Representative with samples of materials and certificates for all the materials to be used during the works.
Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

F4.4.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in "Mustafa Pećanin'' Primary School in Rožaje

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	''Mustafa Pećanin'' Primary School in Rožaje
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	30 May 2013

The purpose of reconstruction of ''Mustafa Pećanin'' Primary School in Rožaje is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management,
2. Heating system optimisation.

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system.
Fuel flow meter shall be installed at the oil feeding pipe, before the pipe enters the burner, and ultrasonic calorimeter shall be fitted at the main return pipe from manifold towards the boiler.
All obtained data shall be processed in computer with designated software and, based on these, any problem that occurs in the heating system at the entire school will be timely resolved.

HEATING SYSTEM OPTIMISATION

Preliminary works on installation of the new equipment

To ensure proper functioning of heating system in future, all radiators will be dismantled and highly pressurized pump will be used to flush deposits settled in the radiators during their usage. Piping will also be flushed, and air-release valves cleaned.

Fitting of Thermostatic Radiator Valves with Thermal Heads

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermal heads. Selected thermostatic heads are convenient for buildings, planned to be used by a large number of users, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is

achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermal head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.

Due to replacement of valves on radiators and fitting of thermostatic valves which will cause variable flows in the heating system, it is necessary to replace the circulation pump. Instead of three-stage circulation pumps with fixed number of revolutions, frequency controlled circulation pump (main and back-up) shall be installed. The pump was selected depending on maximum flow that can feed entire installed heating equipment in the school.
To ensure feeding of the entire heating system in the classrooms and the gym and upper floor offices in the ancillary building, two frequency controlled circulation pumps shall be installed. Circulation pumps can operate with the option of automatic control (self-control from “one to the other proportional pressure curve”) or by maintaining proportional pressure, by maintaining constant pressure or in compliance with constant curve. Running of these pumps will be managed through boiler automatic control system.

Repair of device for chemical water treatment

Device for chemical water treatment is used as protection of the heating system from boiler scale and other deposits found in water. Softened water is injected into the system at the beginning of the heating system and recharged during the heating season.
Existing device for water treatment is fully functional but is not being used. It is planned to add that amount of salt for softening, equivalent to the one recommended by equipment manufacturer, to provide that same amount of reserves and to put the system into operation.

Boiler room equipment insulation

Entire boiler room equipment will be thermally insulated. Feeding and return pipes, pipework, valves and other fitting will be insulated with mineral wool thickness 50mm and protected outside with aluminium sheet metal thickness 0.5mm.
Since front and rear sides of both boilers are not insulated, these parts shall be insulated with mineral wool with protection envisaged in form of a lid, made of stronger sheet metal.

Balancing of the network

Pipework balancing will be achieved with installation of balancing pairs at points indicated in the drawings, to separate certain parts of the pipework.
Return pipe will be fitted with differential pressure controllers without additional power supply, with the option of precise continuous pressure variation setting. The feeding pipe will be fitted with valves for risers control with linear properties and meter gauges and option of pre-setting and reading on a display at hand wheel. These two valves are mutually connected with capillary pipe up to 1m length and as a pair balance pressure variations. Existing manifolds will be kept with interventions at certain points, where radiators were removed, in the library on the upper floor of the ancillary building.

To capacitate manifold for proper operation, existing stop-valves on certain branches will be replaced with ball valves that do not create resistance on the network.
Air-release valves on radiators at the ground floor and mezzanine shall be replaced with radiator caps. These valves are not functional since these radiators are at a lower level than the boilers, however they cause problems in system functioning due to possible leakages.

Radiators in ancillary building do not have air-release valves even though the radiators are positioned at the highest point on that heating system branch.
Each radiator will be fitted with radiator cap with automatic air-release valves that will ensure proper running of the heating system in the upper floor of the ancillary building.

This branch shall also be fitted with balancing pair, with correction of the branching, due to extension of the main pipeline from the boiler room, which will go through the office in the upper floor.

Insulation replacement on the outdoor pipes between the boiler room building and the main school building

Detailed Energy Audit recommended repairing insulation of the pipes for transferring hot water from the boiler room towards the school building due to damages. Damages were caused by trucks that pass beneath the pipes to adjoining houses.
To avoid new damages of the insulation or even the pipes, it is envisaged to put the pipes on a 75 cm higher level than now. Existing pipes in the outdoor space will be replaced with pre-insulated pipes DN100 external diameter with 250 mm insulation.
Existing pipes shall be placed vertically upward from the boiler room through the premise above and through external wall outside. This section of pipework will be made of steel seamless pipes up to the point of exit from the building. Pre-insulated pipes will be welded to them, heading towards the main school building.
Air-release vessels shall be fitted in the office above the boiler room to extract the air from the new section of the pipes, which will be situated above the rest of the pipework.

F4.4.3 Technical description of electrical services

for energy efficiency improvement in ‘’Mustafa Pećanin’’ Primary School in Rožaje

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	‘’Mustafa Pećanin’’ Primary School in Rožaje
Doc. origin:	Final Design of Electrical Services
Date:	30 May 2013

The purpose of reconstruction of ‘’Mustafa Pećanin’’ Primary School in Rožaje is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Installation of energy efficient lighting systems
- Replacement of lightning protection system

INSTALLATION OF ENERGY EFFICIENT LIGHTING SYSTEMS

Replacement of old and non-functional lamps within the school and the gym is envisaged. The newly designed lamps will make it possible to reach the illumination level of more than 300 lx, which is consistent with European standards for particular uses for schools and as required by Detailed Energy Audits.
The selected lamps are with bright parabolic grid, of exceptional photometric properties and with one light source (T16 1x49 W) 840 (neutral white source color), with an electronic ballast for which a photometric calculation was prepared in specialized lighting software program. When positioning the newly designed lamps, special attention was paid to the existing electric feeders, so that the reconstruction is not expected to involve any extra work for the relocation of existing lighting in order to keep the designed array. For this purpose it is planned to move one power outlet in each classroom. Switches for lamps remain the same.
For the purposes of lighting the blackboard, two lamps are envisaged per each classroom (where there is only one board, only one lamp will be installed), i.e. lamps with parabolic asymmetric grid 1x80W grid, with an electronic pre-connection device and a lamp of 840 T16 color. Power supply for these lamps will come from the nearest junction box, to be switched on from any of the existing command centers in the classroom or from the gate in case of centralized solution.
Luminaries with IP 54 protection degree are foreseen in toilets, with 1x28 W T5 840 lamps with electronic ballast and opal protector. In the hallways, 2x35W lamps are envisaged (light fitting 1x28W is envisaged on points where the height of the ceiling is 2.80m), equipped with fluorescent tubes T16, color rendering 0.80 and color temperature 4000 K (840), with high frequency electronic ballast with PMMA BIVERGENZ dark light diffuser or similar technology which eliminates glare. In toilets for handicapped persons, light fittings with IP 54 index of mechanical protection are envisaged, with fluorescent tubes T16 1x28W equipped with electronic ballast, which has to be powered by cable PPy 3x1,5 mm2 from the nearest junction box of aside toilet room.

Within the gym, light fittings with special net cover for mechanical protection are envisaged with fluorescent tubes 4x80W, also with electronic ballast and tubes T16 840.
In ground floor of auxiliary building, light fittings with IP65 protection degree are envisaged, 2x35 W and they are controlled locally by one way switch.
Some of the rooms in school are reconstructed and in these rooms reconstruction of the lighting system is not foreseen.
Bearing in mind type of the building, emergency escape and anti-panic lighting system is designed according to the EN 1838, LED 5W, 1h light fittings. Light fittings which are envisaged enable safe escape from the building with luminance level on the escape route 1 lx and anti-panic luminance of 0.5 lx. in case of total black out. For supply of emergency lights, cables PP-y 3x1,5 mm2 shall be installed from the nearest switchboard.

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and replacement of roof cover on main school building, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, layed down in foundations of the building, and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. New roof cover on the main school building shall be made of ready-made plastic-coated galvanized steel metal sheet, with waterproofing and thermal insulation layers beneath, on a wooden sub construction. Roof cover on ancillary building shall remain the same, but since there is no lightning protection system, new one shall be installed.
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quanitites for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.
New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

F4.4.4 Technical description of sanitary (water supply and sewerage) services

for energy efficiency improvement in “Mustafa Pećanin” Primary School in Rožaje

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P.S "Mustafa Pećanin”, Rožaje
Doc. origin:	Final Design of Water Supply and Sewerage Services
Date:	May 20 2013

Apart from the measures that directly affect energy efficiency improvement in "Mustafa Pećanin”, Primary School in Rožaje, in terms of water supply and sewerage services, it is envisaged to perform a reconstruction of eight toilets. The toilets are situated on the ground floor (toilets 4, 5 and 6), on the floor at +2.40m elevation (toilets 7, 8 and 9) and on the floor (toilets 10 and 11).
It is also foreseen to construct one new toilet for disabled persons (toilet 12), adjacent to toilet 5 and near the lateral auxiliary entrance.
The toilets within administrative facility are not subject to this design.
The reconstruction of water supply installations implies replacement of indoor pipes network made of zinc-plated steel pipes. The replacement should be performed from an entry point of pipeline into the building, so that the complete replacement of network is foreseen in the renovated toilets.
In addition to replacement of water supply installations, a replacement of sanitary units has been also foreseen. The existing sanitary sewerage is made of cast iron pipes. The sewerage installations are in rather good conditions and there is no need for their reconstruction, except for sporadic single repairs of sewerage pipes where deemed necessary. The existing sewerage outputs from the building and exhaust pipes to the manholes should be used and are not subject to any changes.
The construction of the toilet No 12 (toilet for disabled persons) implies installation of new water pipeline and foul drainage pipes and their connection to the existing water riser and soil vent pipe in the next door toilet.

DESCRIPTION OF EXISTING SITUATION

Sewerage installation

The existing toilet sewerage installation, in "Mustafa Pećanin”, Primary School in Rožaje, is manufactured of zinc plated steel pipes, sealed by hemp with cast iron plug. The toilets are equipped with squat toilets and lavatories.

Water supply installation

The water supply installations are constructed of zinc-plated steel pipes. There are no visible points of leakages, but after long term use, one may expect an incrustation on the inner surface of the pipes.

WATER SUPPLY INSTALLATION

Solution concept

The water supply installation is designed in accordance with standard solutions except that water supply pipes are envisaged to be manufactured of polypropylene (PP) to withstand the operation pressures of 10 bars and mutually joined by fusion process. The cold water has to be connected to the existing water connections to the assumed positions according to visual toilet preview and then distributed to the outflow point. It is foreseen to use electrical water heaters of 80l capacity, instead of old ones, which are out of order. The water heaters will be used within the toilets for showers only.
Installation is equipped with required switch valves enabling an independent operation of each water supply branch. In front of each outflow, point installing of an adequate switch valve is foreseen to allow for intervention in case of a failure or replacement of sanitary equipment.
Water supply pipes are laid into the wall. Thermal insulation of the pipes is not necessary since polypropylene is a poor conductor of temperature.
Upon completion of work, water supply installations should be checked for test pressure of 12 bars.
After the testing, it is necessary to perform rinsing and disinfection of complete water supply installation Disinfection must be performed by a certified firm issuing adequate written certificate.

Analysis of water requirement

Water requirements do not change in regards to the present needs and do not affect the size of connection to the school building.

Available quantities of water

Available quantities of water do not change in regards to the existing state.

Quality of water at spring sources

Since the building is connected to the public water supply system, the quality of water has to be guaranteed by the public local PE ‘’Vodovod i kanalizacija’’, Rožaje.

Procedure of preparing drinking water

Since the building is connected to the public water supply system, the quality of water should be guaranteed by the public local PE ‘’Vodovod i kanalizacija’’, Rožaje.

Solution for transport and water distribution to final user

Water is distributed through water supply installations. No hydraulic calculation is necessary because the quantity of water does not change, and the position of outflow points does not change significantly.

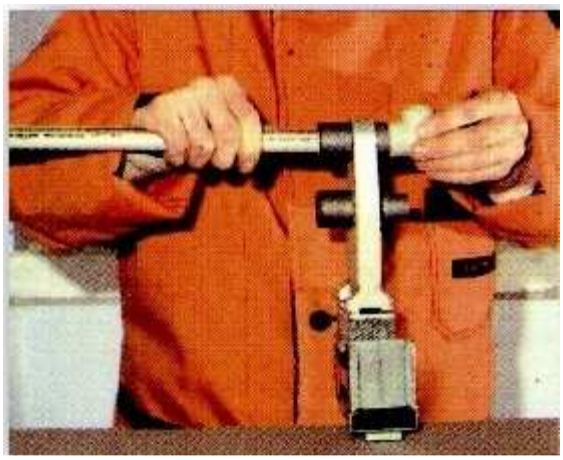
Stages of construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Materials used in constructing the water supply system

Assembling of PP water supply pipelines for interior installation implies installing PP lines in the sanitary facilities and distribution in the bathrooms. The pipe length is not supposed to exceed 2m, works include bringing pipes to the bench from the distance of max.50m of horizontal or vertical route, taking measure, cutting pipes, installing with all necessary cross-sections of welding by poly-fusion weld. Welding is performed in the following way:

Pipes and cross-section pieces to be welded must be cut under straight angle and cleaned from dirt and grease. The parts to be welded are placed at the welding unit simultaneously (thorn and bushing) to the limit stop.



When the welding temperature is achieved, which can be shown either by the lamp or timer, depending upon the type of the welding unit, the elements are taken off the unit and impress into each other. They are retained in that position without movement until they get cold. It is very important not to exceed the limit of depth of inserting one element into the other.

Other specifics, manual instruction with human resources

This water supply installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for rehabilitation of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the community network.

SEWERAGE INSTALLATION

Solution concept

Toilets 1-11:
The existing sewerage installations are made of cast iron and PVC pipes. The installations are in rather good condition and there is no need for its reconstruction, except for sporadic single repairs of sewerage pipes where deemed necessary. However, if the contractor finds out any damages during removals and replacements of existing water supply installations and sanitary equipment, these damages shall be repaired upon supervisor's prior consent.

Toilet 12 (toilet for disabled persons):
Sewage from toilet No.12 shall be connected to closest soil vent pipe in the neighboring toilet. Horizontal pipeline shall be laid in floor and connected to vertical pipe. Newly designed sewage is foreseen from PP sewerage pipes and profile pieces.



Stainless steel couplings for connecting the new sewage to the existing CI (cast iron) installation.

Stages of construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Other specifics, manual instruction with human resources

This sewage installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for rehabilitation of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the community network.

SANITARY EQUIPMENT

The existing sanitary equipment in toilets should be replaced by the new one. The lavatory taps are wall mounted, for cold water only. Hot water for showers is provided from electric water heaters mounted next to it. Toilet bowls shall be completely made of ceramics, type "Simplon", with plastic low mounted water tank.

F4.5. Educational Building 5
"Bećo Bašić" Primary School, Plav

F4.5.1 Technical Description of Building and Trade Works

for Energy Efficiency Improvement in "Bećo Bašić" Secondary School, Plav

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	S.S."Bećo Bašić", Plav
Doc. origin:	Final Architectural Design
Date:	30 February 2014

The purpose of reconstruction of "Bećo Bašić" Primary School in Plav is implementation of Energy Efficiency Measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.
In terms of envisaged building and trade works, improvement of Energy Efficiency is achieved through application of following measures:

- Thermal insulation of façade walls,
- Thermal insulation and waterproofing of the roof,
- Replacement of facade joinery.

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities.

- Dismantling and re-installation of air-conditioning units, cameras, facade lighting and other existing equipment and installations on façade,
- Repairs of the jambs around joinery and of the facade mortar,
- Dismantling and construction of new outdoor flashing sills at the windows,
- Dismantling of RC-canopy, along with its roof cover and its flashings, in the inner courtyard of the school,
- Partial repairing of the surrounding external concrete pavements,
- Removal of eight brick chimneys.

Apart from the measures that directly affect Energy Efficiency Improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned:

- Renovation of sanitary facilities in the school building,
- Renovation of walls in the school building.

THERMAL INSULATION OF FACADE WALLS

Expanded polystyrene EPS, having thermal conductivity coefficient of λmax = 0,037 W/mK, thickness δmin =10 cm, produced in line with relevant EN standards, will be used as external thermal insulation of facade RC and brick walls, on the external side of the walls. External thermal insulation composite system (ETICS) is required to have ETAG 004 certificate.

The lower part of the facade walls, up to 1,7m-2,0m height measured from the ground, shall be treated with harder insulation material, extruded polystyrene XPS thickness d=10 cm resilient to mechanical damages, rated thermal conductivity in the scope of λ=0,035-0,04 W/mK.. The lower parts of façade walls shall be

finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), using at the same time as splash guard and protection against vandalism. Before installation of this render, partial removal of the existing mortar plinth on the workshop that is peeling from the substructure shall be done.

Thermal panels with B1 flammability class (DIN 4102 B1 highly resistance to flammability, non-combustible and self-extinguishing) should be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above openings at the floor slab section made pressed mineral wool reaching A1 flammability class.

EPS/XPS pieces, thickness d=3cm, shall be used for treatment of jambs on external sides of openings, according to drawings and cross sections of the new state and details from the façade joinery schemes.

NOTE: As the existing windows have been installed without considering a sufficient width of the window frame for receiving ETICS façade, proper solutions for this situation have to be found on the site case to case basis during the construction period.

Envisaged façade systems must be produced in compliance with relevant EN standards. External thermal insulation composite system (ETICS) needs to have ETAG 04 certificate. ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention. Thermal boards flammability class is B1 (DIN 4102 B1 heavy flammability, non-combustibility and self-extinguishing).

Thermal insulation boards are lap-joint and fixed to the facade wall with adequate enriched mineral adhesive and anchored with adequate screw anchor. Board surface is protected with fibrous plaster made of following components:

*the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth. Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case additional mechanical anchoring is required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
*reinforcing mesh;
*the second layer of mortar is applied in the same way as the previous. This mortar is applied on a well settled first layer and smoothens with a screed afterwards;
*contact coating, made base on emulsion of synthetic resin and water glass, as agent for impregnation of settled fibrous mortar;
*finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mold. This layer is made in fine grained and smooth structure, painted in color selected by the Employer / Employer's Representative, fully in line with the Design details.

Prior to installation of thermal plates, generally following works must be performed:
*all the works on flat roof, including sheet metal works,
*replacement of facade joinery,
*installation of envisaged installations and equipment on the façade,
*covering and protection of all the surfaces that remained untreated – glass, stone...
*checking existing cradling on the building,
*removal of eight brick chimneys.

Checking Existing Facade Base on the Building:

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm should be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand.

If during separation of polystyrene only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.

If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.

If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.

Corners and jambs of wall openings shall be installed with reinforcing mesh or angle profiles. Facade finishes along the plinth are made with installation of U profile strips adjusted to the thickness of thermal insulation plate.

Prior to installation of thermal insulation plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates shall be additionally anchored using adequate bolts. During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.
Window sills shall be also thermally insulated. Drips made of ready-made galvanized plastic-laminated steel metal sheets will be installed over newly fitted window benches (sills). Drips are placed along the entire width of windows and skylights with overhangs.

Façade Scaffolding

For execution of described works for application of Energy Efficiency Measures in “Bećo Bašić” Secondary School, Plav it is necessary to install adequate facade scaffold.

Facade scaffold should be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It should be used throughout the whole execution of works. Platforms or scaffold to be used primarily to ensure safety of workers, and then ensure quality execution of required works.

Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.

Note: As per available equipment and works execution technology. prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

ROOF THERMAL INSULATION

Recovery and reconstruction of the building roofs are foreseen. According to inclinations and types of coverings, the roofs are classified into 5 groups and specified from mark R1 to R5 (see the drawings of the existing situation). The roofs specified as R2 to R5 are recognized as the roofs which have to be reconstructed i.e. laying down both roof waterproofing and thermal insulation. Having in mind roof inclinations characteristics and insulation requirements, it was decided to use roof composite panels, as the most suitable solution.

The existing metal-sheet roof covering with belonging sub construction, (battens or battens placed on wooding sheathing) and waterproofing paper shall be removed. The removal of these layers has to be performed up to the supporting roof structure, i.e. concrete slab or classic wooden roof structure system.

The new covering shall be performed with the roof polyurethane composite panels d=10cm thickness, heat transfer coefficient λmax = 0.025 W/mK, of standard modular width 1000mm. The panels are fastened to the steel “U” profiles 60/40/3mm, placed at 60-150cm distance and fixed to the reinforced concrete slab or wooden rafters. The upper metal-sheet of panel is of unique trapezoid shape d = 0.5mm, and the lower one is standard SNV d = 0.5mm. After mounting of composite panels, the next operation is flashing of all wall corners and valleys, gable edges and gutters, using all connecting bits and pieces (stainless steel screws, washers and EPDM sealing).

Additional works are needed on wooden substructure and roof parapet of the roof No. R5, over the workshop. The new support rafters 10/12cm shall be mounted and fixed to the existing rafters, providing

slightly lower pitch. In this way, the flat roof over building will be avoided. The additional reinforcement concrete works are also needed on the roof parapet wall, i.e. on gable walls of the part of roof which will be connection to the classrooms building and on the basement window of the technical / boiler room.

Installation of the thermal insulation, on the roof No. R1 is not foreseen. From technical point of view, it was impossible to keep a large part of roof covering, i.e. trapezoid metal sheet covering, due to façade thermal insulation, which is by one part of it in contact with the roof No. R1, then because of works on parapet wall flashings and roof eaves which is directly connected with pitch part of roof No. R1.

The canopies over small balconies on the second floor, and canopies over entrances to the administration and classrooms part of building, should be covered with the trapezoid metal sheet.

TR (trapezoid sheet metal) for roof R1 and canopies characteristics are as follows:
Hot rolled zinc plated sheet metal according to ASTM 525 standard, i.e. EN 10142/10143 with zinc layer of 140 g/m² - 275 g/m² and surface layer of supper polyester 25/35 microns/m², as per EN 10169 standard and various colors as per RAL specification. Strip thickness 0,70mm, strip width 1000 – 1250mm (EN 10142/ 10143 ZN 140 – 275g/m², ISO 9001).

Flat part of the roofs on the classroom area of the building (marked as L) is covered waterproof membrane and thermal insulation XPS with embedded slope 2% minimum thickness10cm. Thermal insulation is fixed to the pad (washers) on the concrete slab, everything in accordance with detail D7 and manufacturer's instructions. Vapor barrier made of post bituminized aluminium foil lined with glass fibre fleece, on the floor slab of the attic, between the construction and thermal insulation

Note: Due to lack of available data on existing layers of the flat roof, possible deviations in the design need to be resolved onsite, after surveying the building, the Employer/ Employer's Representative's or the Supervisor's approval.

REPLACEMENT OF FACADE JOINERY

Existing facade joinery on the building shall be replaced as indicated in the descriptions in the graphical part, section joinery schemes.
The project includes replacement of existing metal framed doors at the second floor (classroom section), with new Al framed doors with double low-emission glazing 4+16+4mm, filled with hermetically sealed argon or other inert gas, with total U-value up to 2,8 W/m2K.
All the doors and windows are fitted with required mounts and mechanism for hanging and closing. Knobs are chrome-plated. Doors are installed with rubber door stoppers.
Manner of opening is shown in the drawings – joinery schemes.
Replacement of the windows is foreseen with 6-chamber PVC windows, strengthened with U-metal profiles, with double low-emission glazing 4+16+4mm, filed with hermetically sealed argon or other inert gas is planned. Total U-value should be up to 1,50 W/m2K. New windows should have minimum required value of solar energy transmittance of glass (solar factor g) g≤65%.
The item also needs to include fitting of PVC window bench of required width.
Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.
A new vestibule doors shall be constructed in the interior of the entrance for pupils and it shall include two-wing swinging doors. The item also includes production and assemblage of plastic coated aluminium profiles without thermal-break, single glazed-thickness of the glass 4mm, including metal supporters, required hanging and closing set. The vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Sheet Metal Works

- dismantling of old and installation of new elements, such as metal-sheet flashings on the roof ridges, valleys, eaves, roof parapet walls (gable walls) and joints with the façade.

Ready-made plastic-laminated galvanized steel metal sheets d=0.7 mm shall be used for all sheet metal works except for downpipes. Sheet metal holders shall be made of stripes of the same material and fixed to the concrete brick laid base, with screws with washers. Special attention is paid to ensure sheet metal joints, whether they are longitudinal or made of fittings, are water tight.

Partial Repairing of the Surrounding External Concrete Pavements

These works include, where necessary:
*Clearing up and removing layer of humus d=10 cm, and planning of the terrain for sidewalk preparation, Preparing the layer of compacted gravel, d=10 cm,

*Concreting of sidewalk around the school building using compacted concrete, type MB20, of 10 cm thickness, along with simultaneously prepared floated surface of d=2cm thickness (in total of 12cm), preparation of border curb (dim. 10/20cm). Pavement has to be strained into the fields CCA 1,5m2. Expansion joints shall be filled with bitumen.

Removal of Eight Brick Chimneys

Removal of eight old brick chimneys and closing of the chimney flues is foreseen. This includes: dismantling of old chimneys which is not functioning, parts through the attic and above the roof, while part of chimney that is on the ground floor and on the upper floors shall remain.
After completion of the works all surfaces should be ready for installation thermal insulation on the external walls and of new roof cover.

Other Works

- Dismantling and re-installation of air-conditioning units, cameras, facade lighting and other existing equipment and installations on façade,
- Repairs of the jambs around joinery and of the facade mortar,
- Dismantling and construction of new outdoor flashing sills at the windows,
- Dismantling of RC-canopy, along with its roof cover and its flashings, in the inner courtyard of the school.

MEASURES AIMED AT IMPROVING COMFORT IN THE BUILDING FOR STAYING AND WORK

Renovation of Sanitary Facilities in the School Building

Sanitary rooms, positioned in the area near the classrooms, are foreseen to be fully reconstructed.

Construction work phase includes demolition of existing ceramic tiles, including all of the layers up to the wall, painting of interior walls, application of new ceramic tiles, dismantling of existing floor ceramic tiles, including all of the floor construction layers, new inclined cement screed, fitting of new waterproofing in floors, replacement of doors, renovation and repair of the walls (painting and smoothing).

Existing terrazzo, at sanitary room's corridor, which is in good condition, shall be preserved. In this part, renovation of the walls is foreseen which includes stripping of old oil paint and painting of the walls with new oil paint up to the previously determined height.

Purchase of material and mounting of indoor joinery, produced of hard and high resistant PVC profiles, reinforced by zinc plated steel „ U“ profiles, strictly according to joinery drawings and details.

The project also includes works on the sanation of the moisture from the toilet which is visible on the façade wall. Works include breaking and removal of the existing wall tiles in order to reach water tube and determine the position of crack which makes leakages, replacement of the pipe, and all necessary works for bringing wall in the previous condition and to perform this leakage repair in the full professional manner.

Prior to commencement of the works, the Contractor is obliged to provide the Employer/ Employer’s Representative with samples of materials and certificates for all the materials to be used during the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

F4.5.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in ‘’Bećo Bašić’’ Secondary School in Plav

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	‘’Bećo Bašić’’ Secondary School in Plav
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	30 May 2013

The purpose of reconstruction of ‘’Bećo Bašić’’ Secondary School in Plav is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management
2. Installation of new heating equipment

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system.
Fuel flow meter shall be installed at the oil feeding pipe, before the pipe enters the burner, and ultrasonic calorimeter shall be fitted at the main return pipe from manifold towards the boiler.
All obtained data shall be processed in computer with designated software and, based on these, any problem that occurs in the heating system at the entire school will be timely resolved.

INSTALLATION OF NEW HEATING EQUIPMENT

Radiator heating in classroom in the attic of the school

Attic in this part of the school was added on two years ago, after reconstruction of the heating system in the school, so it does not have a heating system.

It is envisaged to install radiators in all premises in the attic that are being used for teaching and in the hallway.
Riser pipe that feeds radiators in the attic goes from the main pipeline from the boiler room through slabs, through ancillary facilities along sanitary blocks on all levels. The riser shall be fitted in the storage room of the attic, which is located exactly above the boiler room.
Riser branches into two horizontal branches. The first branch goes towards the west part of the attic and it is installed above the floor and will be used for radiators in premises on that side. The second branch goes

below the ceiling and horizontally through the hallway. This pipe is used for radiators in corridor and premises on the east side of the attic.

Radiators in the premises on the west side of the attic are fitted with air release valves. Radiators in the hallway and east side of the attic are deaerated through pipe network up to riser (going from the boiler room), above which air-release valves with overflow pipe shall be fitted.

Radiator heating in the training cabinet for electricians

Ground floor, which is completely detached from the rest of the school building, is planned to be fitted with new heating system. This part of the building was already planned for renovation and part of the works has been completed. Part of the building consists of classroom, which is being adapted for training pupils attending electrician course, pre-entrance space and a corridor which is turned into storage room, because the entry side from the classroom part of the school was already walled up.

Heating system will be connected to the existing branch in the corridor in front of the classroom. Feeding and return pipe in the corridor are fitted beneath the ceiling and are closed. Radiators in the classroom, pre-entrance space and a corridor shall be connected via new pipes to the existing pipes in the corridor. Since the radiators are fitted at a level lower than the boiler level, feeding pipe will be used for deaeration.

Fitting of thermostatic valves

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermal heads. Selected thermostatic heads are convenient for buildings, planned to be used by a large number of users, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermal head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.

F4.5.3 Technical description of electrical services

for energy efficiency improvement in ‘’Bećo Bašić’’ Secondary School in Plav

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	‘’Bećo Bašić’’ Secondary School in Plav
Doc. origin:	Final Design of Electrical Services
Date:	30 May 2013

The purpose of reconstruction of ‘’Bećo Bašić’’ Secondary School in Plav is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Replacement of lightning protection system

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and replacement of roof cover on main school building, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, layed down in foundations of the building, and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. Roof covers to be applied on the main school building shall be made of 1) plastic-coated colored aluminum metal sheet Al.Tr.40/230/0,7mm, with waterproofing and thermal insulation layers beneath and 2) ribbed roof thermal sandwich panels (TRIMO), on a wooden sub construction.
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quanitites for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.
New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

F4.5.4 Technical description of sanitary (water supply and sewage) services

for energy efficiency improvement in "Bećo Bašić" Secondary School in Plav

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	S.S "Bećo Bašić", Plav
Doc. origin:	Final Design of Water Supply and Sewage Services
Date:	28 February 2013

Apart from the measures that directly affect energy efficiency improvement in "Bećo Bašić" Secondary School, in Plav in terms of water supply and sewage services, it is envisaged to perform a reconstruction of men and ladies toilets on the ground floor.
Toilet for disabled persons, situated between men and ladies toilets, has been recently reconstructed, and therefore it is not subject to this design. The reconstruction of water supply installations implies replacement of indoor pipes network made of zinc-plated steel pipes. The replacement shall be performed from an entry point of pipeline into the building, so that the complete replacement of network is foreseen in the renovated toilets.
On the first floor, there is a toilet which is not foreseen for reconstruction, but there are some damages on the facade due to moisture from that toilet. In the Estimated Bill of Quantities there is item for repair of damages in that toilet.
In addition to replacement of water supply installations, a replacement of sanitary units has also been foreseen. The existing sanitary sewerage is made of cast iron pipes. The sewerage installations are in rather good conditions and there is no need for its reconstruction. The existing sewerage outputs from the building and exhaust pipes to the manholes should be used and are not subject to any changes.

DESCRIPTION OF EXISTING SITUATION

Sewage installation

The existing toilet sewerage installation, in "Bećo Bašić" Secondary School, in Plav, is manufactured of zinc plated steel pipes, sealed by hemp with cast iron plug. The toilets are equipped with squat toilets and lavatories.

Water supply installation

The water supply installations are constructed of zinc-plated steel pipes. There are no visible points of leakages, but after long term use, one may expect an incrustation on the inner surface of the pipes.

WATER SUPPLY INSTALLATION

Solution concept

The water supply installation is designed in accordance with standard solutions except that water supply pipes are envisaged to be manufactured of polypropylene (PP) to withstand the operation pressures of 10 bars and mutually joined by fusion process. The cold water has to be connected to the existing water

connections to the assumed positions according to visual toilet preview and then distributed to the outflow point. It has not been foreseen to provide hot water in the new toilets.
Installation is equipped with required switch valves enabling an independent operation of each water supply branch. In front of each outflow, point installing of an adequate switch valve is foreseen to allow for intervention in case of a failure or replacement of sanitary equipment.
Water supply pipes are laid into the wall. Thermal insulation of the pipes is not necessary since polypropylene is a poor conductor of temperature.
Upon completion of work, water supply installations should be checked for test pressure of 12 bars.
After the testing, it is necessary to perform rinsing and disinfection of complete water supply installation Disinfection must be performed by a certified firm issuing adequate written certificate.

Analysis of water requirement

Water requirements do not change in regards to the present needs and do not affect the size of connection to the school building.

Available quantities of water

Available quantities of water do not change in regards to the existing state.

Quality of water at spring sources

Since the building is connected to the public water supply system, the quality of water has to be guaranteed by the public local PE ‘’Vodovod i kanalizacija’’, Plav.

Procedure of preparing drinking water

Since the building is connected to the public water supply system, the quality of water should be guaranteed by the public local PE ‘’Vodovod i kanalizacija’’, Plav.

Solution for transport and water distribution to final user

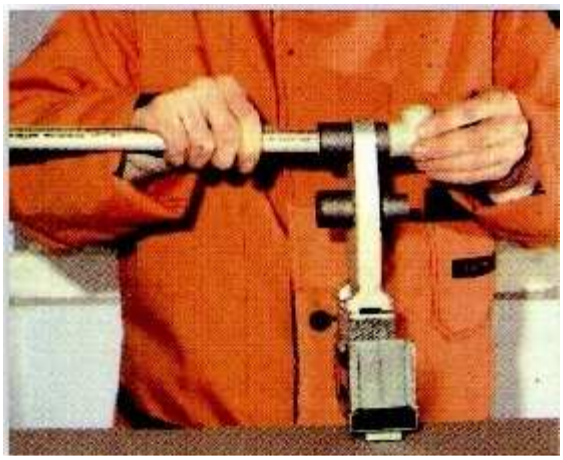
Water is distributed through water supply installations. No hydraulic calculation is necessary because the quantity of water does not change, and the position of outflow points does not change significantly.

Stages of construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Materials used in constructing the water supply system

Assembling of PP water supply pipelines for interior installation implies installing PP lines in the sanitary facilities and distribution in the bathrooms. The pipe length is not supposed to exceed 2m, works include bringing pipes to the bench from the distance of max.50m of horizontal or vertical route, taking measure, cutting pipes, installing with all necessary cross-sections of welding by poly-fusion weld. Welding is performed in the following way:
Pipes and cross-section pieces to be welded must be cut under straight angle and cleaned from dirt and grease. The parts to be welded are placed at the welding unit simultaneously (thorn and bushing) to the limit stop.



When the welding temperature is achieved, which can be shown either by the lamp or timer, depending upon the type of the welding unit, the elements are taken off the unit and impress into each other. They are retained in that position without movement until they get cold. It is very important not to exceed the limit of depth of inserting one element into the other.

Other specifics, manual instruction with human resources

This water supply installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for sanation of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the community network.

SEWAGE INSTALLATION

Solution concept

The existing sewerage installations are made of cast iron pipes. The installations are in rather good conditions and there is no need for its reconstruction. However, if the contractor finds out any damages during removals and replacements of existing water supply installations and sanitary equipment, these damages shall be repaired upon supervisor's prior consent.

SANITARY EQUIPMENT

The existing sanitary equipment in toilets should be replaced by the new one. The lavatory taps are wall mounted, for cold water only.

F4.6. Technical requirements for works execution

F4.6.1 Technical requirements for execution of building and trade works

EARTHWORKS

Prior to earthworks, the Contractor is obliged to clear the land where the pavement is to be built.
Digging and backfilling must be performed exactly as planned.
Any damages caused by the Contractor due to its own fault, incompetent or inadequate work, fails to secure endangered sections shall be remedied and put into proper state at his own expense.
Re-digging is not permitted. If the Contractor re-digs – digs dipper then envisaged in plans, he is obliged to remedy re-dug part at his own expense, using his own material and labor force.
Excavated soil is removed from the construction site to a landfill set by relevant authorities.
Sub-base should be placed immediately upon completion of certain previous works, so as to enable undisturbed execution of other works, removal of excavated soil from the construction site and achieve full and even compression.
Sub-base envisaged in the designed and calculations from BoQ must be made of natural mixture of pure gravel in envisaged layers, measured in compressed state.
Sub-base compression should be also done mechanically, and where that is not allowed or not possible, hand standard ramming should be applied.

MASONRY

Material used for brick-walling must be of high class and must be in line with valid JUS or corresponding MEST standards.

- Brick and other brick ware: B.D1.011 Do D1.015/79, B.D1.030/79, B.D1.016 and B.D1.017/84.
- Lime: B.C1.020/81.
- Cement: B.C1.009 & B.C1.011/82.
- Sand: B.B8.040/82 & B.B8.042/84.
- Gypsum: B.C1.030.

Water used for mixing mortar must be clean, without organic compounds which could have negative impact on quality of mortar and must be aligned with provisions of JUS U.M1.058, or corresponding MEST standard.

Bricklaying
Brick lying must be performed by skilled, qualified labor force and fully in line with valid technical regulations and average civil engineering trade norms.
Bricking must be performed exactly as in plans, with straight joints in fully horizontal lines without pieces smaller than ¼ of the brick and such pieces must not be placed one next to other in a wall.
Vertical and horizontal joints need to be fully filled with mortar, no cavities. Thickness of mortar in the joints cannot exceed 10 to 12 mm. External joints should be left empty at 15 to 20 mm depth for achieving better bonding with mortar for walls plastering. Mortar that leaks from the joints needs to be removed with trowel while still fresh and wipe that spot with burlap.

During brick walling, it is necessary to make sure:

- to build bricks bonds set by the designer consistently and acceptably along the entire length of the wall,
- when necessary, to cut the brick mechanically
- the joints are completely horizontal, i.e. vertical with continuous width of the joint.

Dry installation will be used for indoor joinery.

The calculation and paying shall match general requirements for construction and specialist's trade works, valid average civil engineering norms and adequate items in the BoQ calculated per m3 for massive walls and m2 for partition walls, unless set differently in the specialist's trade works.

CONCRETE WORKS

All concrete and reinforced concrete works shall be completed in line with the "Rulebook on technical measures and requirements for concrete and reinforced concrete".
Concrete production and installation, by rule, is mechanically driven.
Hand concrete installation is allowed in exceptional cases only and upon receiving approval from the supervisory body and only in case of small amount and structures which are not load bearing.
Hand installation includes good compacting into layers and knocking on the formworks, and mechanical is performed using adequate vibrators.
All used material must meet technical requirements set out in "Rulebook on Technical Measures and Requirements for Concrete and Reinforced Concrete" and provisions of relevant international standards, whereby for:
* aggregate,
* cement,
During concrete installation, concrete mass needs to be installed quickly, before the concrete starts settling. In case of concrete mass segregation during transportation, the same shall be manually mixed to again turn it into homogenous mass.
Upon completing concrete installation, concrete needs to be protected from heat and sun by its curing with water for minimum three days, and also the concrete needs to be protected from wind and frost, which shall not be paid for additionally but is included in the work item.
Unit price includes all work, tools, materials with rastering, transportation within and outside the construction site, protection and curing the concrete, workers' wages and all other fees and costs according to the price structure.

PLASTERING

Material used for plastering must be of good quality, i.e. repair of damaged parapet walls and jambs must be done in quality manner, with expert preparation according to valid technical regulations and DIN standard.
Lime fully in accordance with the JUS standard B.C8.042-1970, or corresponding MEST standard.
Cement fully in accordance with the JUS standard B.C8-024, or corresponding MEST standard.
Sand fully in accordance with the JUS standard B.B8-039, or corresponding MEST standard.
Mortaring should be applied in two layers, with total thickness of 15-20 mm, as follows: first layer should be consisted of mortar with rough, sharp and sifted sand, the second one, final layer with fine sand, after the rough layer has settled well. After mortaring, the surfaces should be flat, smooth and without wrinkles, cavities or bulges. The edges must be straight, and corners at walls and ceiling joins right and sharp, so that the item is ready for installation of new PVC with blind frame and aluminum window bench.

CARPENTRY WORKS

The carpentry works should be performed using dry and healthy timber without dropping knags and other faults. Second class arbutus whitewood should be used completely in accordance with the standards published in the "Official Gazette OF Montenegro". All the works should be completed in good quality as per Designer's requirements and Supervisor's instructions.
Timber and joint materials for construction of supporting roof structures, completely matches PTP for wooden structures. Timber used for roof and its parts must be dry, healthy and a good quality one. Cut timber should be whitewood, except on the roof parts which are exposed to outdoor conditions, where pine timber must be used.

This item also implies complete works, materials, transport, auxiliary scaffold, production of patterns for profile drawings, cross-cutting, assembling, positioning of all elements, bitumen coating of walls at supporting points, etc.
Unit price for wooden structure includes the following items: complete materials, works, tools, external and internal transport, scaffold, earnings, taxes and all other corresponding costs.

ROOF TILLING

All the covering works should be performed using good quality and first class roofing cover, with proper certificates, whereat the works have to be completed professionally and in a good quality, using corresponding means for fixing to the roofing structure. Metal-sheet covering should be mounted over previously placed slats (described within carpentry works), with lap joints and screw fixings through the waving metal-sheets ridge.

FAÇADE DOORS AND WINDOWS REPLACEMENT (PVC and AL JOINERY)

PVC joinery
PVC material for window profiles must be quality. Testing must be conducted in line with relevant European norms (EN 12207), tightness to water penetration (EN 12208) and resistance to wind blows, at least in line with European norms (EN 12210) and DIN standards (DIN 53455, 53453, 53460, 52612, 53479A, 53753, 53381, 16830).

Purchase and installation of façade doors and windows should be carried out in accordance with provided sketches and drawings, which are composite part of this Design.
PVC joinery must provide total heat transfer coefficient for windows of Umax 1.5 W/m²K. Window profiles (thickness 3.5mm) must be made of minimum 5-chamber profiles, with thermo-break and reinforced with galvanized steel U profiles, thickness minimum 1.5mm. The profiles must be fully in line with RALA quality standard. Heat transfer coefficient for package of profiles with metal reinforcement (in line with DIN EN 12412-2) is less than 1.4 W/m²K.

High quality PVC hard profiles have to be resistant to UV radiation, cracking, distortion and other deformations. Raw material used for production of PVC profiles must not be made of recycled materials. Strong reinforcement of basic PVC cross cut sections must be made of stainless steel attached to frames and leaves, as well as reinforcement of all angles and connections for permanent preservation of set geometry of windows.

Infill is made of double layer of low-emission glass, with heat transfer coefficient solar factor g≤65% defined in technical description of foreseen works, with hermetically sealed argon or dry air between two glasses. The sealing should be provided by epoxy rubber (according to EN 410 and EN 673, Ug=up to 2.0 W/m² K).

Entire PVC joinery must be installed in line with annexed schemes, in color as requested by the Employer/ Employer's Representative.

The joinery must be fitted with high-quality exchangeable gaskets, high-quality shackles made of nickels and AL-alloys, knobs, i.e. locks with keys. Envisage minimum two weather seal strips along the frames and sashes. All window openings need to have metal supporters with a break as protection for wrong handling and sudden wind blows.

Natural air-streaming at closed window is envisaged through for that purpose specially installed elements in the window frame type "Regel air", or in some other way, in line with DIN and EU norms. Number and size of these elements depend on the size of the window – given minimum per 2 pieces.

Ventilation opening must guarantee safety to strong wind blows, fully in line with valid EU norms - 9A/E750 (EN 12208). This mechanism should be either self-regulating or with manual opening/closing. Elements must not be installed in fixed windows and fan lights.
Regardless which option is selected, the system should provide natural ventilation without jeopardizing the safety, not to permeate outdoor noise above permissible limits, as well as not to permeate humidity or water. At the same time, it should enable moisture drainage in order to reduce and eliminate humidity in the rooms. This system should also ensure a minimum of room ventilation and in such a way prevent room humidity condensation, and at the same time provide energy efficiency savings.

The profiles should be equipped with holes and channels for condensation drainage with compulsory fitted covers on the external side of drainage holes. The covers should be involved in the complete profiles system and made of same materials as profiles themselves, as well as protected against dismantling due to atmospheric conditions.

Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.

Windows need to be installed through previously installed blind frames, fixed with anchors into the walls, i.e. existing structure. Polyurethane foam or such should be used for sealing space between walls and window frames. After sealing, jambs need to be painted so as to conceal tightening material and put surface of the side in proper state.

The windows should be installed in such a way that external sides have to be in the same plane as the removed ones. Where necessary, a lining should be placed on its external side. They are placed along the entire window width and skylights over newly built thermal facade. External drip edge should be provided, with elaborated details of its fixing to the frames. External ready-made galvanized plastic-laminated steel metal sheet sills are installed on the external side of the PVC windows. Drip should be fixed in such a way to prevent water penetration between the wall and window bottom. Prior to production, all measures of openings and sills should be inspected in-site and recorded in construction log.

On the internal side of the window, where it is necessary, place PVC window sills along the entire length of the window, depth depending on the existing parapet.

Quality certified shackles ensure opening according to given scheme.

For windows exceeding 2.2 m, window sashes are opened using “tilt and turn” mechanism on rail with opening using a handle that turns by 360 degrees. “Tilt and turn” mechanism is operated via steel rail on a spindle that allows opening on “tilt and turn” up to minimum 20 degrees. Special attention must be paid to shackles for “tilt and turn” windows to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window leaves.

Special attention should be paid to highly installed windows which must be equipped with high quality accessories and provide good quality opening system within lower opening area. Handling with these openings should be enabled by a lever or similar device. All “tilt-and-turn” opening items which are not suitable to be handled from the floor level should be equipped with special handle system, placed at the level of max. 1,5 m distance from the floor.

Supplier is obliged to submit drawings of cross section of the profiles from requested material as well as sample of the profiles, fittings, accessories and glass, including pieces of raw profiles for which valid certificate from relevant institution was obtained.
Prior to production, it is necessary to prepare and install entire typical window. After elimination of all possible complaints, it will be verified in records and admitted by the Employer/ Employer’s Representative or the Supervisor.

All the windows and doors that should be glazed previously should be installed and set, cleaned, especially the grooves and felts. Glass used for glazing has to be the first class quality. Structure of doors, "tilt", "turn" and "tilt-&-turn" windows should be in the “EUROGROOVE” system, so the fittings of all known manufacturers can be matched.

Unit prices include horizontal and vertical transportation, disassembling and assemblage of doors and windows, accessories, fittings and hardware, cleaning of floors, glass and possibly other objects upon completed works, as well as possible installation, removal and disassembling of scaffold and samples preparation.

The Contractor should provide a 10 years guarantee for profiles, sealing epoxy rubber and complete window.

Aluminum joinery
Facade aluminum doors/windshields shall be produced as the existing (single and double leaf doors opened outwards) with fan lights as the existing, with thermally insulated glass, on three hinges.

For installation of doors, quality certified metal window support needs to ensure opening in line with set scheme and installation of self-closing mechanism, cylinder lock with three keys and floor rubber stoppers. Entrance portals into buildings, envisaged to be replaced with new facade aluminum joinery, shall be fitted with thermal-break, double glazing system and heat transfer coefficient as defined in the technical description of foreseen works.

Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.

Include everything from the description: purchase of material, production, transportation and installation with hinges and blind frame, as well as aluminum sill of required length. Measures should be taken onsite.

The item includes production and assemblage of aluminum structure fitted with thermo-break, heat transfer coefficient as defined in the technical description, aluminum jalousies, metal supporters, required hanging and closing set. Opening is done as shown on graphical annex – joinery scheme. The item should also include installation aluminum bench (sill) of required length. Profiles to be in color according to Employer’s / Employer’s Representative’s request.

Selection of facade joinery color or possible change in details (elevation) can be determined Employer/ Employer’s Representative or Supervisor, including previous Employer/ Employer’s Representative permission.

All the doors and windows must be certified with adequate metal supporters that meet valid standards and regulations.
A supplier has to submit the following attests and certificates for all the doors and windows

- Systematic window testing, in line with14351-1 and B 5300
- Certificate for air permeability. EN 12207 - Class 4
- Certificate to water resistance EN 12208 - Class E 900 A
- Wind resistance EN 12210 - Class C5
- Mechanical requirements EN 12400 - Class 2
- Certificate for sound protection up to class 5
- Certificate for heat energy transfer coefficient DIN EN 12412-2
- Glass Certificate EN 673
- Fittings Certificate V ENV 1627-1630, resistance class 3

Joinery delivered at the construction site shall be property wrapped. All possible damages during transportation or during its installation need to be repaired, if minor, or replaced with new products. These

expenses will be covered by the Contractor. The Contractor is responsible for the joinery till the day of the works handover to the Employer/ Employer's Representative.
Calculation is made per piece of installed element, required hinges and finishes.

The Contractor shall cover all exposed aluminum surfaces, etc. during transportation and installation with protective coating against damages, stains, abrasions, wet cement and such.
When possible, all the parts shall be delivered at the construction site in plastic bags or some other protective coat.

Aluminum parts shall not be stored to allow them rubbing one against another or against some other metal surface. The Contractor shall replace each aluminum piece that gets damaged during the transportation, prior or after the installation, on his own expense.
Prior to handover, the Contractor shall remove protective material and clean aluminum. Special attention shall be attached to protection from mortar, lime and dispersion paints.

The Contractor is obliged to prepare shop drawings for all members, doors, windows with all the nodes and details that need to be installed, and to align the drawings with the design. The Bidder is also advised to provide typical drawings for angles of typical windows and doors and other catalogue and presentation material. Upon preparation of shop documentation for certain structures, Supervisor's approval needs to be obtained. In the process of production of joinery, the Supervisor shall be allowed to carry out inspection during the production process.

Prior to starting major production of joinery, it is necessary to prepare and install typical widow complete with ironmongery set, which will be recoded and accepted by the Employer/ Employer's Representative or the Supervisor, after removal of all possible complaints.

Also, the Contractor is obliged to provide the Supervisor and the Employer/ Employer's Representative with samples of aluminum profiles, seals, glass glue and other, as well as certificates for all the materials to be installed.
Issuing of shop drawings, aligning with the design, delivery of samples and certificates shall not be paid additionally but constitute part of contractual obligations.

The Contractor is also obliged to check dimensions of openings for doors and windows prior to production and to compose a report signed by both parties.

Upon completion of works, the Contractor shall remove remaining material from the construction site, temporary supporting structures, all the debris and waste material and leave the construction site clear. These works shall not be paid for additionally, but are covered with the item's price.

Should material sustain deformations during the usage of equipment or within the period of warranty validity, the Contractor shall remove the same on his expense.

Calculation is done as per measure unit of finished member, with bearing structure, fill, bonding and sealing material, transportation, protection and other fees.

IRONMONGERY

All the metalwork items have to be performed and installed in professional and good quality manner, by skilled labor force using proper tools and materials, all in accordance with valid standards and technical regulations for performance of these types of works. Only items performed in a good quality manner and materials shall be taken into account.

Certificates cannot be older than a year since the day of issuing certificates to the day of commencement of the works.

All the ironmongery items have to be performed in accordance with each corresponding Final Design scheme and installed on the places and positions provided within the Design.
The items should be performed using standard steel profiles or sheet metal steel extruded rectangular profiles of various dimensions, other types of rectangular profiles and other materials, which are either provided or not within items description but need to be installed. Ironmongery items need to be installed as indicated on drawings from the design.

Prior to production start, the Contractor is obliged to provide construction drawings and details to the Employer/ Employer's Representative and the Supervisor, as well as to perform its inspection and synchronization with other construction, specialist's trade and insulation works.
All definitely performed construction drawings and details have to be signed by the Employer/ Employer's Representative and the Supervisor.

In respect to ironmongery items, the Contractor shall start their production upon signing of construction works drawings and details.

The calculation should be carried out as per piece of each metalwork item, as well as per m2 or m1, according to each corresponding item description.

All the ironmongery items, except those supplied by other deliverers, should be made in the Contractor's ironmongery workshop. The finished items should be treated with a real minium lead and anti-corrosion coating, as pointed out within corresponding item description. In such a protective state, the items should be transferred to the construction site. After the installation, ironmongery should be painted twice with enamel coating, which will be also taken into a unit price, if not otherwise specified within the item description.

SHEET METAL WORKS

Each work in positions of this section is envisaged as fully completed with all the necessary binders, packing piece "screw anchor", filling piece and other installation parts. It is mandatory to use materials that fit standards defined in the Official Gazette of Montenegro.
All works must be conducted as per regulations using adequate sheet metal type, thickness as per each point of each position of the cost estimate. Iron parts that are in direct contact with the sheet metal need to be coppered or coated in red lead, and painted with double layer of oil-base paint for metal. When using concrete, brick or mortar base, it is mandatory to apply bitumen roofing felt beneath the sheet metal.

Calculation of the amount of performed works, unless indicated differently in the cost estimate, is done per m2 or m1, of completed, finalized and placed (installed or assembled) sheet metal elements.
The following is included in the price of sheet metal works unit: entire installed material with waste, with required works, tools and all forms of transport, social contributions, as well as all expenses related to these works, according to regulations and legally set requirements for establishing and forming cost structure.
Installation of aluminum sheet "solbank" (sill)
Where required by the Design, on the outside of new widows, pre-painted aluminum sheet "solbank'' (sill) should be installed (must be anchored), d=0,70 mm.
When installing hood mould, lateral sides need to be resting against the wall, and damages on facade remedied. Hood mould needs to be anchored using minimum two anchor bolts in the field. Anchor bolts can be direct or indirect, as agreed with the Designer.
Make sure that the minimal distance between the outdoor hood mould and the facade is 25mm, and also that on one facade, these are in approximately same vertical level. Take the measures on site.
The color is white, unless the Employer/ Employer's Representative has different requirements, which needs to be done in agreement with the Designer.

CERAMIC WORKS

These general conditions represent integral part of description as per individual items and are related to the floor tiling with all types of ceramic tiles both inside and outside of the building. Ceramic tile works must be performed in good quality, engaging corresponding and skilled workers, and in accordance with valid standards and technical regulations for performance of these types of works.
All the materials which will be built in within the building should be brand new and meet the existing standards for quality and dimensions.
- The edges must be sharp, straight and parallel,
- Tiles must not contain any dissoluble salts or harmful ingredients,
- Visible tiles surface should be without cuts or bubbles,
- Color has to be monotonous,
- Water absorption should be within the limits foreseen in standards for corresponding types of tiles.

PVC small crosses should be used to determine joint width between ceramic tiles. Walls tilling must be done with sufficiently wide joints. Horizontal joints go across the entire girth while vertical are placed using a device that ensures their verticality (ex. “plumb-bob”). Also, all the edges need to be completely vertical.
For flooring of the interior of the building, ceramic tilling is performed after plastering all the rooms, installation of window and door frames and ironmongery, and after installation of all types of mains and their testing.
When preparing floors for tiling in cement mortar, the base must be clean and flat, on a level that ensures installation of required thickness of cement mortar 1:3 ratio, minimum 2 cm and maximum 3 cm.
Laying tiles on the floors must be flat without waves and corrugations, with completely horizontal surfaces or elevated where it is foreseen by the design.
In order to protect completed tile floors, any transportation or movement is forbidden.
After tile lying, the walls and floors have to be grouted using special mixture for these purposes. Prior to beginning of works, the Contractor is obliged to supply the Designer and Supervisor with all material samples and certificates for the approval.
Calculation should be as per m2 of finished floor area or wall. Openings up to 0,50 m2 which shall not be tilled, where tilling is done around them, shall not be deducted. All corners and aluminum transition strips should be calculated as well.
Unit price should include complete works, transportation and supplies of needed bonding, built in and auxiliary materials, presentation of samples and certificates, small basis repairs, required scaffold, tools, protection against damages up to the Employer/ Employer’s Representative’s acceptance, cleaning etc.

PAINTWORK

All the paintwork needs to be performed professionally and in quality manner, using materials that meet technical regulations, norms and standards (possible some other regulations) in the premises where these types of works are envisaged in the construction documents.
Materials can be installed an applied only on those areas which are appropriated for such treatment with their physical-chemical and mechanical properties.
Materials need to be of best quality. For these materials, the contractor is obliged to provide attest on completed testing.
Prior to beginning of works, the Contractor is obliged to deliver to Client certificate for all the materials that are being installed. Certificates need to be issued by organizations authorized for this type of works and cannot be more than 1 year old from the day of their issuing until the beginning of works on the building.
The Employer/ Employer’s Representative has the right to verify quality of the material the Contractor is using on the account of the contractor. For that purpose, the Contractor is obliged to provide the Employer/ Employer’s Representative with sufficient amount of material the Client wishes to test.
If the testing shows that the disputed material does not meet requested and agreed quality, the Contractor is obliged to eliminate poorly performed works and to perform the works using more quality material at his expense.
The calculation will include only quality performed works.

Ready-made, materials produced in factories need to be used according to instruction from the manufacturer.
Beginning and the end of paintwork will be carried out in line with the construction site timesheet, and the Contractor is obliged to participate in preparation of the same.
The guarantee validity period will be defined in the contract.
On the dried preparation, walls need to be skimmed, and then place semi-dispersion paint, if the room was painted before in this paint, using the same color as in the rest of the room.
Skimming is performed with two layers of plaster, using required scaffold.
Painted areas need to be clean, without brush marks and paint roller. Color and the tone need to be even, without blotches. Color needs to cover the surface fully. All the tails of painted areas need to be even and in regular shape, as well as joints with the doors and windows, and such.
Painting can be done manually or with a compressor. In case of multiple paint layers, previous layer needs to be completely dry when placing another layer.
When doing paintwork, contractor is obliged to protect the furniture that might be damaged due to workers' negligence. Scattering of paint and other material on floors is forbidden.

FACADE WORKS

All the facade works need to be performed professionally and in quality manner, using materials that meet technical regulations, norms and standards.
For the materials that are not covered by standards, the Contractor is obliged to supply appropriate certificates obtained from authorized institute for the purpose they are meant to be used. The materials can be installed and applied on those areas which are appropriated for such treatment with their physical-chemical and mechanical properties.
Decorative anodized mortar (mono-component) mortar on the base of acryl resin and adhesive, mineral aggregates and additives, by previously applying a substance to neutralize the foundation, adhering technical regulations and requirements will be used for facade finishes. Prior to coating, cracked or damaged parts of the facade need to be removed, all the damaged spots fixed, and lightning rod cables, vertical rain gutters, air/conditioning units removed to place the facade without any hindrances.
Scaffold for execution of works should be included in the price calculations.

Preparation prior to system installation:
It is necessary to ensure firmness of the base and absorption since dirty, wet and non-bearing base must be remedied prior to works. Internal plastering and floor coating must be dry prior to execution of works. Works that need to be performed depending on the base: abrading of smooth surfaces, removal of bubbling with dry brushing, drying and protection of wet surfaces, removal of mould and algae with algae remover, cleaning of settled mortar and coating with flexible and cement-free adhesives, brushing of dusty base, pressurized cleaning, washing with water and drying, removal of lime mortar and coating with equalizer coat, removal of remains of mortar mechanically, filling of joints between bricks with cement mortar, cleaning of the joints upon filling with foam, cleaning of the paint with water and drying.

Preparation prior to system installation:
It is necessary to ensure firmness of the base and absorption since dirty, wet and non-bearing base must be remedied prior to works. Internal plastering and floor coating must be dry prior to execution of works. Works that need to be performed depending on the base: abrading of smooth surfaces, removal of bubbling with dry brushing, drying and protection of wet surfaces, removal of mould and algae with algae remover, cleaning of settled mortar and coating with flexible and cement-free adhesives, brushing of dusty base, pressurized cleaning, washing with water and drying, removal of lime mortar and coating with equalizer coat, removal of remains of mortar mechanically, filling of joints between bricks with cement mortar, cleaning of the joints upon filling with foam, cleaning of the paint with water and drying.

Weather conditions:
Temperature at which façade system is installed must range between 5° and 25°C. When the weather is hot, installation of material on sunny side should be avoided. The base needs to be cooled with even spraying of

clean water during duration of heat. Façade system must not be installed when it's raining. Finishes must not be installed when the base is wet. When the weather is cold, work needs to be suspended which prevents damages that may arise as result of freezing.

FAÇADE SCAFFOLD

Erection of adequate scaffold is required for execution of described works aimed at implementation of energy efficiency measures.
Facade scaffold should be placed fully in line with valid regulations and Health & Safety measures. The scaffold must be statically stable, anchored to the structure and properly grounded. It is used throughout the execution of works. Platforms or scaffold used primarily need to ensure safety of workers, and then ensure quality execution of required works.
Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms and scaffolds for execution of works
Note: In line with the level of his equipment and works technology, prior to execution of facade works, the Contractor is obliged to provide the Supervisor with the Design for installation of selected type of scaffold, for Supervisor's verification and approval.

INSULATION WORKS

Under insulation works, installation of thermal insulation and waterproofing is considered. Prior to insulation installation, all the pad surfaces should be checked and confirmed for any cracks, proper slopes, as well as thoroughly cleaned.
All the insulation foils should be placed, overlapped and fixed in accordance with regulations and manufacturer's instructions. Thermal insulation should be placed in accordance with professional regulations, without free space between the boards, pad or structure, including the waterproofing, and according to applicable regulations.
Good quality materials with corresponding certificates should be used, where manufacturer's instructions have to be fully complied during the installation procedures.
For the materials that are not covered by the standards, the Contractor is obliged to supply appropriate certificates obtained from authorized institute for the purpose they are meant to be used. The materials can be installed and applied on those areas which are appropriated for such treatment with their physical-chemical and mechanical properties.
Thermal panels with B1 flammability class (DIN 4102 B1 highly flammable, non-combustible and self-extinguishing) should also be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows), in the area of floor slabs. These breaks should be made of pressed mineral wool reaching A1 flammability class.
The price needs to include procurement of required material, its transportation and installation costs.

FLOORING WORKS

This type of works includes all types of floor coating glued to previously prepared base and consists of:
- parquet
- other materials with specific properties.

Laying of these floor coatings is done including gluing to the prepared cement screed base or cement flooring plaster MB-20, on top of which smoothing mass is placed prior to laying floor coat.
Prior to laying floor coat, the base needs to be well inspected, cleaned and washed.
Glue must be certified, with verified quality, and must provide firm and permanent bond between the base and floor coat.

Installed material must meet applicable standards. At point where two different types of floors meet (parquet-ceramics, etc.) at the same level, brass strip along the meeting point must be placed which is paid additionally.

MISCELLANEOUS WORKS

All the works have to be carried out as per description for each position, according to general and specified description, i.e. design elaborate, schemes and details included in the same.
Material applied in all these types must be aligned with the provisions of applicable standards.
Following has been included in the price per unit of measure: entire building material with wastage, work, tools, coating, scaffolds with amortization coefficient, backing, fees, all types of transportation, social contributions, taxes and all other expenses related to these works and legally set requirements for establishing and determining the cost structure.

F4.5.2 Technical requirements for execution of works and installation of thermal-technical (heating) services

GENERAL

- The Contractor is obliged to place all installations in quality manner and in line with approved design documents, abiding valid technical and legal regulations and submitted technical requirements.
- Work must be executed in line with these requirements and JUS.M.E6.011 "Technical Requirements for Installing Heating Installations" or applicable MEST standard.
- The Contractor needs to coordinate execution of heating system installations with the execution of other works and services to avoid confusion and damaging of installations.
- The Contractor is obliged to provide an introduction and maintenance manuals for the users of all newly installed devices and installations.

HEATING BODIES AND DEVICES

- Heating bodies can be: radiators, convectors, calorifiers, pipe water radiators - registers made of smooth pipes, as well as other heating bodies of modern design. If during the installation process, certain heating bodies are replaced with other types, Investor's approval is required.
- For all the heating bodies being installed, it is necessary to acquire quality attest and operating properties, attest issued by renowned institutions.
- Heating body needs to be installed independently on consoles in the parapet wall of a window, in exceptional cases differently when required due to construction reasons or due to the very heating body. If a mask is placed below the heating body, it needs to ensure best possible air flow and it needs to be easily removable.
- Sanitary and hygiene requirement for installation of heating bodies are related to accessibility and easy inspection of all the segments and elements of heating bodies to ensure their cleaning.
- Installation and construction requirements are as follows:

  - Size of the heating body must not exceed dimensions of windows or window niche, i.e. size of the area where it is being placed;
  - Avoid excessive bending when connecting heating bodies to vertical riser;
  - Heating bodies need to be installed horizontally.

- All heating bodies need to be properly installed, if necessary leveled and centered. Vibrations generated during operating of the equipment must not spread onto the building or adjoining equipment.
- Installation of heating bodies – appliances needs to be such that they are easy to remove, i.e. separate from the network.
- Installation of standard products needs to be carried out in line with instructions issued by the equipment manufacturer and the installation scheme, and they need to be placed in positions defined with these technical documents.
- Pumps are delivered together with the three-phase asynchronous power engine with the caged rotator, fully enclosed construction and are envisaged for 380V, 50 Hz power, with casted base with elastic flange for direct coupling of the pump and power engine, and adequate star breaker – triangle.
- Electrical installations can be made of OG conductor using adequate waterproofed elements and fittings, and based on the design that needs to be prepared using data and guidelines contained in this Elaborate.
- If radiators are used as heating bodies, during their installation, following requirements need to be met:

  - Distance between the rear side of the radiator and the wall needs to range between 20 and 70 mm, depending on the type of the radiator;
  - Radiator needs to be placed at 100 – 150 mm above the floor, depending on the height of parapet;

- If radiator is placed in a niche or there is a board above the radiator, then maximal distance between the upper part and the niche, i.e. lower edge of the board needs to be 70 to 120 mm

- If consoles are used for radiator installation, they need to be placed in such way that the radiator rather leans against them than hangs on them. Number of consoles is basically set according to following criteria: 2 consoles for radiator with 10 ribs, and one console per next 10 ribs. Number of holders needs to be by 1 lower than the number of consoles.
- Seek to install radiators from the same producer in a building whereby the width and the height of the radiators are the same.
- After forming radiator batteries with required number of ribs, the same need to be washed well under a jet of water to eliminate internal dirt.
- After completing installation and after successful pressure testing, radiators need to be removed, cleaned from rust or dirt and protected with paint. Radiators are painted when they are installed again at radiator temperature of at least 50°C. Special colors and lacquers resistant to high temperature are used for painting the radiators. It is not recommended to use different metal (copper) paints as they reduce coefficient of surface radiation, and at the same time lower heat emission.
- It is also possible to use electric heating bodies that have appropriate attests.

PIPE NETWORK

- All pipes part of horizontal and vertical piping need to be attested and need to meet the JUS C.B5.221, i.e. JUS C.B5.225 standards, or applicable MEST standard.
- Diameters of pipes used for hydronic heating need to be:

DN 10	Ø17.2 x 2.35 mm
DN 15	Ø 21.3 x 2.65 mm
DN 20	Ø 26.9 x 2.65 mm
DN 25	Ø 33.7 x 3.25 mm
DN 32	Ø 42.4 x 3.25 mm
DN 40	Ø 48.3 x 3.25 mm
DN 50	Ø 57 x 2.9 mm
DN 65	Ø 76.1 x 2.9 mm
DN 80	Ø 88.9 x 3.2 mm
DN 100	Ø108 x 3.6 mm
DN 125	Ø133 x 4.0 mm
DN 150	Ø159 x 4.5 mm

- Horizontal piping needs to be hanged against the mezzanine floor or leaned against the wall consoles. In positions where this is requested by the design solution, it is possible to place piping into floor channels with light inspection manhole lids placed at 8-10 m distance. Prior to closing the channels, they need to be cleaned and piping needs to be protected from corrosion and adequately insulated.
- The pipes must not be firmly immured into the building structure; instead, there always needs to be enough room to allow for pipes' undisturbed operating due to changes caused by temperature.
- Vertical piping and connections to heating bodies need to be placed freely against the wall. On vertical piping, right behind the connections to horizontal piping, it is necessary to install gaskets and straight valves, and above them discharge faucets.
- At the junction point of the heating body connector with the vertical piping, the connector needs to have adequate horizontally placed crossover.
- If installed, vertical supply raiser is always on the left side and it needs to be fixed with adequate number of pipe clips.
- Deaeration, if possible, needs to be central, with deaeration network via deaeration or expansion vessels.
- In positions where vertical raisers go through mezzanine structure, piping needs to be wrapped in corrugated fiberboard, except near wet knots where bigger diameter pipe bushing is placed to allow free pipe movement. In floor, these bushings need to be 5cm raised above the floor.

- Compensation pipes need to be envisaged on piping over 30 m length.
- Pipes, i.e. horizontal return and distribution network need to be placed with set drop of 2 – 4 mm/m (and heating body connectors minimum 20mm/m) to achieve good deaeration of the entire installation, to ensure connection with the atmosphere in the direction indicated in the graphics, and if the direction is not indicated, then in the direction of fluid movement through the piping.
- Pipes are welded, unless separable connection is required, which is achieved using flanges in places where pipes are being connected to gate valves and other fittings or other parts of network that need to be separable (dividers – collecting piece, tanks, etc.). Welding needs to be well processed achieving sufficient thickness without reducing the cross section of the pipe. Welding needs to be top class. Pipe welding to installations under pressure must be carried out only by attested welder with the minimal welding coefficient K = 0,8.
- When welding pipes, following works need to be performed:

  - Filing (chamfering) of the edge of pipes that are being connected. Pipes with less than 3mm wall thickness, are welded without chamfering the edges. For pipes with wall thickness bigger than 3mm, the chamfering angle needs to be 60 - 70°;
  - Cleaning of seams from dirt and corrosion;
  - Removing cinder from welding and protecting them from corrosion using basic tincture.

- When using flange to connect piping and fittings, klingerit gaskets must be used.

Standard pipe diameter	Maximal distance	Minimal diameter of bearing bar
13 mm	1.5 m	10 mm
25 mm	2.1 m	10 mm
38 mm	2.7 m	10 mm
50 mm	3.0 m	10 mm
75 mm	3.7 m	13 mm
88 mm	4.0 m	13 mm
100 mm	4.3 m	16 mm
130 mm	4.9 m	16 mm
150 mm	5.2 m	20 mm
200 mm	5.8 m	22 mm
250 mm	6.7 m	22 mm
300 mm	7.0 m	22 mm
360-510 mm	4.6 m	25 mm

- Parts of pipe that are not designed to emit heat or those that could freeze need to be insulated with quality insulation. Insulation must be such to avoid damaging when pipes expand. This particularly refers to horizontal distribution and return network. It is necessary to abide JUS.ME2.170 regulations or applicable MEST standard.
- Pipes placed enclosed in flute, floor and passages through walls and mezzanines need to be protected from corrosion. Connectors to the heating bodies, which cannot be less than 30 cm long, when passing through walls and building elements, need to be protected from corrosion and damages at the penetration positions, ferrules and such. At the penetration points, connector to the heating bodies through walls needs to be placed on both sides of rosette.
- Consoles and shackles which support the piping need to ensure its free movement caused by heat dilatations, without the possibility of creating dentations. Consoles and abutments need to be installed into the walls with cement mortar, not plaster.

- Rust needs to be carefully removed from all the pipes and fittings and other metal pieces, after completed installation and adequate prescribed testing, and these need to be protected with adequate base tincture. After that, piping in the wall can be wrapped with corrugated fiberboard, insulated or painted with oil lacquer colors. Used paint needs to cover the surface well, to be smooth and to be able to sustain operating temperature. Choose color in line with supervisory body. Painting needs to be performed in line with DIN-2043 and DIN 2404 standards or applicable MEST standard.
- When installing gaskets, faucets and valves, spindle with wheel needs to be placed on horizontal ducts. Access needs to be ensured to all fittings in case of possible interventions.
- Heating fluid flow needs to be marked with arrows on the entire installed fitting.

SPECIAL REQUIREMENTS FOR BOILERS

- It is necessary to provide space to accommodate boiler.
- When conducting testing with cold water pressure of a plant, pressure for testing needs to be by 50% higher than the operating pressure. The pressure needs to be maintained within 5 minutes period, after which it is lowered to the highest allowed operating pressure. This pressure needs to be maintained for the whole time during the testing.

  Testing shall be deemed successful if:
  - No cracks were observed on the plant,
  - No leakage is noticed,
  - No visible shape deformations are observed that would remain upon completed testing.

  Testing shall be deemed unsuccessful if even the smallest leakage is spotted at the welding.

- It is strictly prohibited to pour cold water into hot boiler.
- In all other segments, regulations indicated by the equipment supplier need to be adhered to.
- The entire plant needs to have automatic operating and control of all devices provided.
- Prior to putting the plant into trial operating, it is necessary to provide all the instructions for handling the plant, and these need to be visibly prompted in glass frame at danger positions.
- With procurement of mechanical power tools for work, the Contractor is obliged to give the user attests for these tools.

POWER INSTALLATION

- Electric engine needs to be delivered together with adequate blocker rings and fuses.
- Electrical commands at the switchboard need to contain all required fuses and block rings.
- Devices for metering amperage and electricity voltage also need to be installed on the board together with operating and malfunction signals. All required relays and other elements that belong to automatics and plant control devices, or a part of equipment that forms connection between the automatics and electric engine need to be installed into the control panel.
- Constructor in charge of mechanical installations is obliged to ensure electrical connecting and putting into operation all the engines and other electrical appliances that are composite part of the air condition installation, i.e. its delivery
- Each heating, ventilation and air condition system unit with electric engine will be delivered and assembled together with the engine and facilities, and best delivered from the equipment manufacturer.
- Bearings need to be oiled at all times, adjusted and envisaged for 100,000 hours of operating, with 5 year guarantee.
- Choose engines for work with speed in line with special requirements and dimension them to ensure maximal efficiency for certain dimensions and application. Operating equipment of engine with characteristics that do not include overloading should be dimensioned for acceptable loads.
- Electricity and engine voltage are determined based on local conditions. Basically, it is possible to assume that 50 Hz of alternating current at 420 or 380 V is provided.

MOUNTING

- The Contractor is obliged to install entire equipment envisaged by the design in a way indicated in the graphics, technical description, in line with these technical requirements and special conditions for installation of individual equipment according to instructions issued by the equipment manufacturer.
- The Contractor is obliged to provide his professionals and assisting workers, tools, machines, instruments and everything else necessary for the installation.
- Assemblage includes entire installation for heating and venting, connecting with pipes with heat substation (plant room), connecting with water and sewerage connectors, which will be introduced into the substations (plant rooms) by constructor in charge of water supplying and sewerage network works.
- Works on setting foundations for engines, pumps, ventilators are a part of installation delivery and the Contractor is obliged to execute these works.
- All masonry works required for fastening the holders, bearers, clamping rings for the channel, ventilator and other installation elements are also obligation of the contractor in charge of placing installations.
- Prior to drilling holes in the wall or concrete, approval from authority in charge of supervising construction works is required, i.e. ask to execute the construction works and give instructions how to execute it. After the installation of elements, the Contractor is obliged to plug all the holes in a way appropriate for the type of installed elements.

TESTING

- The Contractor is obliged to conduct full technical testing of equipment, piping and fittings in line with JUS.ME6.012, or applicable MEST standard, including:

  - Tightness testing
  - Dilatation testing
  - Thermo-technical testing.

- Prior to testing, following needs to be undertaken:

  - Thorough inspection and cleaning of installed equipment
  - Provide access and lighting for all the parts that undergo the testing
  - Provide solid tightness on all ducts and fittings
  - Secure all ducts that are not used at blind flanges
  - Tightening of all elements
  - Washing of the entire system
  - Installation of throttle shutters (if envisaged in the design)
  - Fill the system with water.

- Tightness testing is done at pressure:

  $P_i = 2 + H_{st} + H_p$ (bar)
  where:
  Hst – is statistic plant pressure
  Nr - pump strain
  Testing is deemed successful if tightness does not appear within 6h as per paragraph 4.2 of JUS.ME6.012, or provisions of applicable MEST standard.

- Thermo-technical testing is carried out to establish functionality and trim of the plant.

  When conducting thermo-technical testing, following is checked:
  - Proper operating of fittings

- Heating equability of heating bodies
- Reaching projected technical parameters (temperature, pressures, temperature differences, pressure difference, etc.)
- Proper operating of metering and regulation tools
- Whether installed system covers projected amount of heat
- Maximal capacity of generator and heat exchanger
- Capacity of heat generator and exchanger for hot water
- Achieving projected degree of usefulness for heating systems with electric boiler.

All the tests need to be carried out in line with paragraph 6.1 - 6.5 of JUS.ME6.012, or provisions of applicable MEST standard.

- At the end of piping testing of each part of the system, that part needs to be carefully washed until the water flowing out of system is clean.

F4.5.3 Technical requirements for execution of works and installation of electrical services

GENERAL

The Contractor is obliged to comply with following general technical requirements for execution of electrical services, as listed below:

1. All electrical installations have to be placed in accordance with the attached plans, these conditions and still valid JUS, or other applicable MEST standards, for execution of low and high voltage installations, i.e. to be executed according to the Regulations of technical standards for low voltage electrical installations ("Official Gazette of Federative Republic of Yugoslavia" No. 53/88, 54 / 88 and 29/95).

2. Before the start of works, the Contractor is requested to review the Design documentation thoroughly and forward the remarks, if any, to the Employer/ Employer's Representative or to the Supervisor in timely manner.

3. Before commencement of the works, the Contractor is obliged to conduct on-site inspection of the building, and if finds out that the certain modifications, as result of construction changes, are required, the Contractor should advise the Supervisor accordingly, and obtain the necessary approval for any changes.

4. On the basis of the received Design documentation, the Contractor shall commence the works only after review and obtained approval from the Supervisor.

5. All installation materials and equipment which will be used for construction of installations have to be in accordance with relevant standards and first class quality. Any material that fails to meet these conditions must not be used.

6. When performing these works, effort has to be made to minimize any damage to already executed works and existing structures. Also, activities have to be coordinated in order to avoid mutual interference in the different phases.

7. According to the applicable Law on Construction of Montenegro, during the works, the Contractor shall maintain a proper construction log, with all the information required for keeping this log, and all claims and statements, both by the Supervisor and Contractor, and should be registered in the construction log.

8. The Contractor has to prepare all the required by-laws regarding health and safety measures and advise the workers of the conditions and sources of hazards and risks, and protection measures.

9. The Contractor is obliged to determine the job positions with special work conditions, if such positions exist.

10. All places, where required by the regulations, have to be clearly marked with warning notices:
    - the amount of voltage,
    - use of specific equipment, and
    - other important information.

11. For interventions in transformer stations, distribution boards and installations, the qualified person is obliged to apply the protective equipment and all other means of protection.

12. The Contractor shall provide a warranty to the performed works, from the date of technical acceptance of the building. All malfunctions and defects, occurred in this period, either due to use of poor materials or poor workmanship, should be eliminated by the Contractor without any expenses.

13. Upon completion of the works, the Contractor shall perform the necessary tests and obtain relevant certificates.

14. Devices and equipment for electrical installations have to be suitable for operation of installations at the rated voltage of electrical installations. Electrical equipment has to withstand running currents during normal operation and under emergency circumstances, during the time allowed by characteristics of the protective devices. Electrical equipment, when switched on and off, should have no harmful effect on other equipment. Equipment, including wires and cables, shall be set so that it can easily be checked, maintained and handled, providing free access to each point of connection. The foregoing also applies to equipment installed in the casing.

15. Name plates and other devices that are used for identification should be placed on electrical appliances to indicate their purpose. Controls and signalization elements should be placed at easily accessible and visible places.

16. Insulated conductors and cables should be laid and marked so as to be easily recognizable for tests, repairs or replacements. The protective conductor (PE) or protective-neutral conductor (PEN) will be identified by the combination of green and yellow, and the neutral one (N) by light blue color. These colors shouldn’t be used for any other marking. Labeling can be done at the end of the conductor near the circuit, especially when the conductors are not insulated.

17. Protective devices should be placed and marked so that its associated circuit can be easily identified. The protective device should be installed in the switch gear and control gear assembly / switchboard /.

18. Plans, diagrams or tables of low voltage electrical installations should be placed at the points with more circuits, to indicate the nature and composition of circuits and characteristics for recognizing protective devices, switching on and off, and the place of their installation and insulation.

19. In the switchgear and control gear assembly / switchboard /, electrical equipment of the same type of current and voltage should be installed and grouped so that no mutually harmful effects may occur.

20. The Contractor is obliged to provide an introduction and maintenance manuals for the users of all devices and installations.

21. The Contractor shall have specialized engineer for low voltage items.

WIRING

1. The connections of wires and other electrical equipment must be made so as to be safe and positioned in such a way to enable permanent checks. The connections should be secured by appliances which correspond the conductor material and its cross section. The connection should be accessible after removing the cover or partition with tools, and access shall have a minimum degree of protection IP 2X, according to JUS N.A5.070 standard or applicable MEST standard.

2. Insulated conductors and cables should not be joined in installation pipes and channels. They can be joined only in the installation boxes, cable connectors or switchgear and control gear assembly, and points of connection shall be isolated using the isolation level that suits the type of electrical distribution. Exceptionally, in the prefabricated concrete walls, joining can be made in boxes, wall jacks, provided that the depth of the box allows accommodation of compounds of the same circuit.

3. The point of connection between electrical installations or the point of connection between electrical distribution and electrical equipment should be executed so that the electrical distribution is not exposed to the pulling or twisting forces. If the effect of force cannot be avoided, a relief system should be provided.

4. The connections should be performed so that there is no reduction in cross section, or damage of wires and insulation. The ends of electrical distribution, particularly inlets and outlets, as well as places where electrical installations penetrate through the walls and electrical equipment, should be permanently sealed.

5. If there are other non-electrical installations close to electrical distribution, space between them should be sufficient to enable maintenance if one doesn't endanger the other one. Minimum permitted distance is 30 mm. If there are heating installations near electrical distribution, pipes with hot air or a chimney, electrical distribution should be thermo-insulated or insulated by screens or to be placed outside the impact of thermal effect.

6. Wiring should not be placed under any non-electric installations exposed to condensation or other liquids. Electrical distribution shall not be placed in the same trucking, pipe or the like, with other non-electric installations. If it cannot be avoided, protection against indirect contact by automatic disconnection of supply or use of insulation for Class II equipment shall be provided and adequate protection should be set against harmful impacts of other installations. Metal parts of electrical distribution, which are exposed to condensation, shall be protected against corrosion inside and outside and the condensate drain has to be provided.

7. If the electrical distribution is placed on the walls, the minimum allowable voltage between elements of electrical distribution and the wall is 5 mm. Electrical distribution for lower voltages shouldn't be placed in the same lining or tube, or close to electrical distribution with higher voltages unless there is an insulation barrier between the two distribution systems, that can withstand test voltage of high voltage electrical distribution. In the same installation tube or channel, conductors of single circuit can be laid, except for conductors of control and auxiliary circuits.

8. Wiring should be set so that in case of failure the environment is not endangered. Junction boxes for cables or wires that are placed under the plaster shall be made of insulating material or metal lined with insulating casing and feed through made of insulating materials. For attaching electrical distribution, it is possible to use the tools and apply procedures that do not cause any deformation or damage to insulation, such as plastering, clamp rings of insulating material adapted to the form and cross-section of cable, gluing or nailing using nails with washers made of insulating material.

9. Cables laid directly under the plaster and in the walls should be covered along the entire length with minimum of 4mm thick plaster. Exceptionally, covering by plaster is not necessary if cables are laid in the cavities of walls and ceilings made of concrete or similar materials which neither burn nor help in burning.

10. Installation cables and conductors laid in pipe installation in the walls or cables laid directly in mortar and under mortar shall be vertical and/or horizontal and in parallel to the edges of the room. If laid horizontally, cables are laid at a distance of 30-110 cm from the floor and 200 cm from floor to ceiling. If laid vertically, cables and wires are laid at a distance of at least 15 cm from the edges of windows and doors. The cable routes for feeding of electricity to the fixed water heaters should be aligned with the heater axis. It is permitted to lay cables and installation conductors in slant position in ceilings, but not in the walls.

11. The cable laying in the wall is permitted if the cable is insulated with thermoplastics with filling and coatings, if it is installed on the wall clamps and if it has additional mechanical protection from the

floor to a height of 2 m. Junction boxes and other accessories that are attached to the wall with the laying of cables, shall have sealed conduit bushing and the degree of protection of minimum IP 5X specified for wet rooms, and an adequate level of protection established for the other rooms.

12. Cables with no filling, such as PP-R cable, can be laid only in dry areas, and under plaster, in the wall and ceiling cavities made of concrete and similar non-combustible material not covered by mortar. These cables shouldn’t' be laid as bunched cables, placed in trunking or below the gypsum-cardboard panels, regardless of the manner in which those are fixed and shouldn't be placed on combustible materials not even when covered with plaster.

DISTRIBUTION BOARD

1. Distribution boards of closed or hermetic types are mounted at 1.7 m above the floor, and open boards at 2.5 m above the floor. Distribution boxes in installations should meet the following requirements:
   - Exterior of the cabinet must not affect the concept of interior design;
   - They should be built into the wall, or mounted on the wall;
   - Electricity meters shall be separated from the rest of built-in equipment;
   - Doors must be fitted with a lock and key;
   - All clamps on built-in equipment shall be accessible from the front. In normal operation all the clamps and accessories that are energized shall be shielded from contact.

2. Parts under voltage of the control or distribution block shall be 20 mm away from housing, and smaller distance is allowed only if insulated walls are applied.

INSPECTION AND TESTING

Any electrical installations, during installation or when completed, but prior to delivery to the user, should be inspected and tested. During the inspection and testing, the safety measures should be undertaken to protect the staff, including protection of electrical and other equipment from damages. If the electrical installations are replaced, they have to be also checked and examined whether the electrical installations are in accordance with the Regulation clauses.

F4.5.4 Technical requirements execution of works and installation of sanitary (water supply and sewerage) services

PREPARATORY WORKS

General
Preparatory works for construction of water supply and sewerage installations are divided into preparatory works for interior water supply and sewerage and preparatory works for exterior water supply and sewerage.

Preparatory works for interior water supply and sewerage.
Preparatory works for interior water supply and sewerage are divided into nine categories depending on the number of outlet points in the structure, according to the following classification:

- Structure up to 50 outlet points,
- Structure from 50 to 100 outlet points,
- Structure from 100 to 200 outlet points,
- Structure from 200 to 300 outlet points,
- Structure from 300 to 400 outlet points,
- Structure from 400 to 500 outlet points,
- Structure from 500 to 700 outlet points,
- Structure from 700 to 1000 outlet points,
- Structure over 1000 outlet points.

Preparatory works include the following:

- Mobilization of team to the construction site, with tools,
- Storage of tools and materials in the warehouse,
- Examination of technical documents,
- Getting to introduce the construction building
- Introduction of assembly groups into the works.

Calculation for preparatory works for interior water supply and sewerage is made per construction building.

Preparatory Works for Exterior Water Supply and Sewerage
Preparatory works for exterior water supply and sewerage are divided into four categories depending on the length of pipeline, as follows:

- Structure up to 500 m’ pipeline length,
- Structure from 500 m’ to 1000 m’ pipeline length,
- Structure from 1000 m’ to 2000 m’ pipeline length,
- Structure from 2000 m’ to 3000 m’ pipeline length.

Preparatory works include the following:

- Mobilization of team to the construction site, with tools,
- Storage of tools and materials in the warehouse,
- Examination of technical documents,
- Site visit,
- Introduction of assembling groups into the works.

Calculation for preparatory works for external water supply and sewerage is made per construction building.

EARTH WORKS

General

During the design preparation, soil should be timely examined and data on soil tests entered in the records. Before commencement of earth works, the terrain should be cleared from shrubs, trees and roots. If the top soil is to be used later on, these should be cut into pieces up to 15 cm thick, and piled up as cones with their roots downwards; they need to be watered daily and preserved until reuse.

All earth works are divided into 7 categories of soil, namely:

Category I: loose, light (soft) soil, i.e. pure sand, incoherent gravel, humus, fine, loose loess and soil similar to the one without internal cohesion. Only the most necessary excavation and removal by shovel is performed, and if required (aided) with spade;

Category II: fertile soil, softer subsoil and sandy soil, light sandy clay – clayey sand, compacted sand and fine-grained gravel, i.e. in the soil with weaker internal cohesion. Excavation is performed by spade;

Category III: hard and ductile soil, subsoil, coarse-grained semi-coherent gravel, pastures soil with boulders and naturally moist clay with low sand contents. Excavation is performed by spade and picks (mattock, navy pick, etc.);

Category IV: rocks of transient weathering formations, marl and humus shale, soft and weathered lime stones, soft sandstones, conglomerates and breccias with weaker link by phyllites, mica schist and rich in mica, chlorite-schist and quartz shale. Excavation is performed by tommy bars, wedges, picks (mattocks) and occasionally explosives;

Category V: soft rock (medium strength), i.e. hard sandstone, conglomerate, limestone, hard volcanic tuffs, shaly gneiss and all fissures, strongly intersected with massive rocks, etc. Breaking is performed by tommy bars, wedges, picks, with occasional use of explosives (gunpowder);

Category VI: hard but brittle rock, i.e. solid massive limestone, marbles, dolomites, sandstones and conglomerates in thick layers and well cemented; in most magmatic rocks, garnet, syenite and diorite magma; in gneiss, in bedded quartzite, etc. Breaking only by explosives (dynamite);

Category VII: very strong and ductile rock, i.e. fresh basic and ultra basic magmatic rock, such as: granite, porphyry, basalt, quartzite, pyroxenite, numerous gabbros, some diorites, massive amphibole, etc. Breaking only by explosives (dynamite).

TABLE OF SOIL PROPERTIES

Soil category	Soil name by categories	Tools particularly used for excavation and breaking	Loading coefficient / temporary volume increase	Permanent volume increase in % of autochthonous soil
I	Loose soil	Shovel	1.15	0-2 %
II	Common soil	Spade	1.20	2-4 %
III	Hard soil	Heavy spade and pick	1.25	3-5 %
IV	Friable rock	Pick and mattock	1.30	4-7 % and more
V	Soft rock	Gunpowder	1.40	8-10 % and more
VI	Hard rock	Dynamite	1.50	10-15 % and more
VII	Very hard rock	Dynamite	1.50	10-15 % and more

Soil categories are taken into cost estimate at preliminary prices, but their real categorization is assessed only during execution of works.

Before commencement of digging, it is necessary to survey the profiles for the purpose of calculation.
Regarding excavation from borrow areas, the method of excavation is determined so as to provide regular shape of excavation.
Borrowed areas at the shortest transportation distance are to be used first.
Calculations for excavated earth are made according to previously surveyed profiles, after determining by leveling that excavation is executed to the required depth.

Manual Bulk Excavation for all Width Trenches and Non-Wide Range Excavations

Description of Works
Excavation should be done by means of hand tools, provided that excavation sides are cut straight, and excavation bottom flattened to the required elevation with ± 5 cm accuracy.
Excavated earth should be thrown at 1m distance from trench edge. For depths over 2m, excavation should be done gradually and thrown away by shovel or from platform to platform.

Method of Calculation
The method of calculation should be per 1 m³ of excavation, calculated per layers of 0-2, 2-4, 4-6 and 6-8 m in depth. The norms are given both for work in naturally moist soil, and in wet soil, as well as soil with veins. In case of surface water protrusion into the excavation, the contractor is obliged to remove the water by available means at his own expenses. The term “excavation in wet” implies excavation in case of groundwater protrusions. Category of earth and excavation shall be determined by Supervisor at the site. The norms include works among braces and relocation of wooden working scaffolds (platform), used for transfer of excavated material.

Backfilling and Compacting

Description of Works
This item implies spreading of delivered material by shovel and compaction to the required compactness. During backfilling, the worker is obliged to spread by shovel the material from delivered pile, and to backfill the material to the distance of 3 m. Transportation of material is not included.

Method of Calculation
Calculation should be made per 1 m3 of spread material. The norms are divided into the following 5 categories:

1. Manual compaction of earth in 10cm layer, by compactor weighing 10kg of the required compactness,
2. Manual compaction of earth in 20cm layer, by compactor weighing 10kg, of the required compactness,
3. Manual compaction of earth in 30cm layer, by compactor weighing 10kg, of the required compactness,
4. Manual backfilling and covering without compaction.
5. Machine compaction by vibrating plate.

Planning

Description of Works
Planning implies terrain planning with ± 3 cm accuracy with average excavation of 0.05 m³/m² and transport of excessive material to the distance of 50m.

Method of Calculation
Calculation should be made per 1 m² of planned surface. Geodetic works required for planning are not included in the norms.

Machine Excavation by Dredger

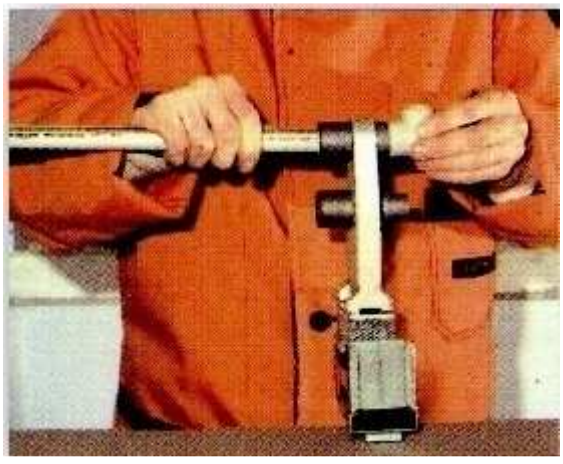
Description of Works
Machine excavation by dredger implies excavation with direct loading onto transport vehicle. No excess excavation i.e. excavation below the required level, is allowed.

Method of Calculation
Calculation of machine excavation should be made per 1 m³ of excavated subsoil. Unit price includes costs of hiring a dredger.

ASSEMBLING WORKS

Assembly of PP Water Supply Pipes for Interior Installations

Description of Works
Assembling of PP water supply pipes for interior installation includes assembly of PP pipes in sanitary facilities and distribution in the bathrooms and pump station. This implies pipe length which does not exceed 2 m', bringing the pipes to the stall from the distance of maximum 50 m of horizontal or vertical route, measuring, cutting of pipes, assembly with all required fittings by semi-fusion welding.
Welding is performed as follows:
Pipes and fittings to be welded should be cut at the right angle and cleaned from dirt and grease.
Parts to be connected are at the same time placed on the welding machine (mandrel and bushing) to the stop beads.



When welding temperature is achieved, as indicated either by switching off of the lamp or by timer, depending on the type of welding machine, the elements to be welded are removed from the apparatus and pressed into each other. They are held motionless until cooled.
It is very important not to surpass the depth limits of insertion of one element into the other.

Transport
PP pipes for interior water supply installation are stored at any flat place. Pipes should not be bended, but laid down at their entire length.
At low temperatures, below 0°C, pipes might be damaged at the strong mechanical impacts.

Although the PP pipes have UV stabilizers, they should not be stored on the sunshine for more than 6 months.

Method of Calculation

Calculation should be made per 1 m' and that implies the following:

- Vertical and horizontal transport of material to the distance of 50 m (any longer distances shall be separately calculated);
- Works with ladders or simple scaffolds up to the height of 3.00 m;
- Works in previously dug and marked trench, up to 2.00 m deep.

Assembly of PP Drains and Fittings for Indoor Plumbing

Description of Works

The item on assembling of PP drains and fittings for indoor plumbing includes distribution of pipes from stockpile up to 50 m away to the point of assembly, and assembling of pipes. Manual distribution and assembly are implied for all sections.

Pipes shall be assembled as follows:

- If the pipe is laid in the ground or earth, it is laid in the 40cm wide trench with minimum depth according to the following table:

Pipe section (mm)	Minimum trench depth (cm)
dia 150	50
dia 125	45
dia 100	40
dia 75	35

- Pipe must be laid down into the trench at its entire length, on sand without any coarse pieces of rocks;
- Trench is completely backfilled by sand and compacted by manual compactor weighing 10kg up to required compactness;
- When connecting pipes, the socket needs to be cleaned, rubber gasket formed in the shape of heart and inserted in the socket, bevel end of another pipe lubricated with sliding agent (potassium soap) and, by gentle turning, the bevel end of the other pipe inserted in the socket to the end and then pulled out to the marked stopper, if there is one, and if not, by approximately 5mm;
- PP pipes can be also assembled outside of the trench and then laid down in it;
- Laying of side pipes in the earth shall be performed at minimum decline of 2.5°. In case of vertical pipelines, fixing is done by clamps at 1m or 2m distance
- When laying pipes on the wall, fixing is done by free clamps at maximum distance of 10 x d (d - outer pipe diameter);
- Between pipe and clamp, a strip for protection against possible damage to PP pipe should be placed. Immobile saddles embrace the pipe and create one solid point, and free saddles enable changes of pipe lengths;
- PP drains and fittings can be directly concreted or bricked-in, but previously it is recommended to wrap the fittings in corrugated cardboard. Particular lengths of pipes in that case should not exceed 1m. Concrete or covering layer, in that case, should be at least 1.5 cm over the apex of the largest diameter pipe;
- Change-over of PP pipes to cast iron pipes for interior sewerage is done by means of relevant change-over piece.
- Toilet connection is made by connection piece with rubber gasket;
- Roof ventilation can be made with one or more ventilation caps. Mounting of ventilation cap is independent from roof pitch. Openings on ventilation cap should be 0.3 to 0.5 m above the roof. Vertical pipelines with diameter up to dia 100 mm are performed without reduction in cross section, and larger ones may be reduced to this dimension. Ventilation cap is introduced through the roof and

inserted in the pipe. For protection of ceiling against moisture, ventilation cap should be trimmed with lead or sheet metal;

- Passage through ceilings should be executed so as to ensure waterproofing to moisture, and sound insulation. Since PP and concrete do not bond together, when mounting on mortar or concrete, one protective polyester tube through which the PP pipe passes should be incorporated in the ceiling, and the space between PP pipe and protective polyester tube should be filled with cold putty.

Transportation

PP pipes can be transported by any means of transport. During transport, the pipes should be laid at their entire length on loading surface. If the pipes extend out of the truck, they need to be protected against obtaining bumps.

No objects with sharp edges can be transported together with pipes. During loading and unloading, the pipes should not be thrown.

PP pipes and fittings should not be dragged on the ground. At low temperatures, PP pipes are sensitive to impact, so they should be handled with care in winter season.

During storage, maximum stacking height is 2m. The socket and canted end of adjacent pipe should be next to each other. Pipes should not be exposed to sunshine over a longer period of time. When exposed to sunshine for long time, PP pipes fade but do not deteriorate in quality.

Method of Calculation

The item on assembling of PP water supply pipes includes distribution of pipes from stockpile up to 50 m away to the point of assembly, and assembly of pipes. Manual distribution is implied.

The calculation should be made per 1 m' of pipe. The unit price of assembly includes marking of channel route before excavation, taking over of excavated and leveled trench, control of pipes before laying, laying of pipeline with leveling of specified gradients, cutting of pipes as required, various works for connection of pipeline and assembly and placement of various supports. The unit price of labor includes engaged labor force and all required materials.

Assembly of stop valves on cold water distribution system

Description of Works

The item on assembly of stop valves on cold water distribution system includes distribution of material from the stockpile to the point of assembling, wrapping in oakum and assembling stop valve.

Method of Calculation

Assembly of stop valves on cold water distribution systems is calculated per 1 piece. This implies labor to the height of 3m using ladders or simple scaffolds. If scaffolds need to be constructed or if the works are executed at height above 3m, the unit price shall be increased by costs for hard labor conditions.

Assembly of Sanitary Equipment

Description of Works

Assembly of sanitary equipment assumes horizontal or vertical transportation of material up to 50m distance, unpacking, preparation for assembling (inspection of fittings, etc.), assembling of fittings or devices as required, cleaning of service outlets for water supply and sewerage system from various deposits and oakum, preparation and cutting of connection pipes, preparation of sealing material, drilling of various holes for plugs, fitting of connections to water supply and sewerage system, if required by adhesion, soldering or welding.

Transportation

Sanitary appliances are transported by all means of transportation. During loading, unloading, storage and handling in general, sanitary appliances should be handled with care to prevent damage.

Method of Calculation
Assembly of sanitary appliances should be calculated per 1 piece of assembled device. The unit price includes works on ladders and inspection of sanitary appliances after installation, with checking of all service outlets for water supply and sewerage systems and elimination of any possible leaks.

FINISHING WORKS

Pressure Tests of New Water Supply System

Description of Works

- Pressure tests are limited in time, with pressure above the nominal one. Tests are divided into: short tests (I, II, III), preliminary tests, main tests and complete tests. If a pipeline cannot be tested at once, it must be tested per sections. In that case, connection points between sections must be tested to impermeability by complete test;
- Tests are performed mostly on sections up to 500m long. If there is high difference in heights, it is necessary to select the sections lengths so as to ensure that at least operating pressure is achieved during testing at the highest point;
- Before pressure tests, pipeline must be anchored at all points of route changes and branching. It is necessary to take into account the test pressure and carrying capacity of surrounding soil to pressure and sliding. Pipeline shall be backfilled or, in case of interior installation, fixed in the wall, provided that all connection points are left visible. Pipeline shall be filled with clean water, and all air must be released from it. Pipeline filling is performed from the lowest point. Pump for pressure rise should be placed at position protected against accidents. During the tests, no works or staying in the trench is allowed, to prevent accidents if the pipes are broken.
- Only checked pressure gauges shall be used for testing. They should have a scale which enables reading of 0.1 bar pressure changes. Two gauging instruments are recommended, one of which is a control pressure gauge. Pressure gauge should be mounted at the lowest point of test section. In addition to pressure, quantity of water added due to thermal and elastic expansion of pipeline shall be measured as well;
- During the tests, the plumbing fitter should be present in order to do any repairs if necessary.
- If there are any points on test sections where leakage at connections is noticed (drops, jets, etc.), the tests should be stopped and that test section emptied. The water should be removed from the leakage points. The tests should be repeated after repair of defects;
- Pressure tests shall be recorded in a report, one copy for the Client and one to be held by the contractor.

Short Test I
This test is done on short pipelines (e.g. household connections of low sections, up to 15m long). The tests are related to inspection of pipeline and connections under operating pressure.

Short Test II
Tests are done on pipelines up to app. 30m long (e.g. longer household connections). Pipeline is put under pressure equaling 1.5 x operating pressure. After 30 min, the test begins, without any pressure rise during that period if the pressure has dropped during those 30 min. After the beginning of test, the pressure in pipeline during each 5 min must not drop by more than 0.2 bars. Test takes 60 min.

Short Test III
This test is done on pipelines without interconnecting elements (connections, fittings) over 30m in length. Pipeline is put under pressure of 1.5 x the operating pressure. After 2 hours, the pressure which has dropped in that period should be raised to 1.3 x the operating pressure. After another two hours, the test begins, without pressure uplift. After the beginning of test, pressure drop of 0.2 bar an hour can be expected. Test takes 30 min for each started 100m of pipeline, and no less than 2 hours.

Preliminary Tests
These tests are done on pipeline sections with interconnecting elements (connections, fittings) up to 500 m length. The air should be released from pipeline. The air which remains in the pipeline will be removed by water during the previous tests. Pipeline expands depending on material it is made of, and increase in pipeline volume should be taken from pipe material manufacturer's tables. Test pressure is 1.3 x the operating pressure. Preliminary test takes at least 12 hours. At regular time intervals (e.g. every 2 hours) the pipeline shall be replenished with water up to test pressure (for maximum volume increase, refer to pipe material manufacturer's tables). Close to the end of preliminary test, pressure drop should be 0.1 to 1.2 bars per hour, every 2 hours after the last pressure rise, even if pipeline is impermeable at all points depending on type of material and temperature changes.

Main Test
If no leaking is found during preliminary tests on pipes, connections and fittings, and if pipeline volume during preliminary tests grows as described, it is allowed to proceed with main tests, without pressure lowering. Test pressure is the same as at the end of preliminary test. Recommended duration of test is 30 min for each 100m, and at least 2 hours. Also during the main tests, it is important to pay attention to pipeline expansion, which is not completely finished yet. It is recommended that the main test should start not earlier than 2 hours after the last pressure rise in previous test. Testing is over if there is no pressure drop exceeding 0.1 to 0.2 bars per hour and if there are no leaking points.

Complete Test
This test is related to connection points between test sections. Short tests and main test should be completed. Connection points must not be covered. Test pressure is 1.3 x the operating pressure. The test takes 2 hours.

Method of Calculation
The calculation should be made per m' of particular pipeline section. The unit price includes preparation of pipeline for trial, mounting of plugs in interior installation, placement of test pump at working place, pipeline filling with water, marking of leakage points, repair of leakage points, taking minutes of pipeline testing and pipeline emptying after testing.

Testing of Sewerage Installation

Internal Sewerage
Close all openings on plumbing, except the highest and lowest ones. At the lowest point of installation, a hose for filling the installation with water is mounted. After the installation fills up to the highest point, the opening is closed and installation recharged with water up to test pressure of 4m water column over the highest opening. After 30 min, the required water quantity is measured in order to achieve the test pressure again. Obtained water quantity is calculated over to 24 hours and if it is lower than 0.005 l/m', the installation is in proper condition.

Method of Calculation
Testing of sewerage installation should be calculated per pipeline sections per m'.

Rinsing and Disinfection of Water Supply Installation

Contamination of water supply might be originated from filthiness of pipes or incorporated parts, and from infiltration of impurities (sand, earth, mud, polluted water from trench, etc.) during execution of works on pipeline laying.
Therefore, in order to conduct the process of rinsing and disinfection in the simplest and most efficient way, it is required to pay attention and use as much as possible clean pipes and fittings, undertaking all measures during pipeline laying for prevention of protrusion of impurities and other foreign particles into the pipeline itself.

During suspension of works on laying, the pipe ends should be plugged by wooden plug. This also prevents entrance of various small animals (mouse, rat, weasel, hedgehog, cat, etc.) into the pipeline.
Disinfection of interior surfaces of new or reconstructed pipelines is much more difficult than disinfection of contaminated water, because chlorine must protrude through organic matters, which are present inside of the pipe walls.
To obtain good results, pipelines should be previously cleaned and thoroughly rinsed.

Washing
Pipeline washing should be approached upon completed tests at test pressures.
Only proper potable water may be used for washing. Efficient washing is enabled only if minimum water velocity is 1.5 m/s.
Method of washing depends on the number of outlets. In gravity pipelines, washing should be done from the top downwards.
The water released during washing must not cause any damage. If there is no solution for this in the Design, the Supervisor is obliged to provide solution on-site.
Washing should be continued until the water at the outlet is completely clean.
During the washing, it is necessary to perform occasional controls of the water quality at the outlet, and as soon as muddy water stops running out, i.e. when completely clear water appears, washing is finished. If this takes less than 20 min, washing should be continued until this time, so that the used water quantity for washing reaches approximately triple volume of the washed section, in compliance with common practice.
Required quantities of water for washing (min norms) should be calculated as follows:

- Up to dia 150 3 to 5 – times the volume of washed section,
- Over dia 150 2 to 3 – times the volume of washed section.

Disinfection
To ensure that after completed washing all remaining organic substances and all organisms are destroyed, and that pipeline is of such quality that water which flows preserves its bacteriological safety, it shall be necessary to disinfect these facilities.
To enable complete disinfection, water with certain dose of chlorine needs to stay in the pipeline for about 24 hours.
Disinfectant shall be prescribed by sanitary service of *PE Vodovod i kanalizacija* (Municipal Water Supply and Sewerage Company), in compliance with sanitary local inspection. Control of washing and disinfection should be performed solely under management of a responsible, qualified and authorized Representative of sanitary service of the company.
Chlorine dose for disinfection should be within the range of 30-200 mg/l. It is believed that 30-50 mg/l would be sufficient.
In this specific case, the dose shall be prescribed by authorized Representative of sanitary inspectors who are fully responsible for disinfection and any possible consequences.
Lower contents are recommended when chlorine stays in contact for 12-24 hours.
Normal time for chlorine action is 3-12 hours. Higher chlorine doses are used when it is known that pipeline contains organic substances which cannot be eliminated by washing, or when it is necessary to shorten the time of disinfection.
Minimum time of disinfection should be 30-60 min. Chlorine could be added through initial hydrant or special purpose service outlet. Water is released to downstream hydrant, until chlorine is clearly felt.
Parts of pipeline which are not subject to disinfection must be disconnected from the rest of the pipeline which is subject to disinfection.
Responsible officer of sanitary service should provide protection of workers who are engaged in disinfection, since chlorine is a health hazard if not handled with care.
Responsible officer should also ensure (by public notice or alike) that no one should use the water intended for disinfection.
Executed chlorination must be recorded in a report, verified by the person who controlled the disinfection.
Upon expiry of this time, chlorine contents shall be checked. If determined that water contains about 10mg of chlorine per one liter of water, it is indicator of successful disinfection. In that case, all pre-chlorinated

water from pipeline and tank chambers should be released. When releasing the pre-chlorinated water, care should be taken not to release it over agricultural crops, because it will destroy them.
If check-up of chlorine contents shows that there is about 5 mg/l or less chlorine in the water, it means that the disinfection needs to be repeated.

Rinsing
Rinsing is done by the same procedure as washing of pipeline. Rinsing is done using potable water with chlorine contents of 0.5 mg/l. Rinsing lasts until determined at the outlet that chlorine content in the water is 1 mg/l or less.
Upon completed rinsing, pipeline and tank chambers are ready for proper operation.

Waters quality test
In the case of refurbishment of the piping in the school's toilets performing and payment of the water quality test is Contractor's obligation.

G. Contractor´s bid

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žr: 540-1330-35 Erste

Date:29/08/2014

Loan/Credit No.: [BMZ Nr. 202080554]

KfW No.: [...]

Name of Contract:

Energy Efficiency Program in Public Buildings – Cluster III

To:

Ministry of Economy

Directorate for Energy Efficiency

Rimski Trg 46

81000 Podgorica

Montenegro

Phone: +382 (20) 482 238

Fax: +382 (20) 234 081

E-mail: sandra.sipcic@ee-me.org

Attention: Mrs Sandra Sipcic

Ladies and/or Gentlemen,

Having examined the Bid documents, the receipt of which is hereby acknowledged, we, the undersigned, offer to perform construction works under the above named Contract in full conformity with the said Bid documents for the sum of:

(Three millions two hundred thirty eight thousands five hundred ninety six point seventy nine, Eur) for definite works **(3,238,596.79 Eur)**

thereof

1,095,514.94 Eur for Educational building 1: Primary school Secondary Vocational School, Pljevlja **(One million ninety five thousands five hundred forteen Eur and ninety four cents)**

605,941.98 Eur for Educational building 2: Primary school "Ristan Pavlovic", Pljevlja

(Six hundreds five thousands nine hundred forty one Eur and ninety four cents)

631,783.61 Eur for Educational building 3: Secondary school "Miloje Dobrasinovic",Bijelo Polje

(Six hundreds thirty one thousand seven hundreds eighty three Eur and sixty one cents)

654,344.14 Eur for Educational building 4: Primary school "Mustafa Pecanin", Rozaje

(Six hundred fifty four thousands three hundred forty four Eur and fourteen cents)

251,012.12 Eur for Educational building 5: Secondary school "Beco Basic", Plav

(Two hundred fifty one thousand twelve Eur and twelve cents)

or such other sums as may be determined in accordance with the terms and conditions of the Contract. The above amounts are in accordance with the price schedules attached herewith and are made part of this Bid.

We undertake, if our Bid is accepted, to commence the Facilities, and to achieve Completion within the respective times stated in the Bid documents.

If our Bid is accepted, we undertake to provide an advance payment security and a performance security in the form and amounts, and within the times specified in the Bid documents.

We agree to abide by this Bid for a period of **180** days from the date fixed for submission of Bids as stipulated in the Bid documents, and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

Until a formal contract is prepared and executed between us, this Bid, which consists of this letter and Attachments through hereto, together with your written acceptance thereof and your notification of award, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest, or any Bid you may receive.

Dated this 29 day of August 2014



.....

(signature)

In the capacity of

Executive Director

Duly authorized to sign this Bid for and on behalf of

ROAMING MONTENEGRO

GROUP A5.1.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Secondary Vocational School in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	Secondary Vocational School, Pljevlja
	Doc. origin:	Final Architectural Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings, drips, flashing sills, horizontal and vertical rain gutters, top gutter cisterns and gargoyles. Flashings have different developed widths and they are made of galvanized double interlock system metal sheet d=0,68 mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and transportation of debris to the town landfill up to 5 km distance. Calculation per m of dismantled flashing, gutters and their supporters.						
	Calculation per m and per piece.						
	drips						
	- building A						
	roof parapet - d.w. 60cm	m	44.20	x	1.03 €		45
	up the wall on the first floor - d.w. 40cm	m	29.24	x	1.03 €		30
	canopy - d.w. 35cm	m	15.50	x	1.03 €	=	16
	facade walls beneath the windows - d.w.25cm	m	278.68	x	1.03 €	=	286
	flashing sills						
	- building A - openings marked as N d.w. 25 cm	m	8.05	x	1.03 €	=	8
	- building B - all openings d.w. 25cm	m	131.09	x	1.03 €	=	134
	- building B - boiler room and garage d.w. 25cm	m	8.80	x	1.03 €	=	9
	vertical rain gutters						
	- building A - dim. 12x12cm	m	105.14	x	1.03 €	=	108
	- building B - dim. 12x12cm	m	32.70	x	1.03 €	=	34
	- building B - boiler room and garage dim 10x10cm	m	4.84	x	1.03 €	=	5
	- building B - boiler room and garage dim 10x7cm	m	8.92	x	1.03 €	=	9
	- building C - dim 12x12cm	m	41.70	x	1.03 €	=	43
	top gutter cisterns						
	- building A	pc	10	x	5.13 €	=	51
	- building B	pc	5	x	5.13 €	=	26
	- building B - boiler room and garage	pc	3	x	5.13 €	=	15
	- building C	pc	4	x	5.13 €	=	21
	horizontal rain gutters						
	- building A - dim 12x12cm	m	93.01	x	1.03 €	=	95
	- building B - dim 12x12cm	m	49.38	x	1.03 €	=	51

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	- building B - boiler room and garage dim 10x10cm	m	6.50	x	1.03 €	=	7
	- building B - boiler room and garage dim 10x7cm	m	14.83	x	1.03 €	=	15
	- building C - dim 12x12cm	m	69.72	x	1.03 €	=	71
	gargoyles						
	- building A	pc	3	x	5.13 €	=	15
1.02.	Careful demolition of the existing walls: - boiler room and garage walls, d=30 cm, due to installation of new double-leaf door, -parapet walls (beneath five basement windows marked as 3 and one marked as 26 - drawing SS-ARH-08). Removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance, -inner walls in order to open the new door and ventilation opening for planned disabled person's toilet, and the new door for teaching preparation room nearby.						
	Calculation per m^3						
	boiler room and the garage	m^3	0.86	x	76.88 €	=	66
	parapet walls below the windows	m^3	2.96	x	76.88 €	=	228
	inner walls	m^3	0.67	x	76.88 €	=	52
1.03.	Stripping off the dilapidated plaster from the facade using scaffold (calculated as a percentage of complete plastered facade area). Removal and loading of debris onto a truck and transportation to a land fill up to 5 km distance.						
	Calculation per m2						
	building A	m2	20.00	x	5.64 €		113
	building B (5% of total facade area)	m2	34.36	x	5.64 €		194
	building B - reliefs (5%)	m2	1.57	x	5.64 €	=	9
	building B - boiler room and garage (5%)	m2	6.21	x	5.64 €	=	35
	building C (20%)	m2	122.40	x	5.64 €	=	690

1.04.	Clean the facade surface from dirt, moss and dust. Undertake the cleaning mechanically or chemically. During cleaning, be careful not to damage the surface. Surface strength and absorption shall be provided. Prior to this, dirty, wet and non-bearing surface shall be remedied. The interior mortar and coating shall set prior to commencing the works. Works to be conducted depending on the surface: *smooth surfaces furrowed, *bubbling brushed with dry brush, *wet surfaces dried and protected, *mildew and algae cleaned by using algae remover, *binding mortar cleaned and coated with flexible and cement free adhesive, *dusty surface brushed, cleaned under high pressure, washed with water and dried, *lime mortar removed and covered with equalization coating, *mortar remains mechanically removed, *joints between bricks filled with cement mortar, filled joints cleaned with foam, paint cleaned with water and dried. Calculation as per m2 of the cleaned surface. The unit price includes usage of scaffolding.				0.00 €		
	Calculation per m2				0.00 €		
	building A	m2	1,266.11	x	2.26 €	=	**2855**
	building B	m2	823.70	x	2.26 €	=	**1857**
	building B - boiler room and garage	m2	110.41	x	2.26 €	=	**249**
	building C	m2	523.62	x	2.26 €	=	**1181**
1.05.	Purchase of material and construction of new walls: *building A: parapet walls at the end of corridors on first and second floor-near the external staircase, *building B: wall that partially closes existing window marked as 26, *building C: partial closing of the window in the staircase. Walls shall be made of brick blocks, dim. 19x19x25 cm, laid in gauge mortar 1:2:6, d=25 cm with proper connection to existing wall reinforcement and vertical and horizontal beams in line with regulations. Brick blocks shall be drenched before use. Cleaning of the joints after the work completion is required.						
	Calculation per m^3.						
	building A	m^3	1.02	x	105.58 €	=	**108**
	building B	m^3	1.38	x	105.58 €	=	**146**
	building C	m^3	0.78	x	105.58 €	=	**82**

1.06.	Purchase of the material and building the partition wall in the area of reconstruction of toilets for disabled persons and closing of the openings of the two dismantled doors. The walls shall be built by bricks in gauged mortar 1:2:6 in line with Design. During construction, connection shall be achieved by "working on a half-element" and the connection to the existing wall shall be done in line with regulations. The unit price includes necessary reinforcement beams above doors, proper connection to existing walls and vertical and horizontal beams in line with regulations and usage of the scaffold. Item to be calculated per m2.						
	wall 12 cm thick	m2	12.86	x	22.96 €	=	**295**
1.07.	Plastering of the existing damaged external walls, as well as the damages caused by the dismantling of the existing windows, doors and removal of the new parapets. This item also includes plastering of the newly built inner walls. Damaged surfaces shall be treated with two layers of cement mortar 1:3, previously treated with cement milk. The first layer shall be applied roughly and the second-fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges.						
	Calculation per m2.						
	damaged facade						
	building A	m2	20.00	x	8.00 €	=	**160**
	building B (5%)	m2	34.36	x	8.00 €	=	**275**
	building B - reliefs (5%)	m2	1.57	x	8.00 €	=	**13**
	building B - boiler room and garage (5%)	m2	6.21	x	8.00 €	=	**50**
	building C (20%)	m2	122.40	x	8.00 €	=	**979**
	around openings						
	building A	m2	270.25	x	8.00 €	=	**2161**
	building B	m2	124.02	x	8.00 €	=	**992**
	building B - boiler room and garage	m2	7.62	x	8.00 €	=	**61**
	building C	m2	56.57	x	8.00 €	=	**452**
	new parapets						
	building A, B and C	m2	9.44	x	8.00 €	=	**75**
	wall in the area of newly built toilet for disabled persons	m2	25.72	x	8.00 €	=	**206**
1.08.	Dismantling and re-installation of cameras, lighting and antennas. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility.						
	Calculation as per piece.						
	building A						
	cameras	pc	3	x	46.13 €	=	**138**
	antennas	pc	2	x	46.13 €	=	**92**
	building B						
	cameras	pc	1	x	46.13 €	=	**46**

	lightning	pc	2	x	46.13 €	=	92
	building C						
	cameras	pc	1	x	46.13 €	=	46
	lightning	pc	2	x	46.13 €	=	92
1.09.	Production and installation of metal sheet flashings, on roof parapets, drips, flashing sills, rain gutters, top gutter cisterns and gargoyles made of ready made galvanized plastic-laminated steel metal sheets d=0,70 mm. The item includes surface preparation and complete binding following the regulations. Undertake the entire procedure in compliance with the Design and samples selected and approved by the Employer / Employer's Representative. Calculation per m of treated flashing, entire binding and joining material.						
	Calculation per m						
	drips						
	- building A -						
	roof parapet - d.w. 70cm	m	44.20	x	18.04 €	=	797
	to the wall of the first floor - d.w. 40cm	m	29.24	x	14.97 €	=	438
	canopy - d.w. 35cm	m	15.50	x	14.97 €	=	232
	on the facade, beneath the windows - d.w. 35cm	m	278.68	x	14.97 €	=	4170
	- building C -						
	roof - valley - d.w. 60cm	m	12.00	x	14.97 €	=	180
	roof- next to the skylight - d.w. 40cm	m	19.20	x	14.97 €	=	287
	roof - beneath the rain gutters - d.w. 50cm	m	75.34	x	14.97 €	=	1127
	flashing sills						
	- building A - d.w. 25cm						
	basement	m	51.52	x	14.97 €	=	771
	lateral facade- the first and the second floor	m	5.24	x	14.97 €	=	78
	- building B - d.w. 35cm	m	129.89	x	14.97 €	=	1944
	- building B - boiler room and garage - d.w. 25 cm	m	8.80	x	14.97 €	=	132
	- building C - d.w. 25cm	m	39.16	x	14.97 €	=	586
	vertical rain gutters						
	- building A - dim. 12x12cm	m	105.14	x	14.97 €	=	1573
	- building B - dim. 12x12cm	m	55.00	x	14.97 €	=	823
	- building B - dim. 10x10cm	m	4.84	x	14.97 €	=	72
	- building B- dim. 10x7cm	m	8.92	x	14.97 €	=	133
	- building C - dim. 12x12cm	m	41.70	x	14.97 €	=	624
	top gutter cisterns						
	- building A -	pc	10	x	46.13 €	=	461
	- building B -	pc	7	x	46.13 €	=	323
	- building B -	pc	3	x	46.13 €	=	138
	- building C -	pc	4	x	46.13 €	=	185
	horizontal rain gutters						
	- building A - dim. 12x12cm	m	93.01	x	14.97 €	=	1392
	- building B - dim. 12x12cm	m	71.69	x	14.97 €	=	1073
	- building B - dim. 10x10cm	m	6.50	x	14.97 €	=	97
	- building B - boiler room and garage - dim. 10x7cm	m	14.83	x	14.97 €	=	222
	- building C - dim. 12x12cm	m	69.72	x	14.97 €	=	1043
	gargoyles						
	- building A - canopy -	pc	3	x	66.63 €	=	200
	vertical dilatation						
	- building A - d.w. 25cm	m	10.00	x	14.97 €	=	150

	- building B - d.w. 25cm	m	6.50	x	14.97 €	=	97
	- building B - boiler room - d.w. 25cm	m	6.50	x	14.97 €	=	97
	- building C - d.w. 25cm	m	5.00	x	14.97 €	=	75
1.10.	On the external side, thermal insulation of reinforced concrete (hereinafter RC) and brick facade walls will be made of expanded EPS polystyrene having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm (5 cm thickness on the sides of the windows), produced in line with the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade walls reaching up to the height of h=1,6m from ground floor will be treated with stiffer insulating material, XPS- extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with heat transfer coefficient of λ=0,035-0,04 W/mK. Board steadiness: min. 500KPa.						
	Thermal panels shall have flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing), with vertical breaks 50 cm width, installed along facade area at maximum distance of 20 cm and, also, with horizontal breaks 50 cm width, above the openings, placed on the floor slabs which are made of TP mineral wool, flammability class A1.						
	Thermal panels are lap-joint, attached to facade wall with corresponding enriched mineral adhesive, anchored with relevant dowels. After the installation of the thermal-plates, installation of glass mesh and double layer of adhesive is foreseen.						
	Before setting up the thermal plates, the following works will be conducted: * all works on the roofs, including sheet metal works, *reduction of glazed areas by bricking new parapets / walls, *demolitions of the existing walls/ parapets, * facade joinery replacement, *setting up of all installations on the façade, *planned demolishing, and construction of the walls / window parapets, *covering and protection of all non-treated surfaces – glass, wood, aluminium...				0.00 €		

	*Control and testing of the existing facility surface: Use of impregnation- basic coating at the most critical points of the facility. When the basic coating sets, place the EPS cube of 5x5x5 cm using polystyrene adhesive. Once the adhesive has completely settled, minimum 3 days if working conditions are adequate, try to separate the cube manually. *Previous installation of all flashing sills is recommended.				0.00 €		
	If in the process of separating polystyrene only the adhesive separates and not parts of the basis- the basis is sufficiently strong, solid and stable. If in the process of separating polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.				0.00 €		
	If in the process of separating polystyrene, part of the adhesive and cradling is separated - it means that the basis is not strong enough and it will withstand a new layer of thermal insulation. Use the reinforcing mesh or corner profiles for the window corners and jambs.						
	Prior to the thermal plates installation, it is necessary to clean facade surface from the dust, mold and grease. At heights exceeding 8 meters, plates need additional anchoring with appropriate bolts. During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortars must not be applied in case of strong wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers.						
	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention. NOTE: As a level of the Building A will be changed by thermal insulation layer, the unit price shall include replacement of the maintenance doors. New doors shall be sampled and approved by Employer / Employer's Representative.						

	Calculation per m2.						
	- building A						
	EPS d=10cm	m2	596.58	x	13.43 €	=	**8011**
	EPS d=5cm, sides of windows	m2	238.79	x	12.40 €	=	**2962**
	XPS d=10cm	m2	132.58	x	18.55 €	=	**2460**
	XPS d=5cm, sides of windows	m2	31.46	x	17.53 €	=	**551**
	mineral wool d=10cm	m2	187.07	x	16.50 €	=	**3087**
	- building B						
	EPS d=10cm	m2	386.60	x	13.43 €	=	**5191**
	EPS d=5cm, sides of windows	m2	98.90	x	12.40 €	=	**1227**
	XPS d=10cm	m2	96.26	x	18.55 €	=	**1786**
	XPS d=5cm, sides of windows	m2	25.12	x	17.53 €	=	**440**
	mineral wool d=10cm	m2	123.34	x	16.50 €	=	**2035**
1.11.	Installation of thermal insulated panels made of extruded polystyrene boards, d=2 cm, thermal conductivity of λ=0,04 W/mK, with the layer made of reflecting Al sheet metal d=0,70 mm, painted in the same colour as the internal walls (paint must be thermal resistant). These panels shall be installed under the windows, behind radiators, in the height of the parapet walls and on the inner side of the facade walls of the building C. Works shall be performed in line with the Design and enclosed detail D3.						
	Calculation per m2.	m2	28.22	x	25.11 €	=	**709**
1.12.	Treatment of flashings of the roof edges, made of the wood trim covering, with suitable dissolvent. Remove the paint mechanically until the healthy wood is reached. Pay special attention not to damage the wood. Cleaned wood trim covering and strips shall be inspected and damaged elements shall be carefully disassembled. New elements shall be made of the same kind of wood and installed according to the original. Wood must be coated with the double layer of protective coating ("Sandolin" or equivalent) with wax for external surfaces. Color will be selected by the Employer / Employer's Representative.						
	The unit price includes purchase and installation of all materials, preliminary works and base preparation.						
	Calculation per m2.						
	building B	m2	80.20	x	9.84 €	=	**789**
	building B - boiler room and garage	m2	27.51	x	9.84 €	=	**271**
	building C	m2	86.64	x	9.84 €	=	**853**

1.13.	Processing of the facade surfaces with decorative ready-mixed lime-cement based render type "Bavalit" or equivalent material. Special attention need to be made to assure that the selected material is certified. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve better joining. One layer shall be applied with painting brush, and if the surface absorbs it quickly, another layer shall be applied. A layer of adhesive with mesh shall be applied to prepare the surface for works. Other layers are applied in the same way as in the previous item:						
	* contact coating, made based on emulsion of synthetic resin and water glass, as agent for impregnation of dried reinforced mortar, * finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in colour selected by the Employer / Employer's repre, fully in line with the Design details. The openings shall be protected with PVC membrane. The unit price includes the purchase, installation of complete material, preparatory works and surface preparation.						
	Calculation per m2.						
	building A	m2	1,135.72	x	6.56 €	=	**7450**
	building B	m2	677.04	x	6.56 €	=	**4441**
	building B - boiler room and garage	m2	124.24	x	6.56 €	=	**815**
	building C	m2	667.49	x	6.56 €	=	**4379**
1.14.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulir plast") as splash guard (as indicated on the drawings). The existing mortar plinth has to be removed where it is peeling of from the substructure. Surface shall be cleaned, washed and sprinkled with acrylic base with granulate, color of the base by the color chart of the manufacturer determined by the Employer / Employer's Representative. Render shall be applied on cleaned and dried surface by manufacturer's instruction.						
	Calculation per m2.						
	building A	m2	207.91	x	15.58 €	=	**3239**
	building B	m2	112.18	x	15.58 €	=	**1748**

1.15.	Demolition of existing parapet walls in hallways in the building B and at the main staircase landing in the building A. Parapets are made of "Siporeks" blocks, d=10cm. The unit price includes all works, materials and transportation of debris to the town landfill up to 5 km distance.						
	Calculation per m2.						
	buildings A and B	m2	12.80	x	6.97 €	=	**89**
1.16.	Cleaning / washing the stone claded plinth of the building C with pressurized water. Water pressure must be such so as not to damage the façade and molding. Stains, patina, dust, salt and such must be cleaned. If required, chemical substances not damaging for the façade could be added.						
	Calculation per m2.						
	building C	m2	125.00	x	2.26 €	=	**282**
1.17.	Cleaning all external parts of the main chimney by use of steam, coming from the boiler room, and provide flexible building joint to the building B in line with ETICS façade, approved by Employer / Employer's Representative.						
	Calculated as lump sum.	lump sum	1.00	x	246.00 €	=	**246**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**87765**
II	**THERMAL INSULATION OF THE FLOORS IN THE BUILDINGS B AND C**						
2.01.	Demolition of existing floors and sub-floor layers. Removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m2.						
	- building B - basement						
	wood cover	m2	233.60	x	2.87 €	=	**670**
	terrazzo	m2	60.28	x	3.59 €	=	**216**
	linoleum	m2	58.74	x	2.26 €	=	**132**
	concrete	m2	74.41	x	5.33 €	=	**397**
	- building B - ground floor						
	parquet	m2	263.79	x	2.87 €	=	**757**
	terrazzo	m2	18.90	x	3.59 €	=	**68**
	- building B -first floor						
	parquet	m2	262.36	x	2.87 €	=	**753**
	- building C- ground floor						
	wood cover	m2	204.16	x	2.87 €	=	**586**
	laminate floors	m2	25.52	x	2.87 €	=	**73**
	terrazzo	m2	13.14	x	3.59 €	=	**47**
	linoleum	m2	12.05	x	2.26 €	=	**27**
	- building C - first floor						
	wooden floor	m2	266.62	x	2.87 €	=	**765**

2.02.	Purchase and transportation of material, gravel filling and compression, in the basement in the building B. On the ground floor in the building C, beneath the floors, gravel and crushed stone shall be filled and compressed in layers. Layers of gravel and crushed stone shall be rammed manually and by machine if necessary to achieve total compactness.						
	Calculation per m^3.						
	building B - gravel- d=10cm	m^3	42.34	x	4.61 €	=	**195**
	building C - crushed stone 60-80cm (depending upon air space thickness)	m^3	202.24	x	19.48 €	=	**3939**
	building C- gravel- d=20cm	m^3	50.56	x	9.23 €	=	**466**
2.03.	Purchase of material and concrete works on the RC slab with all necessary reinforcement, concrete type: MB20, d=10cm.						
	Calculation per m2.						
	building B- basement	m2	423.45	x	15.58 €	=	**6597**
	building C- ground floor	m2	252.80	x	15.58 €	=	**3939**
2.04.	Setting up of horizontal waterproofing under the floors, in the following layers (from the bottom up): - bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos. The unit price includes all works and materials following the description.						
	Calculation per m2.						
	building B - basement	m2	423.45	x	19.99 €	=	**8464**
	building C- ground floor	m2	252.80	x	19.99 €	=	**5053**
2.05.	Purchase of material and setting up of the floor thermal insulation made of extruded polystyrene, 4cm thick.						
	building B- basement	m2	423.45	x	6.87 €	=	**2908**
	building C- ground floor	m2	252.80	x	6.87 €	=	**1736**
2.06.	Purchase of material and preparation of the floor base for setting up parquet floor, granite tiles and ceramic tiles. Floor base shall be cement screed 1:3, 4 cm thick with mechanical injection of connective fibers simultaneously.						
	Calculation per m2.						
	building B- basement	m2	423.45	x	8.41 €	=	**3559**
	building B-ground floor	m2	282.69	x	8.41 €	=	**2376**
	building B- first floor	m2	262.36	x	8.41 €	=	**2205**
	building C-ground floor	m2	252.80	x	8.41 €	=	**2125**
	building C- first floor	m2	266.62	x	8.41 €	=	**2241**

2.07.	Purchase of material and plastering of wall parts in the basement corridor, where terrazzo plinth used to be. Use gauged mortar 1:2:6 with previous treatment of walls with cement milk. The first layer shall be applied rough and the second one has to be floated. Plastered surfaces have to be smooth with no breaks and bumps, while edges have to be sharp and straight.						
	Calculation per m2.						
	building B- basement	m2	4.30	x	8.00 €	=	**34**
	building C- ground floor	m2	2.47	x	8.00 €	=	**20**
2.08.	Purchase and installation of class I oak parquet, d= 22 mm thick. Line the parquet flooring over the cement screed, in the manner approved by the Employer / Employer's Representative. This item includes base preparation, bonding, using proper non-heated adhesive, triple layer of scrubbing and varnishing and preliminary works. The angle strips shall be 8 cm height, fixed to the wall by bonding.						
	Calculation per m2.						
	building B- basement	m2	233.63	x	38.95 €	=	**9100**
	building B - ground floor	m2	282.69	x	38.95 €	=	**11011**
	building B -first floor	m2	262.36	x	38.95 €	=	**10219**
	building C- ground floor	m2	252.80	x	38.95 €	=	**9847**
	building C -first floor	m2	266.62	x	38.95 €	=	**10385**
2.09.	Purchase of material and floor tiling using class I granite ceramics and ceramic tiles. Line the tiles in layer of adhesive, in joint bonding manner, with making of plinth, h=10 cm. The colour and tone will be selected by the Employer / Employer's Representative. The unit price includes installation of Al-strips on the connection of the two different floors.						
	Calculation per m2.						
	building B- basement- ceramic tiles	m2	143.06	x	27.88 €	=	**3989**
	building B- basement- granite ceramics	m2	61.00	x	27.88 €	=	**1701**
	TOTAL FOR THERMAL INSULATION OF FLOORS IN THE BUILDINGS B AND C						**106600**
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away.						
	Calculation is done per m2 of dismantled joinery.						
	- building A						
	1,1a dim. 205/80cm	pc	20.00	x	11.50 €	=	**230**
	6 dim. 375/155cm	pc	1.00	x	11.50 €	=	**12**
	7 dim. 245/40+190cm	pc	80.00	x	11.50 €	=	**920**
	8 dim. 245/65cm	pc	4.00	x	11.50 €	=	**46**
	9 dim. 240/150cm	pc	1.00	x	11.50 €	=	**12**
	16 dim. 170/180cm	pc	2.00	x	11.50 €	=	**23**

	17	dim. 385/40+190cm	pc	2.00	x	11.50 €	=	**23**
	22	dim. 375/150+178cm	pc	1.00	x	11.50 €	=	**12**
	23	dim. 375/145+170cm	pc	1.00	x	11.50 €	=	**12**
	24	dim. 375/145cm	pc	1.00	x	11.50 €	=	**12**
	29	dim. 205/280cm	pc	1.00	x	11.50 €	=	**12**
	30	dim. 380/220+75cm	pc	1.00	x	11.50 €	=	**12**
	32	dim. 90/220+80cm	pc	2.00	x	11.50 €	=	**23**
	- building B							
	2	dim. 205/160cm	pc	6.00	x	11.50 €	=	**69**
	2*	dim. 205/160cm	pc	2.00	x	11.50 €	=	**23**
	3	dim. 205/70+160cm	pc	7.00	x	11.50 €	=	**81**
	4	dim. 205/75cm	pc	1.00	x	11.50 €	=	**12**
	5	dim. 324/90cm	pc	2.00	x	11.50 €	=	**23**
	5*	dim. 233/90+90/210+90cm	pc	1.00	x	11.50 €	=	**12**
	10	dim. 205/55+150cm	pc	10.00	x	11.50 €	=	**115**
	10*	dim. 205/55+150cm	pc	6.00	x	11.50 €	=	**69**
	12	dim. 315/55+150+90cm	pc	1.00	x	11.50 €	=	**12**
	14	dim. 205/55+115+45cm	pc	8.00	x	11.50 €	=	**92**
	14*	dim. 205/55+115+45cm	pc	8.00	x	11.50 €	=	**92**
	15	dim. 315/180cm	pc	1.00	x	11.50 €	=	**12**
	25	dim. 313/150+165+75cm	pc	1.00	x	11.50 €	=	**12**
	26	dim. 85/60+170cm	pc	1.00	x	11.50 €	=	**12**
	27	dim. 90/205cm	pc	1.00	x	11.50 €	=	**12**
	28	dim. 134/220+85cm	pc	1.00	x	11.50 €	=	**12**
	28'	dim. 134/220+85cm	pc	1.00	x	11.50 €	=	**12**
	33	dim. 350/220+60cm	pc	1.00	x	11.50 €	=	**12**
	- building C							
	11	dim. 130/240cm	pc	17.00	x	11.50 €	=	**196**
	11*	dim. 130/240cm	pc	10.00	x	11.50 €	=	**115**
	13	dim. 150/315cm	pc	1.00	x	11.50 €	=	**12**
	18	dim. 505/100cm	pc	2.00	x	11.50 €	=	**23**
	19&19'	dim. 130/100cm	pc	2.00	x	11.50 €	=	**23**
	20	dim. 120/157cm	pc	1.00	x	11.50 €	=	**12**
	21	dim. 80/100cm	pc	1.00	x	11.50 €	=	**12**
	31	dim. 160/220+90cm	pc	1.00	x	11.50 €	=	**12**
3.02.	Removal of existing protective bars from the facade before replacement of joinery and its refitting, upon new joinery is installed. Cleaning and scraping. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted.							
	Calculation as per piece.							
	- building A							
	1	dim. 205/80cm	pc	13.00	x	57.50 €	=	**748**
	1a	dim. 103/80cm	pc	1.00	x	57.50 €	=	**58**
	29	dim. 93/80cm	pc	2.00	x	34.50 €	=	**69**
	- building B							
	2	dim. 205/160cm	pc	8.00	x	34.50 €	=	**276**
	4	dim. 205/75cm	pc	1.00	x	57.50 €	=	**58**
	- building C							
	11	dim. 130/240cm	pc	5.00	x	57.50 €	=	**288**
	31	dim. 140/75cm	pc	1.00	x	34.50 €	=	**35**
	N	dim.125/160cm, on the kiosk window	pc	1.00	x	57.50 €	=	**58**
	N	dim.90/220cm, on the kiosk door	pc	1.00	x	57.50 €	=	**58**

3.03.	Purchase materials and construction of the new protective steel bars for the windows. The frames of the protective bars shall be made of steel box profiles dimensions 30*30 mm, and inner bars of full profile 10*10 mm. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted. Measures to be taken on the site. The unit price also includes removal of existing protective bars from the facade before replacement of joinery and its transportation to the town landfill or its handing over to the Employer / Employer's Representative (according to the future agreement) for storing away.						
	3 dim. 205/160cm	pc	5.00	x	161.00 €	=	**805**
	26 dim. 85/160cm	pc	1.00	x	143.75 €	=	**144**
3.04.	Due to the damages on the existing internal walls caused by the dismantling of existing joinery and plastering of new parapet walls, damaged surfaces shall be treated with double layer of cement mortar 1:3:9, with previous spraying of cement milk. Rough first layer and the second one has to be floated, with the use of scaffold. Plastered surfaces have to be smooth without breaks and bumps, while edges have to be sharp and straight.						
	Calculation per m2.						
	building A - around the openings	m2	270.25	x	8.97 €	=	**2424**
	building A - new parapet walls	m2	4.08	x	8.97 €	=	**37**
	building B - around the openings	m2	124.20	x	8.97 €	=	**1114**
	building B- around the openings- boiler room and garage	m2	7.62	x	8.97 €	=	**68**
	building B- basement- new parapet walls	m2	2.76	x	8.97 €	=	**25**
	building C- around the openings	m2	56.57	x	8.97 €	=	**507**
	building C- first floor stairs- new parapet wall	m2	2.60	x	8.97 €	=	**23**
3.05.	Skimming of internal walls on the part of added parapets. Skimming of walls damaged by dismantling of existing openings shall be done in two layers, using skimming compound and scaffold.						
	Calculation per m2.						
	building A- around the openings	m2	191.36	x	2.65 €	=	**506**
	building A - new parapet walls	m2	4.08	x	2.65 €	=	**11**
	building B- around the openings	m2	124.20	x	2.65 €	=	**329**
	building B- around the openings- boiler room and garage	m2	7.62	x	2.65 €	=	**20**
	object B - basement- new parapet walls	m2	2.76	x	2.65 €	=	**7**
	building C- around the openings	m2	56.57	x	2.65 €	=	**150**
	building C- first floor stairs- new parapet wall	m2	2.60	x	2.65 €	=	**7**

3.06.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frames, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4 +16 +4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes. NOTE: The items marked with * include glass coated with low emission coating as the protection against sunshine.						
	PVC part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill. Thermal conductivity must be maximum U=1,50 W/m2K and solar energy transmittance (solar factor) g≤ 65 %.						
	The item includes all the necessary cleaning and dumping at the landfill as well as all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is selected by the Employer / Employer's Representative. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	- building A						
	1 dim. 205/80cm	pc	19	x	419.75 €	=	**7975**
	7 dim. 245/40+190cm lower parts of the window covered with white foil	pc	80	x	616.40 €	=	**49312**
	8 dim. 245/65cm	pc	4	x	412.85 €	=	**1651**
	9 dim. 240/150cm	pc	1	x	466.90 €	=	**467**
	17 dim. 385/40+190cm	pc	2	x	878.60 €	=	**1757**
	26 dim. 85/60+170cm, lower parts of the window covered with white foil	pc	1	x	247.25 €	=	**247**
	- building B						
	2 dim. 205/160cm	pc	6	x	491.05 €	=	**2946**
	2* dim. 205/160cm	pc	2	x	491.05 €	=	**982**
	3 dim. 205/60+170cm, lower parts of the window covered with white foil	pc	5	x	600.30 €	=	**3002**
	3* dim. 205/60+170cm, lower parts of the window covered with white foil	pc	2	x	600.30 €	=	**1201**
	4 dim. 205/75cm	pc	1	x	320.85 €	=	**321**

	10 dim. 205/55+150cm	pc	10	x	566.95 €	=	**5670**
	10* dim. 205/55+150cm, lower parts of the window covered with white foil	pc	6	x	585.35 €	=	**3512**
	14 dim. 205/55+115-160cm	pc	8	x	583.05 €	=	**4664**
	14* dim. 205/55+115+160cm, lower parts of the window covered with white foil	pc	8	x	626.75 €	=	**5014**
3.07.	Production and installation of the facade aluminium joinery. The unit price includes everything from the description: purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2,80 W/m2K, and solar energy transmittance (solar factor) g≤65%. -glass system 4+16+4mm, with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber are used for glazing. - aluminium jealousies if existing in joinery schemes, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	NOTE: The items marked with * include glass coated with low emission coating as the protection against sunshine.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Measures must be taken on site, prior to production.						
	Calculation as per piece of finished item.						
	- building A						
	1a dim. 205/80cm	pc	1	x	385.25 €	=	**385**
	6 dim. 375/155cm	pc	1	x	1,147.70 €	=	**1148**
	16 dim. 170/180cm	pc	2	x	637.10 €	=	**1274**
	22 dim. 375/150+178cm	pc	1	x	2,416.15 €	=	**2416**
	23 dim. 375/145+170cm	pc	1	x	2,337.95 €	=	**2338**
	24 dim. 375/145cm	pc	1	x	1,158.05 €	=	**1158**
	29 dim. 205/280cm	pc	1	x	1,208.65 €	=	**1209**
	30 dim. 380/220+75cm	pc	1	x	2,056.20 €	=	**2056**
	32 dim. 90/220+80cm	pc	2	x	632.50 €	=	**1265**
	- building B						
	5 dim. 323/90cm	pc	3	x	617.55 €	=	**1853**
	12 dim. 315/55+150+100cm	pc	1	x	1,821.60 €	=	**1822**
	15 dim. 315/180cm	pc	1	x	1,193.70 €	=	**1194**
	25 dim. 315/300-380	pc	1	x	2,809.45 €	=	**2809**
	26a dim. 220/220cm	pc	1	x	956.80 €	=	**957**
	27 dim. 90/205cm	pc	1	x	434.70 €	=	**435**

	28	dim. 134/220+85cm	pc	1	x	930.35 €	=	**930**
	28'	dim. 134/220+85cm	pc	1	x	930.35 €	=	**930**
	33	dim. 350/220+60cm	pc	1	x	1,675.55 €	=	**1676**
3.08.	Production and installation of the aluminium windshield. The unit price includes everything from the description: the purchase of material, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break - glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.							
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.							
	Calculation as per piece.							
	- building A							
	34	dim. 370/305cm	pc	1	x	1,926.25 €	=	**1926**
	35	dim. 193/305cm	pc	1	x	856.75 €	=	**857**
3.09.	Preparation and installation of Al profiled facade joinery skylights, coated in plastic layer, with thermal break as per joinery scheme and details, with high quality mechanism, fittings, hinges for opening and with the sill stool made of the same type of material as the windows. Window shall be wire-reinforced double-glazed (4+16+4mm), with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber are used for glazing. **NOTE:**The items marked with * include glass coated with low emission coating as the protection against sunshine.							
	Thermal conductivity must be maximum U=2,80 W/m2K and solar energy transmittance (solar factor) g≤65%.							
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.							
	Calculation as per piece.							

	- building C						
	18 dim. 505/100cm- skylight	pc	2	x	1,312.15 €	=	**2624**
	19 &19* dim. 130/100cm- skylight	pc	2	x	338.10 €	=	**676**
3.10.	Purchase of materials, preparation and installation of wooden windows, shaped and colored as the old ones, as per joinery scheme and details, with high quality mechanism, fittings, hinges for opening, with sill stool. Joinery shall be made of high quality oak wood. The external window shall be single framed and single glazed, while the inner window shall be single framed, but double glazed. **NOTE:** The items marked with * include glass coated with low emission coating as the protection against sun heat.						
	Thermal conductivity must be maximum U=1,50 W/m2K.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, plastering and painting, edge strips - if required). Calculation is made per piece of finished item. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	- building C						
	11 dim. 130/240cm, lower parts of the window covered with white foil	pc	7	x	1,105.15 €	=	**7736**
	11 dim. 130/240cm	pc	10	x	1,105.15 €	=	**11052**
	11* dim. 130/240cm	pc	5	x	1,113.20 €	=	**5566**
	11* dim. 130/240cm with protective foil	pc	5	x	1,105.15 €	=	**5526**
	13 dim. 150/185cm	pc	1	x	1,094.80 €	=	**1095**
	20 dim. 120/157cm	pc	1	x	667.00 €	=	**667**
	21 dim. 80/100cm	pc	1	x	342.70 €	=	**343**
	31 dim. 160/220+90cm	pc	1	x	2,199.95 €	=	**2200**
	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper. **NOTE:** Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.						
3.11.	Production and assemblage of PVC sills (window benches) on the inner side of the new windows. Sills shall be made of PVC-profiles identical as the profiles used for windows.						
	Calculation per m.	m	269.66	x	12.65 €	=	**3411**
	TOTAL FOR REPLACEMENT OF FACADE JOINERY						**168502**
IV	**RECONSTRUCTION AND THERMAL INSULATION OF THE ROOFS**						

4.01.	Removal of the existing roof cover made of Al metal sheet. Storage location, after classification, shall be determined by the Employer / Employer's Representative. The unit price includes all works and transportation of debris to a construction material landfill up to 10 km distance.						
	Calculation per m2 of the orthogonal projection.						
	building A	m2	857.63	x	2.77 €	=	**2373**
	building C	m2	530.00	x	2.77 €	=	**1467**
4.02.	Removal of the existing wooden roof sub-structure. Storage location, after classification, shall be determined by the Employer / Employer's Representative. The unit price includes all works and transportation of debris to a construction material landfill up to 10 km distance.						
	Calculation per m2 of the orthogonal projection.						
	building A	m2	857.63	x	1.54 €	=	**1319**
	building C	m2	530.00	x	1.54 €	=	**815**
4.03.	Demolition of existing attic structure - straw-based ceiling. The unit price includes all works and transportation of debris to a landfill up to 10 km distance.						
	Calculation per m2 of the orthogonal projection.						
	building C	m2	266.62	x	2.56 €	=	**683**
4.04.	Demolition of the existing canopy layers at the entrance of the building A up to the concrete floor slab, jointly with the following assumed layers: - waterproofing (3 layers of building paper and 4 layers with protection made of "albit fol"), - sloping layer (lean concrete). The unit price includes all works, required scaffold and transportation of debris to a landfill.						
	Calculation per m2						
	building A	m2	14.14	x	14.86 €	=	**210**
4.05.	Removal of existing thermal insulation layers from the roof parapet on the canopy. Transportation of debris to a landfill up to 5 km distance.						
	Calculation per m2.						
	building A	m2	7.66	x	3.59 €	=	**27**

4.06.	Purchase of material and construction of the wooden roof structure made of sound and dry fir as per valid standards for the: 1) roof cover made of trapezoid Al metal sheet in the building A and 2) for the flat seamed galvanized and plastic coated metal sheet in the building C. The unit price includes production of the supporting roof elements joints according to the regulations, with use of nails, bolts and other strengthening steel elements for the installation of the RC plate anchors. The anchors shall be coated with double layer of antirust paint, while the wooden elements shall be coated against decay, wormholes and fire, everything in accordance to the Design.						
	Calculation per m2 of orthogonal projection.						
	building A- roof	m2	820.74	x	14.15 €	=	**11609**
	building C- roof	m2	418.86	x	14.15 €	=	**5925**
4.07.	Purchase of material and installation of OSB plates over the roof rafters, thickness: d= 2 cm.						
	Calculation per m2 actual area of the sloped roof.						
	building A- roof	m2	857.63	x	11.89 €	=	**10197**
	building C- roof	m2	462.19	x	11.89 €	=	**5495**
4.08.	Purchase of material and setting up of the polythene foil, 2 mm (vapor barrier) over the previously cleaned reinforced concrete in the: building A-over the roof slab and canopy, building B-over the last floor ceiling, building C-over the roof construction.						
	Calculation per m2.						
	building A- canopy	m2	14.14	x	2.67 €	=	**38**
	building A- roof	m2	857.63	x	2.67 €	=	**2286**
	building B- over the ceiling	m2	336.93	x	2.67 €	=	**898**
	building C- roof	m2	462.19	x	2.67 €	=	**1232**
4.09.	Purchase of material and setting up of the thermal insulation on the roof of the building A and over the ceilings in the last floor in the buildings B and C, consisting of mineral wool 10 cm thick, with low water absorption.						
	Calculation per m2.						
	building A- roof	m2	857.63	x	10.05 €	=	**8615**
	building B- over the ceiling	m2	336.93	x	10.05 €	=	**3384**
	building C- over the ceiling	m2	266.62	x	10.05 €	=	**2678**
4.10.	Purchase of materials and setting up the waterproof layer- vapor permeable foil. Foil is used as a backup protection for waterproof layer and it shall be placed under the metal sheet cover and over the OSB plates. In the building B, foil shall be installed in the attic, over the thermal insulation.						
	Calculation per m2.						

	building A- roof	m2	857.63	x	2.46 €	=	**2110**
	building B- over the ceiling	m2	336.93	x	2.46 €	=	**829**
	building C- roof	m2	462.19	x	2.46 €	=	**1137**
4.11.	Purchase of material and installation of wooden laths 5x8 cm, on the roof, over the OSB plates.						
	Calculation per m2 actual area of the sloped roof.						
	building A- roof	m2	857.63	x	3.49 €	=	**2989**
4.12.	Purchase of material and installation of wooden laths 5X5 cm, in the opposite direction, on the roof covered with trapezoid Al metal sheet.						
	Calculation per m2 actual area of the sloped roof.						
	building A- roof	m2	857.63	x	1.95 €	=	**1670**
4.13.	Purchase of material and installation of painted trapezoid Al metal sheet 40/230/0,8 in the building A and flat seamed galvanized and plastic coated metal sheet, over the base in the building C, jointly with installation of snow hurdles, including all necessary flashings and other smaller parts of construction.						
	Calculation per m2 and per m						
	building A- roof	m2	867.39	x	27.47 €	=	**23827**
	building A- roof- two-part roof ridges, d.w. 50cm	m	45.60	x	19.68 €	=	**897**
	building A- roof- drip by the rain gutter, d.w. 50cm	m	93.01	x	19.68 €	=	**1830**
	building C- roof	m2	539.28	x	18.04 €	=	**9729**
4.14.	Purchase of the material and making the slope layer on the eave. The slope layer shall be made of lean concrete with added perlite and it shall be minimum 3 cm thick, as indicated on the drawings. Base shall be clean from dust and grease. Installment shall be done by spreading the fresh concrete mass and its flattening with metal levelers along pre-prepared slides. Due to the possible occurrence of a temperature spreading of hardened concrete, expansion groove shall be installed on the perimeter of the roof. In order to achieve better connection, it is allowed to spray the area with cement slurry, before pouring the concrete. Due the fact that concrete mass is foamy and soft, it shall be protected for seven days against mechanical loads and rapid drying. Rapid drying can be prevented by covering the fresh concrete PVC foil etc... It is also recommended that during the curing, concrete shall be sprayed by water.						
	Calculation per m2.						
	building A- canopy	m2	14.14	x	14.97 €	=	**212**

4.15.	Purchase of material and setting up the geotextile layer, 300g/m2 as a protection for the waterproofing.						
	Calculation per m2.						
	building A- canopy	m2	14.14	x	3.08 €	=	**43**
4.16.	Purchase of material and setting up final layer of horizontal waterproofing of the canopy, along with its raising up to the attic, up to 35 cm, made of PVC membrane, reinforced with polyester net. PVC membrane shall be resistant to aging, weather conditions and UV- radiation. Follow the instructions of manufacturer when installing.						
	Calculation per m2.						
	building A	m2	21.80	x	32.39 €	=	**706**
4.17.	Removal of debris from the canopy and transportation to a construction material landfill up to 10 km distance.						
	Calculation per m2.						
	building A- canopy	m2	14.14	x	9.02 €	=	**128**
4.18.	Purchase of material and construction of the last floor ceiling in the building C, made of fireproof plasterboards, 12 mm thickness and 30 minutes of fire resistance. Plasterboards shall be installed on the metal substructure, with installation of joint tape over the joints and with use of require scaffold.						
	Calculation per m2.						
	building C- last floor ceiling	m2	266.62	x	18.04 €	=	**4810**
	NOTE: An alternative technology for flat roof covering can be offered as a deviation.						
	TOTAL FOR RECONSTRUCTION AND THERMAL INSULATION OF THE ROOFS						**110169**
V	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
	DISMANTLING AND REINSTALLATION OF VERTICAL AND HORIZONTAL GUTTERS.						
5.01.	These items are described in chapter "Thermal insulation of façade walls", item number 1.01. and 1.09.						
	-DISMANTLING AND REINSTALLATION OF AIR CONDITIONING UNITS, CAMERAS, LIGHTING.						
5.02.	These items are described in chapter "Thermal insulation of façade walls", item number 1.08.						
	- DISMANTLING AND REINSTALLATION OF FLASING SILLS, PLASTERING AND PAINTING OF SIDELIGHTS.						

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5.03.	These items are described in chapter "Thermal insulation of façade walls", item number 3.01. and item number 3.11. within the chapter "Replacement of façade joinery".						
	-DISMANTLING AND REINSTALLATION OF DRIPS AND FLASHINGS.						
5.04.	These items are described in chapter "Thermal insulation of façade walls", item number 1.01 and item number 1.09.						
	-DISMANTLING AND REINSTALLATION OF METAL PROTECTIVE BARS						
5.05.	These items are described in chapter "Replacement of façade joinery", item number 3.02.						
	-TREATMENT OF FLASHINGS OF THE ROOF EDGES MADE OF WOOD						
5.06.	These items are described in chapter "Thermal insulation of façade walls" item number 1.12.						
	-CONSTRUCTION OF THE NEW PAVEMENT						
5.07.	These items are described in chapter "Measures to enable higher comfort and better working conditions" items number 6.23.						
	-STEAM CLEANING OF THE CHIMNEY WITHIN THE BOILER ROOM						
5.08.	These items are described in chapter "Thermal insulation of façade walls" items number 1.17.						
VI	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
6.01.	Demolition of existing ceiling made of chipboard, jointly with its substructure in the first floor of the building B. Removal and loading of debris onto a truck and transportation to a construction material landfill up to 10 km distance. The unit price includes the usage of the scaffold.						
	Calculation per m2.						
	building B	m2	336.93	x	2.77 €	=	**932**
6.02.	Dismantling of existing interior wooden doors in sanitary facilities. Classification and its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away.						
	Calculation as per piece.						
	building A- basement						

	dim. 70/205cm	pc	6	x	10.25 €	=	62
	dim. 80/205cm	pc	2	x	10.25 €	=	21
	building A- ground floor						
	dim. 70/205cm	pc	7	x	10.25 €	=	72
	dim. 80/205cm	pc	4	x	10.25 €	=	41
	building A- first floor						
	dim. 70/205cm	pc	7	x	10.25 €	=	72
	dim. 80/205cm	pc	4	x	10.25 €	=	41
	building B- boiler room						
	dim. 70/205cm	pc	1	x	10.25 €	=	10
	dim. 90/205cm	pc	1	x	10.25 €	=	10
	dim 90/195+115	pc	1.00	x	10.25 €	=	10
	dim 90/195+80	pc	1.00	x	10.25 €	=	10
6.03.	Demolition of existing wall ceramic tiles (height h=220cm) in sanitary facilities jointly with base, using required scaffold. Debris shall be collected, removed, loaded onto a truck and dumped at construction material landfill – distance up to 10km.						
	Calculation per m2.						
	building A- basement	m2	131.05	x	3.59 €	=	470
	building A- ground floor	m2	130.04	x	3.59 €	=	467
	building A- first floor	m2	130.04	x	3.59 €	=	467
	building B- boiler room	m2	20.74	x	3.59 €	=	74
6.04.	Demolition of existing linoleum / vinyl floor in preparatory room (on the first floor of the building "A" nearby existing toilets) jointly with base. Debris shall be collected, removed, loaded onto a truck and dumped at construction material landfill – distance up to 10km.						
	Calculation per m2.	m2	17.67	x	3.59 €	=	63
6.05.	Demolition of existing floor ceramic tiles in toilets jointly with base. Debris needs to be collected, removed, loaded onto a truck and dumped at construction material landfill – distance up to 10 km.						
	Calculation per m2.						
	building A- basement	m2	32.23	x	3.59 €	=	116
	building A- ground floor	m2	28.61	x	3.59 €	=	103
	building A- first floor	m2	28.61	x	3.59 €	=	103
	building B- boiler room	m2	3.76	x	3.59 €	=	13
6.06.	Purchase of material and installation of base for ceramic tiles floors in toilets made of cement screed 1:3, along with simultaneous mechanic injecting of binding fibbers.						
	Calculation per m2.						
	building A- basement	m2	32.23	x	8.00 €	=	258
	building A- ground floor	m2	32.52	x	8.00 €	=	260
	building A- first floor	m2	28.61	x	8.00 €	=	229
	building B- boiler room	m2	3.76	x	8.00 €	=	30

6.07.	Preparation of horizontal waterproofing below floors in sanitary blocks in following layers from bottom to top: -bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos. Waterproofing shall be put up the walls for min h=25cm. In the areas of showers and urinals, waterproofing to be put against the wall for h= 200 cm. The unit price includes all the works and material as described.						
	Calculation per m2.						
	building A- basement	m2	57.34	x	19.99 €	=	**1146**
	building A- ground floor	m2	53.87	x	19.99 €	=	**1077**
	building A- first floor	m2	49.96	x	19.99 €	=	**999**
	building B- boiler room	m2	6.06	x	19.99 €	=	**121**
6.08.	Purchase of material and fitting of thermal insulation in the floors of sanitary blocks, using extruded polystyrene d=4 cm.						
	building A- basement	m2	32.23	x	6.87 €	=	**221**
	building B- boiler room	m2	3.76	x	6.87 €	=	**26**
6.09.	Purchase of materials and fitting of soundproofing 1 cm thick, made of termosilent, in the floors of sanitary blocks .						
	building A- ground floor	m2	32.52	x	2.67 €	=	**87**
	building A- first floor	m2	28.61	x	2.67 €	=	**76**
6.10.	Purchase of material and plastering of walls in sanitary facilities, on parts where existing ceramic wall tiles were (total height up to 220 cm), in two layers using gauged mortar 1:2:6 on previously sprayed with cement slurry base. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges.						
	Calculation per m2.						
	building A- basement	m2	149.07	x	8.00 €	=	**1192**
	building A- ground floor	m2	159.90	x	8.00 €	=	**1278**
	building A- first floor	m2	159.90	x	8.00 €	=	**1278**
	building B- boiler room	m2	25.34	x	8.00 €	=	**203**
6.11.	Tiling the toilet walls with the class I ceramic tiles, while the size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster. The unit price includes installation of Al strips. Ceramic tiles shall be placed up to the ceiling height or to the top of the lower walls h=2,20m.						
	Calculation per m2.						
	building A- basement	m2	131.05	x	22.96 €	=	**3009**
	building A- ground floor	m2	147.84	x	22.96 €	=	**3394**

	building A- first floor	m2	130.04	x	22.96 €	=	**2986**
	building B- boiler room	m2	20.74	x	22.96 €	=	**476**
6.12.	Tiling the toilet floors with the class I anti-slip ceramic tiles, while the size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster. The unit price includes installation of Al strips. In the toilets, consisting a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2.						
	building A- basement	m2	32.23	x	22.96 €	=	**740**
	building A- ground floor	m2	32.52	x	22.96 €	=	**747**
	building A- first floor	m2	28.61	x	22.96 €	=	**657**
	building B- boiler room	m2	3.76	x	22.96 €	=	**86**
6.13.	Preparation and installation of toilet doors made of hard highly resistant PVC profiles reinforced with stainless steel U-profiles coated in plastics, as per joinery scheme and details, with high quality mechanism, hardware, hinges for opening. PVC panels are used as infill.						
	The item includes all the necessary cleaning and dumping at the landfill as well as all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is selected by the Employer / Employer's Representative. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	building A- basement						
	1 dim. 70/205cm	pc	6	x	369.00 €	=	**2214**
	2 dim. 80/205cm	pc	2	x	381.30 €	=	**763**
	building A- ground floor						
	1 dim. 70/205cm	pc	7	x	369.00 €	=	**2583**
	2 dim. 80/205cm	pc	4	x	381.30 €	=	**1525**
	3 dim. 90/205cm	pc	1	x	394.63 €	=	**395**
	4 dim. 105/205cm	pc	1	x	403.85 €	=	**404**
	building A- first floor						
	1 dim. 70/205cm	pc	7	x	369.00 €	=	**2583**
	2 dim. 80/205cm	pc	4	x	381.30 €	=	**1525**
	building B- boiler room						
	1 dim. 70/205cm	pc	1	x	381.30 €	=	**381**
	3 dim. 90/205cm	pc	1	x	394.63 €	=	**395**

6.14.	Purchase of material and construction of monolith ceiling on the last floor in the building B made of fire resistant plasterboards, 1.2 cm of thickness and 30 minutes of fire resistance. New ceiling shall be constructed on the metal substructure with installation of joint tape over the joints and with use of required scaffold.						
	Calculation per m2.						
	building B- first floor	m2	336.93	x	18.04 €	=	**6078**
6.15.	Purchase of material and installation of new vinyl floor in the preparation room next to the toilet for disabled persons. Works shall include: *Applying self-leveling mass. Before applying the mass thoroughly clean the surface from dust. *Purchase and applying of vinyl floor. Adhesive shall be adequate for this type of floor. Before applying the adhesive thoroughly clean the surface from dust. The unit price includes applying of the stripes for vinyl floor on the room edges.						
	Calculation per m2	m2	13.45	x	32.39 €	=	
6.16.	Demolition of mortar damaged during dismantling of existing floor slabs. This works refers to: walls of the last floor premises in the building B (50 % of total area) and the walls in the building C (100 % of total area). Removal and loading of debris onto a truck and transportation to a landfill up to 10 km distance.						
	Calculation per m2.						
	building B	m2	346.65	x	3.90 €	=	**1350**
	building C	m2	962.50	x	3.90 €	=	**3749**
6.17.	Plastering of walls damaged in the process of dismantling of the last floor ceilings in the buildings B (50%) and C (100%). Plastering shall be done in two layers using cement mortar 1:3 on previously sprayed with cement slurry base. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges.						
	Calculation per m2.						
	building B	m2	346.65	x	8.00 €	=	**2771**
	building C	m2	962.50	x	8.00 €	=	**7695**

6.18.	Scraping and skimming of old walls with emulsion putty. All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Firstly correct and fill minor damages and cracks. Apply flattening and skimming with emulsion putty for the first time. All the surfaces must be finally glassed, then flattened and skimmed with putty for the second time, using required scaffold.						
	Calculation per m2.						
	- walls						
	building A - basement	m2	1,278.18	x	2.36 €	=	**3013**
	building A - ground floor	m2	1,399.27	x	2.36 €	=	**3299**
	building A - first floor	m2	1,273.86	x	2.36 €	=	**3003**
	building A - second floor	m2	1,273.86	x	2.36 €	=	**3003**
	building B - basement	m2	1,026.82	x	2.36 €	=	**2421**
	building B - boiler room-toilet	m2	11.52	x	2.36 €	=	**27**
	building B - ground floor	m2	693.30	x	2.36 €	=	**1634**
	building B - first floor	m2	693.30	x	2.36 €	=	**1634**
	building C - ground floor	m2	876.09	x	2.36 €	=	**2065**
	building C -first floor	m2	951.71	x	2.36 €	=	**2244**
	- ceilings						
	building A - basement	m2	658.13	x	2.36 €	=	**1552**
	building A - ground floor	m2	661.34	x	2.36 €	=	**1559**
	building A - first floor	m2	661.34	x	2.36 €	=	**1559**
	building A - second floor	m2	666.52	x	2.36 €	=	**1571**
	building B - basement	m2	423.45	x	2.36 €	=	**998**
	building B - ground floor	m2	252.80	x	2.36 €	=	**596**
	building B - boiler room-toilet	m2	3.76	x	2.36 €	=	**9**
	building C - ground floor	m2	334.52	x	2.36 €	=	**789**
6.19.	Purchase of materials and skimming of inner newly plastered walls and ceilings using emulsion putty. All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Flattening and skimming with putty minor damages and cracks. Flattening and skimming with emulsion putty first time. All the surfaces must be finally glassed, then flattened and skimmed with putty for the second time, using required scaffold.						
	Calculation per m2.						
	- walls						
	building B- first floor (50% of total area)	m2	346.65	x	2.36 €	=	**817**
	building C- first floor (100% of total area)	m2	962.50	x	2.36 €	=	**2269**
	- ceilings						
	building B- first floor	m2	336.93	x	2.36 €	=	**794**
	building C- first floor	m2	266.62	x	2.36 €	=	**629**
6.20.	Inner walls and ceilings to be treated with double layer of semi-dispersed paint with use of scaffold. Colour of the paint will be selected by the Employer / Employer's Representative. The unit price includes the usage of scafold.						
	Calculation per m2.						
	- walls						
	building A - basement	m2	679.86	x	1.64 €	=	**1115**
	building A - ground floor	m2	764.48	x	1.64 €	=	**1254**
	building A - first floor	m2	689.99	x	1.64 €	=	**1132**

	building A - second floor	m2	689.99	x	1.64 €	=	1132
	building B - basement	m2	601.29	x	1.64 €	=	986
	building B - boiler room-toilet	m2	11.52	x	1.64 €	=	19
	building B - ground floor	m2	403.34	x	1.64 €	=	661
	building B - first floor	m2	406.34	x	1.64 €	=	666
	building A - around openings	m2	191.36	x	1.64 €	=	314
	building B - around openings	m2	34.85	x	1.64 €	=	57
	building B -boiler room - around openings	m2	7.62	x	1.64 €	=	12
	building C - ground floor	m2	533.54	x	1.64 €	=	875
	building C - first floor	m2	636.01	x	1.64 €	=	1043
	- ceilings						
	building A - basement	m2	658.13	x	1.64 €	=	1079
	building A - ground floor	m2	661.34	x	1.64 €	=	1085
	building A - first floor	m2	661.34	x	1.64 €	=	1085
	building A - second floor	m2	666.52	x	1.64 €	=	1093
	building B - basement	m2	423.45	x	1.64 €	=	694
	building B - ground floor	m2	252.80	x	1.64 €	=	415
	building B - first floor	m2	336.93	x	1.64 €	=	553
	building B - boiler room toilet	m2	3.76	x	1.64 €	=	6
	building C - ground floor	m2	334.52	x	1.64 €	=	549
	building C - first floor	m2	266.62	x	1.64 €	=	437
6.21.	Inner walls to be treated with double layer of oil based paint up to the height of 1,6 m. Colour of the paint will be selected by the Employer / Employer's Representative.						
	Calculation per m2.						
	building A - basement	m2	598.32	x	3.33 €	=	1993
	building A - ground floor	m2	598.32	x	3.33 €	=	1993
	building A - first floor	m2	583.87	x	3.33 €	=	1945
	building A - second floor	m2	583.87	x	3.33 €	=	1945
	building B - basement	m2	425.53	x	3.33 €	=	1418
	building B - ground floor	m2	289.96	x	3.33 €	=	966
	building B - first floor	m2	286.96	x	3.33 €	=	956
	building C - ground floor	m2	342.55	x	3.33 €	=	1141
	building C - first floor	m2	315.69	x	3.33 €	=	1052
	buildings A,B & C - walls behind radiators in the premises which are not planned for painting	m2	46.50	x	3.33 €	=	155
6.22.	Collect and remove debris from the sanitary facilities, loaded onto a truck and transported to a landfill up to 10 km distance.						
	Calculation per m2.						
	building A	m2	2893.39	x	1.03 €	=	2966
	building B	m2	1095.10	x	1.03 €	=	1122
	building C	m2	519.42	x	1.03 €	=	532

6.23.	Renovation / construction of the pavement: - around buildings A and B, -construction of new pavement around building C and pavement that connect external ramp and school yard, -construction of concrete surface drain structure in the uphill area of connection between buildings A and C. The newly constructed pavement around the buildings A and B shall have the same width as the existing one, and 80 cm width around building C. The item shall include, where necessary, all preparation works such as: cleaning off the overgrowth, stripping of the humus layer, preparation of the terrain for the construction of new pavement. Purchase and transportation of materials for gravel filling and concrete works. (Layer of gravel to be 10 cm of thickness. Gravel shall be rammed manually and by machine if necessary to achieve complete compactness). Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm. New pavement shall have inclination of 1,5% compared to the building.						
	Pavement has to be strained into the fields cca 1,5m2. Expansion joints shall be filled up with joint filler. The unit price includes all works and material.						
	Calculation per m2.	m2	136.00	x	15.79 €	=	**2147**
6.24.	Construction of the ramp for disabled persons (dimensions 10 / 1.2 m, slope 5 %) on the main entrance of the building C. The item shall include preparation of the terrain for the construction of the ramp. Purchase and transportation of material for gravel filling and concrete works. (Gravel shall be rammed manually and by machine if necessary to achieve complete compactness of 20 Mpa). Putting plain concrete MB 15 with proper reinforcement mesh Q 131 in the both zones , d= 10 cm, with smoothing of area, d= 2 cm (total: 12 cm), as well as the installation of border beams 10/20 cm and dilatation points, sealed with bitumen and placed at 2 m.						
	Calculated as per lump sum	lump sum	1.00	x	353.63 €	=	**354**
6.25.	Purchase of the material, production and installation of internal ramp (dimensions 1.22 / 4.45m, slope 11%) for disabled persons in the connection area of the buildings B and C. Construction of the ramp shall be made of the wooden structure. Surface of the ramp shall be made of embossed galvanized metal sheet. The unit price includes all works and materials.						
	Calculated as per lump sum	lump sum	1.00	x	440.75 €	=	**441**

6.26.	Replacement of defect interior wooden doors in the basement of the building B by a sturdy, heavy duty wooden unit with smooth surface. This item includes a new frame and exactly adapted new laminated tubular chip board door leaf, the change of the door lock, the door handle set, the locking plate, the hinges and coating of frame and wing (process: grinding, primer, grinding, two layers of synthetic resin paint). All materials shall be of high quality. The unit price includes dismantling of the old doors from the same positions and their transportation to a landfill up to 5 km distance.						
	Calculated as per piece.						
	5 105 / 205	pc	4.00	x	123.00 €	=	**492**
	6 90 / 205	pc	3.00	x	97.38 €	=	**292**
	7 80 / 205	pc	5.00	x	97.38 €	=	**487**
6.27.	Purchase and installation of a wall mounted platform stair lift for disabled persons, with the following characteristics: - minimum loading capacitymax 300 kg, - speed approx. 0,10 m/s, - power approx. 0,5 kW. The lift shall be positioned in the connection zone of the main entrance hall to the building A, as indicated in drawing SSS-01-ARH-10. Total height difference of the two levels is approx. one meter. The unit price shall comprise the bearing connection devices to the walls, all necessary accessories ready to use the lift, and the electrical installations at the lift itself, the on wall supply cabling in PVC ducts connecting to the nearest switch board and the adjustments of the electrical switch board. All damages occured during the installation of the lift shall be remediated and the working areas shall be restored to their original condition.						
	Calculated as per piece.	pc	1.00	x	9,471.00 €	=	
6.28.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers and painting of hydrant and switch boxes in oil based paint in two layers. The item also includes painting of metal bearing structures and handrails of all staircases in colour determined by Employer / Employer's Representative.						
	Calculated as lump sum	lump sum	1.00	x	240.88 €	=	**241**

6.29.	Two doors on the boiler room, which shall not be replaced, shall be painted, including previous cleaning and scraping. The doors shall be coated with double layer of basic, anti rust paint and with double layer of finishing colour, selected by the Employer / Employer's Representative. All the joints shall be coloured and protected against rust.						
	Calculation per m2.	m2	29.97	x	5.33 €	=	**160**
6.30.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative, in the school courtyard in front of the building A. Trees shall be planted on min 5 m distance and min. 4 m distance from the buildings and 3m high. Dig a pit for planting and throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting, cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of 3 kg per tree of peat enriched fertilizer. Having completed the planting of the seedlings, trees shall be well watered.						
	Calculation per piece	pc	10.00	x	51.25 €	=	**513**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**133200**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VII	**LIST OF SPARE PARTS**						
7.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece.	pc	3.00	x	11.50 €	=	**35**
7.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece.	pc	1.00	x	11.50 €	=	**12**
7.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece.	pc	2.00	x	11.50 €	=	**23**
7.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece.	pc	2.00	x	28.75 €	=	**58**
7.05.	Purchase and delivery of lever operated opening mechanism for the windows at high points.						
	Calculated as per piece.	pc	5.00	x	28.75 €	=	**144**

7.06.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						
	wall	m2	1.00	x	13.80 €	=	**14**
	floor	m2	1.00	x	13.80 €	=	**14**
7.07.	Purchase and delivery of spare granite tiles. Calculated as per m2.	m2	1.00	x	18.40 €	=	**18**
	TOTAL FOR SPARE PARTS						**316**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

	SUMMARY OF COSTS	
I	THERMAL INSULATION OF FACADE WALLS	87765
II	THERMAL INSULATION OF THE FLOORS IN THE BUILDINGS B AND C	106600
III	REPLACEMENT OF FACADE JOINERY	168502
IV	RECONSTRUCTION AND THERMAL INSULATION OF THE ROOFS	110169
VI	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	132528
VII	SPARE PARTS	316
	TOTAL PRICE, VAT EXCLUDED:	605879
	VAT (19%):	115117
	TOTAL PRICE, VAT INCLUDED:	**720996**

GROUP A5.1.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Secondary Vocational School in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	Secondary Vocational School in Pljevlja
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity				Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: Siemens or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 15 m^3/h						
	Connector: DN50						
		pc	1	x	1,319.05 €	=	1,319.05 €
2	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: Siemens or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	2,472.50 €	=	2,472.50 €
3	Purchase, delivery and installation of electric solids flowmeter in silo.						
	Manufacturer: Siemens or equivalent						
	Type 7ML5440-0AB00-0AC1						
		pc	1	x	3,047.50 €	=	3,047.50 €
4	Software development and staff training.						
		pc	1	x	1,035.00 €	=	1,035.00 €
	TOTAL A - Energy management						**7,874.05 €**

B - HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS							
B.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of existing equipment of the heating system: 2 ribbed coal-fired boilers Vulkan Super each 475kW, feeder and return pipes, two closed expansion vessel, two pumps on each branch separately, 12 valves over DN40 and other fittings and all pipes in the boiler room. The item includes removal and dumping dismantled equipment to a suitable place.						
	Calculated lump-sum	pc	1	x	3,450.00 €	=	3,450.00 €
2	Washing existing walls and floor to remove coal dust deposits in premises of the boiler room and fuel storage facilities. Mending holes in walls, plastering walls area 40 m2, fitting cement screed and tiling 60 m2 of floor.						
	Calculated lump-sum	pc	1	x	2,714.00 €	=	2,714.00 €
3	Preparation of concrete chimney for installation of new prefabricated funnel - penetration of openings for bonding new chimney, penetration of openings for fitting funnel, demolition of existing funnel 5.5 m long, construction of chimney base using brick, height 0.5m, making penetrations in wall between the boiler room and fuel storage room for conveyer belt for pellet, fitting of terminal cap made of steel galvanised sheet metal, removal of debris from the boiler room and its dumping to a suitable location.						
	Calculated lump-sum	pc	1	x	1,150.00 €	=	1,150.00 €
	TOTAL B.I - Dismantling of existing equipment and preliminary works						**7,314.00 €**
B.II	**Installation of new boiler room equipment**						
1	Purchase, delivery and installation of: biomass-fired boiler - wood pellet HERZ Firematic BioControl 250 or equivalent, rated capacity 251 kW (76.8-251 kW) for production of hot water, maximal temperature 95 °C.						

	HERZ Firematic consists of: - welded structure made of special boiler sheet metal thickness 6 mm - completely insulated body with mineral wool thickness 120 mm - stoker auger - frequency-driven smoke gases fan - safety temperature limiter -heat exchanger automatic cleaning (fire+smoke tubes) - usage of remaining heat - two-zone automatic cleaning grate - Burn-back protection RSE flap - intermediate hopper with fuel level maintenance - automatic ignition via electric heaters with hot air - automatic ashes removal from the combustion chamber and heat exchanger - integrated computer for control of boiler and system operating.						
	Microprocessor T-control with touch-LCD screen: - combustion control - heat accumulator control - preparation of domestic hot water - cold end protection with pump and mixing valve - Lambda probe oxygen sensor control - control and operating depending on outdoor conditions with 6 independent heating circuits (1 on) - automatic fuel, air dosing, maintaining necessary flame temperature, smoke gases, boiler temperature, minimal return temperature, hot water temperature in accumulator, water temperature in heating circuits - automatic frost protection - CAN-BUS operating						
	Safety elements : - back burn protection flap, no power, closed - Back-burn inhibitor sprinkler, sprinkler with water tank - back sparking protection, fuel supply block - measuring temperature in the combustion chamber - temperature metering in the storage room, intermediate hopper and dosing augers - safety boiler temperature limiters						

	Technical data for boiler: - Boiler thermal capacity = 251 kW (76.8-251), the boiler modulates between 30-100 % load - Maximal operating pressure = 3 bar - Maximal operating temperature = 95 °C - Boiler efficiency degree = 92 % - Minimal water temperature at entrance into the boiler = 60 °C - Boiler weight = 1750 kg - Power supply: ~230 V / 50 Hz, 16 A, 2.0 kW						
	HERZ module for heat accumulator control with T-control unit – it is delivered with boiler: - temperature sensor (for metering upper and lower accumulator zone) – 2 pcs - immersion coils for temperature sensors – 2 pcs - sensors are placed in uronske čaure and then fitted onto a vessel - T-control unit controls the operating						
	HERZ basic T-control module for 1 heating circuit driven by outdoor temperature.						
		set	2	x	########	=	95,645.50 €
2	HERZ additional module or equivalent, for control for T-control, for 1 heating circuit driven by outdoor temperature: - 2 x PT 1000 temperature sensor sensor temperature (feed and return) - 1x outlet for room temperature sensor - 3x relay outlet 230VAC: pump and mixing valve - control system T-control for operating control						
		pc	2	x	561.20 €	=	1,122.40 €
3	HERZ cascade operation or equivalent, for T-control						
		pc	1	x	1,934.30 €	=	1,934.30 €
4	HERZ set or equivalent, for protection from cold water for Firematic 250 boiler with boiler pump and 3-way mixing valve - pump WILO Stratos Para 50/1-12 - three-way flanged mixing valve, type HERZ 4037, DN 65, PN 16 - electric motor drive for three-way mixing valve, type ESBE, series 90, type 95, 1min/90° - 2 x ball valve, DN 40, non-return valve						
		pc	2	x	4,697.75 €	=	9,395.50 €
5	HERZ safety thermostatic valves or equivalent, for safety heat exchanger, no auxiliary power drive, 95 °C						
		pc	2	x	105.80 €	=	211.60 €

6	HERZ sound proofing or equivalent, for Firematic 250 boiler						
		pc	2	x	994.75 €	=	1,989.50 €
7	HERZ basic package or equivalent, transportation auger. It consists of : - agitator with pushing mechanism - climbing screw - 6m long screw - electric-motor drive - power supply 230 V						
		pc	2	x	4,011.20 €	=	8,022.40 €
8	Unit for connecting transportation auger and boiler and RSE flap						
		pc	2	x	235.75 €	=	471.50 €
9	HERZ hot water accumulator or equivalent, capacity 5000l, maximum operating pressure 3 bars, made of steel S235JR, with anti-corrosion protection on the outside, dimensions: Ø 1800 x 3035 mm. with connections : - DN100 3 pieces (2 at the top and 1 at the bottom), - DN15 3 pieces (for temperature sensors, at the bottom, middle and top).						
		pc	1	x	7,532.50 €	=	7,532.50 €
10	HERZ thermal insulation or equivalent, for accumulator capacity 5000 l, insulation thickness 100 mm with aluminium sheet metal coating thickness 0.7 mm						
		pc	1	x	2,512.75 €	=	2,512.75 €
11	Purchase, delivery and installation of wooden intermediate hopper for pellet cca 11 m³ , dimensions w=3.5m, l=3.0m, H=1.5m, with transport agitator at the bottom. Tanks sides are made of enriched chipboard thickness 20mm (coated mult-ilayer playwood) with smooth internal side, and supporting substructure and strengthening frames are made of wooden beams 5x5cm and 7x5cm (as indicated on the enclosed drawings).						
		pc	1	x	2,438.00 €	=	2,438.00 €
12	Purchase, delivery and installation of self-supporting expansions vessel Pneumatex Compresso CU 500.6 or equivalent, with flexible hose for connecting to the water side and ball service valve for fast charging, airproof non-permeable bubble from butyl tank is deareated from the top with condensate drain at the bottom.						
	Nominal volume VN 500 liters						
	Max. permitted pressure PS 6 bar						
	Max. permitted temperature 120°C						

	Max. permitted temperature of membrane 70°						
	Connection S Rp 1"						
	Water drainage connection SW G 3/4"						
	Diameter: D=680 mm, H=1669 mm						
		pc	1	x	3,018.75 €	=	3,018.75 €
13	Purchase, delivery and installation of Pneumatex Switzerland or equivalent, pressure maintenance system Compresso C 10.1-6 F, ±0.1 bar, with on-site excess temperature protection in case of power blackout.						
	The item includes assembly kit for the air-side connection of the TecBox with the primary vessel, valve manifold with 1 spill valve and safety valve, fillsafe water make-up monitoring, water, time and frequency control; BrainCube control.						
	Max. permitted pressure PS 6 bars						
	Max. permitted temperature 70 °C						
	Supply voltage 230 V/50, 0.6 kW						
		pc	1	x	3,353.40 €	=	3,353.40 €
14	SCHIEDEL chimney system ICS 25 or equivalent, made of twin-wall stainless steel W.Nr. 1.4404 wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature stable insulation material - Superwool. ICS chimney system includes all required elements: inspection port and boiler connection, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals.						
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS is made of stainless steel W.Nr. 1.4404 wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus.						
	All chimney elements are industrially produced for a particularly building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø300mm, total height 2x15.5 m (two risers), active height 13.6m.						

	Furnace flue ICS25 Ø250 mm, developed length 6m+2.6m						
		set	1	x	9,872.75 €	=	9,872.75 €
15	Purchase, delivery and installation of the duplex circulating pump with electronic frequency controller used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna3 D 40-120 F						
	Flow: 16 m^3/h (14.2m^3/h)						
	Thrust: 5.5 m (5m)						
	Type of connection: Flanged DN40						
	Power supply: V=1~230V						
	Maximum current: I=0.18 - 1.95A						
	Transferred power: P=16 - 439W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
		pc	1	x	2,512.75 €	=	2,512.75 €
16	Three-way mixing and diverting valve for constant control of systems with hot and cold water, maximal operating temperature of fluid 140°C						
	DN 50 PN16; Kvs=42						
		pc	12	x	207.00 €	=	2,484.00 €
	Valve electric-motor drive for continuous control with typical curve selection * power supply: 24V DC / 230V AC * control: impulse * max. force: 2000N						
		pc	2	x	287.50 €	=	575.00 €
17	Purchase, delivery and installation of compact water softener. Compact casing contains ion-exchange resin which is being automatically regenerated once its capacity is spent, properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Aquaset 1000						
	Max. flow: 2.0 m^3/h						
	Amount of resin: 25 l						
	Softening capacity (for 18°dH) 98m^3						
	Salt consumption per regeneration: 4 kg						
	Operating pressure: 1,4 – 8 bar						
	Operating temperature: 4-40 °C						
	Connections 1"						
	Power supply 220V/50Hz						
	Dimensions						
	l: 432 mm, w: 324mm, h: 1170 mm						
	Unit is delivered with protective pre-flitted which consists of casing with 25 microns protective mesh.						
		pc	1	x	1,554.80 €	=	1,554.80 €

18	Electric air convector, capacity 9kW, power supply 400V, for maintaining minimum temperature in the boiler room and prevention of installation from freezing at low outdoor temperatures in the period when the heating system is not running, installation together with thermostat for activation.						
		pc	1	x	480.70 €	=	480.70 €
19	Purchase, delivery and installation of angle safety valve for installation in front of expansion vessel, with following properties:						
	Rated outlet: DN32						
	Overflow outlet: DN40						
	Rated pressure: 6 bars						
	Maximal discharge flow: 18000 kg/h						
	Operating pressure 4 bars						
	Working temperature: -10 °C to +220 °C						
	Max. operating pressure: 16 bars						
	Coefficient: K=0,05						
	Overpressure calibration: 10% from the set pressure						
	Max. counter pressure: 1,031 bar						
		pc	1	x	105.80 €	=	105.80 €
20	Purchase, delivery and fitting of feeder and receiver pipes for radiator and calorifer heating circuits, with following dimensions:						
	Diameter 273.0x5.0 mm						
	Feeder length 1550 mm						
	Returen pipe length 1350 mm						
	Connections: DN65 x 1pcs DN80 x 2pcs DN100 x 1pcs R3/4" x 2pcs R1/2" x 2pcs						
		pc	2	x	787.75 €	=	1,575.50 €
21	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN100 PN6						
		pc	5	x	97.29 €	=	486.45 €
	DN80 PN6						
		pc	16	x	85.33 €	=	1,365.28 €
	DN65 PN6						
		pc	2	x	68.08 €	=	136.16 €
22	Purchase, delivery and installation valves for riser pipes and metering differential pressure, inclined model with metering outlets, connection size:						
	DN80 PN6 - Kvs 70.5						

		pc	2	x	264.50 €	=	529.00 €
23	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets, following dimensions of connections:						
	DN80 PN6						
		pc	6	x	184.00 €	=	1,104.00 €
24	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets, with following dimensions of connections:						
	DN80 PN6						
		pc	4	x	128.80 €	=	515.20 €
25	Purchase, delivery and installation of fixed aluminium jealousies, dimensions 600x400mm, to be installed in boiler room doors (allows free flow of air required for fuel combustion in the boiler), type Hidria Slovenia AZR-3 600x400 or equivalent.						
		pc	2	x	56.35 €	=	112.70 €
26	Purchase, delivery and installation of water gauge at fresh water feeder from the water mains into the softener, with flow control scale and number disk for total flow registration, connection dimensions 1".						
		pc	1	x	102.01 €	=	102.01 €
27	Purchase, delivery and installation of glass thermometer in brass casing and sleeve for fitting into the pipeline, metering range 0-120°C.						
		pc	8	x	28.75 €	=	230.00 €
28	Purchase, delivery and installation of pressure gauge complete with manometer flow-through valve, metering range 0-6 bars.						
		pc	8	x	29.90 €	=	239.20 €
29	Purchase, delivery and installation of threaded backflow preventer, connection size:						
	DN25 PN6						
		pc	1	x	13.23 €	=	13.23 €
30	Purchase, delivery and installation of automatic valve for water fill in the system, with block valve and ball backflow valve filter and manometer with following characteristics:						
	connection dimensions 1"						
	Control range 0.3 – 4 bar						
	Maximal flow at inlet 16bar						
	Maximal temperature at inlet 50°C						
		pc	1	x	46.00 €	=	46.00 €

31	Purchase, delivery and assemblage of air-release vessels with overflow pipe and valve DN 15, made of black steel pipe, DN150 length 300 mm.						
		pc	3	x	40.25 €	=	120.75 €
32	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	5	x	9.61 €	=	48.07 €
33	Purchase of material and installation of piping for connecting boiler room equipment made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø 114,3x3,6						
		m	23	x	29.67 €	=	682.41 €
	Ø 88,9x3,2						
		m	17	x	22.77 €	=	387.09 €
	Ø 60,3x2,9						
		m	10	x	14.95 €	=	149.50 €
	Ø 42,4x2,6						
		m	8	x	9.78 €	=	78.20 €
34	Joining, tightening material and brackets, elbows, branches and such are calculated as 50% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 50% of the previous item		0.5	x	1,297.20 €	=	648.60 €
35	Purchase of material and production of insulation for pipes, feeders and receivers using rock wool, thickness 50 mm in AL coating thickness 0.5 mm, complete with fitting material. Fire resistance flammability class A1 in line with SIST EN 13501-1 i JUS U.J1.050. Calculated as per m^2 of insulation measured on the exterior of the pipe.						
		m^2	38	x	33.35 €	=	1,267.30 €
36	Purchase and installation of PP-R water pipes for connecting equipment for chemical water treatment, for operating pressure of 10 bars with all required fittings. Pipes need to be fixed to walls with double pipe clips at every 1.5 to 2.0 m. Pipes on branching need to be insulated with "plamafleksom" to prevent condensation. Pipes are welded with butt welded joint. Pipe diameter is rated diameter of DN25.						
		m	12	x	10.35 €	=	124.20 €
	TOTAL B.II - Installation of new boiler room equipment						**165,194.74 €**

C - EFFICIENCY OF THE DISTRIBUTION SYSTEM							
C.I	**Installation of thermostatic and balancing valves**						
1	Purchase, delivery and installation of thermostatic radiator valve, connection size:						
	1/2" (inclined and straight)						
		pc	197	x	13.94 €	=	2,745.79 €
	3/4" (inclined and straight)						
		pc	13	x	20.01 €	=	260.13 €
2	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without having to remove protective cap. The thermostat has liquid sensor.						
	Temperature range from 8 °C to 26 °C						
	No. of channels: four						
	Closing time 24 min.						
		pc	210	x	15.67 €	=	3,291.65 €
3	Purchase, delivery and installation of radiator angle valves, connection size						
	1/2" (inclined and straight)						
		pc	197	x	12.49 €	=	2,461.01 €
	3/4" (inclined and straight)						
		pc	13	x	16.79 €	=	218.27 €
4	Purchase, delivery and installation of riser control valves with metering outlets in brass casing, presetting with digital reading (fitted on feeder of the manifold), size and properties:						
	DN40 PN6 - Kvs 19.2						
		pc	3	x	89.70 €	=	269.10 €
	DN32 PN6 - Kvs 14.2						
		pc	1	x	78.20 €	=	78.20 €
5	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
	DN40, Kvm 12.8						
		pc	3	x	166.75 €	=	500.25 €
	DN32, Kvm 8.5						
		pc	1	x	149.50 €	=	149.50 €
	TOTAL C.I - Installation of thermostatic and balancing valves						**9,973.89 €**

C.II	**Repair of existing heating system pipes in the school and installation of new pipes in C building**						
1	Flushing of the entire heating system in buildings A, B and C. Dismounting of all radiators (208 steel ribbed radiators with 4 to 36 ribs and 2 aluminium radiators each 15 ribs), flushing to remove deposits from the bottom of the radiators, cleaning of air-release valves, remounting of radiators with installation of new radiator brackets.						
	Calculated lump-sum	pc	1	x	7,187.50 €	=	7,187.50 €
2	Dismantling of existing piping for hot water distribution towards the radiators in building C, dismantling of horizontal manifold in free space and all risers towards the radiators, as well as part of the pipes beneath the entry lobby that connects buildings A, B and C. Total of 160 m of steam pipes is dismantled.						
	Calculated lump-sum	set	1	x	920.00 €	=	920.00 €
3	Dismounting of existing control valves on riser and horizontal manifolds in the basement of building A, total of 20 pairs dimensions up to 1", as well as stop valves on certain manifolds of the piping connection size 2" and 3". Pipes will be fitted instead of dismounted valves.						
	Calculated lump-sum	set	1	x	460.00 €	=	460.00 €
4	Purchase of material and piping (horizontal manifold is fitted beneath the ceiling of the ground floor, and risers are fitted on the same positions as the existing) made of steel seamless pipes in compliance with JUS C.B5.221 or DIN 2448, dimensions:						
	Ø 48,3x2,6						
		m	20	x	11.39 €	=	227.70 €
	Ø 42,4x2,6						
		m	90	x	9.78 €	=	879.75 €
	Ø 33,7x2,6						
		m	60	x	8.34 €	=	500.25 €
	Ø 26,9x2,3						
		m	60	x	7.06 €	=	423.66 €
	Ø 21,3x2,0						
		m	280	x	6.44 €	=	1,803.20 €
	Ø 17,2x1,8						
		m	10	x	5.52 €	=	55.20 €
5	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures.						

	Calculated as 60% of the previous item		0.6	x	3,889.76 €	=	2,333.86 €
6	Relocation of one radiator in the upstairs hallway of building C to a more suitable place, drilling holes through slab to pull through pipes and connect to the existing air-release network.						
	Calculated lump-sum	set	1	x	92.00 €	=	92.00 €
	TOTAL C.II - Repair of existing heating system pipes in the school and installation of new pipes in C building						**14,883.12 €**
C.III	**Preliminary and finishing works**						
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
		lump-sum	1	x	460.00 €	=	460.00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves.						
		lump-sum	1	x	460.00 €	=	460.00 €
3	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.						
		lump-sum	1	x	230.00 €	=	230.00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.						
		lump-sum	1	x	172.50 €	=	172.50 €
5	Issuing of certificate for entire installed material and equipment.						
		lump-sum	1	x	230.00 €	=	230.00 €
6	Preparation of "As-built" design.						
		lump-sum	1	x	575.00 €	=	575.00 €
7	Installation of framed and glazed scheme of connections on a visible place in the boiler room.						
		lump-sum	1	x	230.00 €	=	230.00 €
8	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with the fire protection standards.						
		lump-sum	1	x	115.00 €	=	115.00 €

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9	Making holes in walls and ceilings of the building C for putting heating pipes, including mending works at penetration points for bringing walls and ceilings in proper condition.(12 penetration points on the walls and 7 on the ceilings)						
		lump-sum	1	x	575.00 €	=	575.00 €
	TOTAL C.III - Preliminary and finishing works						**3,047.50 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**7,874.05 €**
B	**HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS**	**172,508.74 €**
B.I	Dismantling of existing equipment and preliminary works	7,314.00 €
B.II	Installation of new boiler room equipment	165,194.74 €
C	**EFFICIENCY OF THE DISTRIBUTION SYSTEM**	27,904.51 €
C.I	Installation of thermostatic and balancing valves	9,973.89 €
C.II	Repair of existing heating system pipes in the school and installation of new pipes in C building	14,883.12 €
C.III	Preliminary and finishing works	3,047.50 €
	TOTAL PRICE, VAT EXCLUDED	**208,287.30 €**
	VAT (19 %)	**39,574.59 €**
	TOTAL PRICE, VAT INCLUDED	**247,861.89 €**

GROUP A5.1.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Secondary Vocational School in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	Secondary Vocational School in Pljevlja
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures above blackboards in classrooms and for lighting fixtures in buildings "B" and "C". Cables for light fitting for building "A" shall be connected to existing junction box in classroom and for buildings "B" and "C" as per attached drawings. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Control for light fixtures above blackboard is performed from existing control point. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	7.00				
	Works and material:	pc	270	x	24.15	=	6,520.50 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	14.00				
	Works and material:	pc	29.00	x	48.30	=	1,400.70 €
1.3.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	404	x	3.45	=	1,393.80 €

1.4.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	197	x	92.00	=	18,124.00 €
1.5.	Delivery and mounting of ceiling mounted luminaries 2/35W T16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	104	x	115.00	=	11,960.00 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	70	x	157.55	=	11,028.50 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	50	x	103.50	=	5,175.00 €
1.8.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	50	x	131.10	=	6,555.00 €
1.9.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	2	x	80.50	=	161.00 €
1.10.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	9	x	86.25	=	776.25 €

1.11.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	29	x	103.50	=	3,001.50 €
1.12.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	87	x	101.20	=	8,804.40 €
1.13.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	7	x	205.85	=	1,440.95 €
1.14.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	9	x	205.85	=	1,852.65 €
1.15.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP65 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	13	x	211.60	=	2,750.80 €
1.16.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 2M - pcs 1						
	Total for works and material	pc	16	x	5.75	=	92.00 €
1.17.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 1M - pcs 2						
	Total for works and material	pc	4	x	6.90	=	27.60 €
1.18.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	two-way switch 2M - pcs 1						
	Total for works and material	pc	4	x	6.33	=	25.30 €
1.19.	Delivery and installation of modular installation accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	two-way switch 1M - pcs 2						

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	Total for works and material	pc	4	x	8.05	=	32.20 €
1.20.	Delivery and installation of modular installation accessories, white						
	PVC box 3M						
	armature 3M						
	decorative mask 3M						
	ordinary switch 1M - pcs 3						
	Total for works and material	pc	18	x	9.20	=	165.60 €
1.21.	Delivery and installation of modular installation accessories, white						
	PVC box 6M						
	armature 6M						
	decorative mask 6M						
	ordinary switch with indication 1M - pcs 6						
	Total for works and material	pc	1	x	19.55	=	19.55 €
1.22.	Delivery and installation of infrared motion sensors 180° IP 54. Total for works and material	pc	1	x	79.35	=	79.35 €
	Total for lighting installation						**81,386.65 €**
2	**ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION**						
2.1.	Delivery and mounting of switch box "**RT-C1"**, ready-made, with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of the equipment. The following equipment shall be installed in switchbox:						
	disconnector switch INS 1-0, 40A, 3P	pc	1				
	automatic switch iC60N 20A, 6 kA, 1P	pc	3				
	automatic switch iC60N 16A, 6 kA, 1P	pc	8				
	automatic switch iC60N 10A, 6 kA, 1P	pc	6				
	contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-C1":	pc	1	x	287.50	=	287.50 €
2.2.	Delivery and mounting of switchbox "**RT-C2"**, ready-made, with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of the equipment. The following equipment shall be installed in switchbox:						
	differential current protective device iID 25/0,(	pc	1				
	automatic switch iC60N 16A, 6 kA, 1P	pc	12				
	automatic switch iC60N 10A, 6 kA, 1P	pc	6				
	contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-C2":	pc	1	x	322.00	=	322.00 €

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2.3.	Delivery and mounting of switchbox "**RT-ST**", ready-made, with a lock. The board is wall mounted for the installation of 24 modules (2x12M). The price includes all material required for installation of the equipment. The following equipment shall be installed in switchbox:						
	differential current protective device iID 25/0,(	pc	1				
	automatic switch iC60N 16A, 6 kA, 3P	pc	3				
	automatic switch iC60N 16A, 6 kA, 1P	pc	5				
	automatic switch iC60N 10A, 6 kA, 1P	pc	3				
	The price includes all material required for installation of this equipment. Total switch box "RT-C2":	pc	1	x	258.75	=	258.75 €
2.4.	Delivery and mounting of equipment within switchbox "**RT-BP**". The price includes all material required for installation of this equipment. The price includes dismantling of old equipment. The following equipment shall be installed in switchbox:						
	discontector switch INS 1-0, 80A, 3P	pc	1				
	automatic switch iC60N 32A, 6 kA, 3P	pc	3				
	automatic switch iC60N 25A, 6 kA, 1P	pc	6				
	automatic switch iC60N 16A, 6 kA, 1P	pc	15				
	automatic switch iC60N 10A, 6 kA, 1P	pc	16				
	automatic switch iC60N 6A, 6 kA, 1P	pc	2				
	contactor iCT 1NO, 16A, 230V	pc	3				
	contactor iCT 3NO, 16A, 230V	pc	1				
	Selector switch CM 1-0-2, 10A	pc	1				
	programmable time switch IHP 24 hours + 7 days	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-BP":	pc	1	x	506.00	=	506.00 €
2.5.	Delivery and mounting of equipment in existing switchbox **RT-BS**. The price includes all material required for installation of this equipment. This item also includes dismantling of old automatic switches for lighting. The following equipment shall be installed in switchbox:						
	automatic switch iC60N 10A, 6 kA, 1P	pc	7				
	contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment.	pc	1	x	69.00	=	69.00 €

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2.6.	Delivery and installation of power supply cables from RT-BP to RT ST and RT C1, and from RT C1 to RT C2. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. The price includes complete delivery with installation, connection and testing of conductors:						
	PPY 5x6 mm2	m	59	x	5.75	=	339.25 €
	PPY 5x4 mm2	m	5	x	4.60	=	23.00 €
2.7.	Delivery and installation of three phase connection points with PPY 5x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average length of laid down cable per one connection point is 12m. Work and material to be included:	pc	3	x	55.20	=	165.60 €
2.8.	Delivery and installation of one phase connection points with PPY 3x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average length of laid down cable per one connection point is 14m. Work and material to be included:	pc	61	x	48.30	=	2,946.30 €
2.9.	Delivery and installation of 2-modular accessories, white						
	PVC box ø 60						
	armature 2M						
	decorative mask 2M						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	59	x	6.90	=	407.10 €
					- €		
2.10.	Delivery and installation of 4-modular accessories, white						
	PVC box 4M						
	armature 4M						
	decorative mask 4M						
	outlet 2P+E 16A, 2M white - pcs 2						
	Total for works and material	pc	2	x	11.50	=	23.00 €
2.11.	Delivery and installation of three phase outlet 16A/400V, JUS N.EO.350. Total for works and material:	pc	3	x	9.20	=	27.60 €
	Total electrical installations for general consumption						**5,375.10 €**

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3	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
3.1.	Delivery and mounting of prefabricated wall mounted IP 55 switchbox in boiler room "RT KO" with appropriate dimensions and completely equipped with following parts:						
	Disconnector switch INS 1-0, 40A, 3P	pc	1.00				
	Motor protection switch GV2 ME, 1.6 - 2.5 A	pc	2.00				
	automatic switch 3p iC60N 20A 6 kA	pc	1.00				
	automatic switch 1p iC60N 16A 10 kA	pc	15.00				
	automatic switch 1p iC60N 16A 10 kA	pc	3.00				
	The price includes all material required for installation of this equipment.						
	Total switch box "RT-KO"	pc	1.00	x	517.50	=	517.50 €
3.2.	Delivery and laying of cables in wall installations with PVC rigid installation pipes and galvanized cable trays in boiler room, for construction of the electrical circuits of electrical consumers in the boiler room through cable trays and partly through rigid PVC pipes in wall installation. Works and material are calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	25.00	x	2.19	=	54.63 €
	PP-Y 3x2,5 mm2	m	152.00	x	2.76	=	419.52 €
	PP-Y 5x2,5 mm2	m	23.00	x	3.11	=	71.42 €
	PP-Y 5x4 mm2	m	14.00	x	4.60	=	64.40 €
	Outlet three phase 3P+N+PE 16A/400V IP55	pc	1.00	x	9.20	=	9.20 €
	Outlet 2P+E / 230V/ IP 55	pc	2.00	x	8.05	=	16.10 €
	Ordinary switch 10A, IP44	pc	2.00	x	5.75	=	11.50 €
	Two-way switch IP44 10A	pc	2.00	x	6.90	=	13.80 €
	Serial switch 10A IP44	pc	1.00	x	5.75	=	5.75 €
	Delivery and mounting of ceiling mounted emergency luminaries with electronic control gear, 8W,IP 65, 1h.Works and material to be included per unit:	pc	1.00	x	40.25	=	40.25 €
3.3.	Delivery and mounting of deep galvanized cable trays according to the drawing layouts. Works include delivery, mounting of all necessary materials for connection and mounting. The unit measure is m' per the cable tray 100 mm.						
	PNK 100	m	18.00	x	14.95	=	269.10 €
	Total for power supply and electrical installation for boiler room and heating equipment						**1,493.16 €**

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4	**POTENTIAL EQUALIZATION INSTALLATION**						
4.1.	Delivery and mounting of deep galvanized tape Fe-Zn 25x4 mm for potential equalization in boiler room, according to the installation drawing layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	24.00	x	2.30	=	55.20 €
4.2.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	22.00	x	5.75	=	126.50 €
4.3.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	m	5.00	x	4.60	=	23.00 €
4.4.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	14.00	x	3.45	=	48.30 €
4.5	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	60.00	x	5.75	=	345.00 €
	Total potential equalization installation						**598.00 €**
5	**LIGHTING AND GROUNDING INSTALLATION**						
5.1.	Dismantling of existing lightning protection system.	lump sum	1	x	230.0	=	230.00 €
5.2.	Delivery and installation of lightning descending system, round conductors made of Al/Mg with diameter of 10 mm, for the replacement of obsolete lightning descending conductors. Lightning descending conductors shall be mounted from outlet of foundation grounding system to the position of lightning installations at the roof, according to technical recommendation and regulations. Works and material to be calculated per unit:	m	58.00	x	2.3	=	133.40 €
5.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						

	Lightning conductor holder for roof installation:	pc	22.00	x	5.75	=	126.50 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	38.00	x	5.75	=	218.50 €
	Holders for vertical mechanical protection of lightning conductors:	pc	4.00	x	5.75	=	23.00 €
5.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-wire	pc	2.00	x	5.75	=	11.50 €
	linking clamp wire-wire	pc	4.00	x	5.75	=	23.00 €
	groove clamp (for crossing over horizontal gutters)	pc	20.00	x	5.75	=	115.00 €
		pc					
5.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	2.00	x	28.75	=	57.50 €
5.6.	Delivery and mounting of prefabricated lightning installation system with air terminal SI60 INTERCEPTOR ERITECH or equivalent. Sections of the mast are 2m and 1 x 2m. Mast is connected to the wall in accordance to the technical drawings. Works and material to be included in price:						
	AIR TERMINAL INTERCEPTOR SI 60	pc	1	x	1667.5		1,667.50 €
	2M section 1	pc	1	x	11.5		11.50 €
	2M section 2	pc	1	x	11.5		11.50 €
	console for air terminal	pc	3	x	57.5		172.50 €
	junction part for connection with grounding tape	pc	1	x	11.5		11.50 €
5.7.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	130.00	x	2.30	=	299.00 €
5.8.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measurement unit.	pc	16.00	x	9.20	=	147.20 €
	Total for lighting and grounding installation						**3,259.10 €**
6	**SPARE PARTS**						
6.1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	6.4	=	12.88 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	5.4	=	10.81 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	5.4	=	10.81 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	5.3	=	10.58 €

	compact fluorescent light bulb TC-L 18W	pc	2	x	5.2	=	10.35 €
	Total for spare parts:						**55.43 €**
7	**TESTING**						
7.1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	230.00 €	=	230.00 €
7.2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	345.00 €	=	345.00 €
	Total for testing:						**575.00 €**
8	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**345.00 €**	=	**345.00 €**

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	81,386.65 €
2	ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION	5,375.10 €
3	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	1,493.16 €
4	POTENTIAL EQUALIZATION INSTALLATION	598.00 €
5	LIGHTING AND GROUNDING INSTALLATION	3,259.10 €
6	SPARE PARTS	55.43 €
7	TESTING	575.00 €
8	PREPARATION OF MAINTENANCE DESIGN	345.00 €
	TOTAL PRICE, VAT EXCLUDED	93,087.44 €
	VAT (19%)	17,686.61 €
	TOTAL PRICE, VAT INCLUDED	**110,774.05 €**

GROUP A5.1.4 ***BILL OF QUANTITIES*** *on Indoor Water Supply and Sewerage Services in Secondary Vocational School in Pljevlja*	*Client:*	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Secondary Vocational School, Pljevlja
	Documentation:	Final Design of Indoor Water Supply and Sewerage Services
	Date:	30 May 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1.01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	16.00	x	10.25 €	=	164
1.02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	17.00	x	10.25 €	=	174
1.03	Removal of existing toilet bowels with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	1.00	x	10.25 €	=	10
1.04	Removal of existing shower faucets, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2.00	x	15.38 €	=	31
1.05	Removal of existing faucets above concrete lavatories, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	8.00	x	51.25 €	=	410
1.06	Removal of existing showers, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2.00	x	35.88 €	=	72
1.07	Removal of existing urinals, with siphon trap and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	8.00	x	10.25 €	=	82

1.08	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per m'	m'	62.42	x	7.18 €	=	448
1.09	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	6.00	x	15.38 €	=	92
1.10.	Removal of existing water heating cylinders, and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	3.00	x	10.25 €	=	31
	TOTAL REMOVAL WORKS						**1514**
II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
2.01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dØ20mm(DN15)	m	47.03	x	3.59 €	=	169
	dØ25mm(DN20)	m	26.61	x	4.61 €	=	123
2.02	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dØ20mm(DN15)	piece	30.00	x	12.30 €	=	369
	dØ25mm(DN20)	piece	10.00	x	14.35 €	=	144
2.03	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	25.00	x	12.30 €	=	308

2.04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	73.64	x	2.05 €	=	151
2.05	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works shall be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	73.64	x	3.59 €	=	264
2.06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1.00	x	153.75 €	=	154
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**1680**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
	Toilets 1, 2, 3 and 4:						
3.01	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1.00	x	512.50 €	=	513
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	6.00	x	30.75 €	=	185
	Toilet 5 (for disabled persons):						
3.03	Purchase and installation of PP sewage pipes for interior installations, together with all required sealing equipment for proper network operation. Pipe connecting shall performed by rubbers. Upon finished pipes assembling to rinse pipelines and performed distribution lines has to be waterproof tested. All chase cuttings and hole perforations within walls, slabs and structures, as well as bringing the walls back into original state shall be incalculated within the unit price. Calculation as per m' of installed pipes.						
	DN50mm	m	1.70	x	6.15 €	=	10
	DN110mm	m	2.60	x	9.02 €	=	23

3.04	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	1.00	x	30.75 €	=	31
3.05	Conducting water pressure test of all newly installed sewage pipes, as per appicable regulation (refer to chapter "Technical conditions for works execution" of this tender document). Pump the water into the respective foul drainage network. If the network is defective, all deficiencies must be repaired.						
	Calculation per m'.	m	4.30	x	153.75 €	=	661
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**1423**
IV	**SANITARY EQUIPMENT**						
4.01	Purchase and installation of toilet bowl completely made of ceramics, type "simplon", with plastic low mounted water tank, connection pipes, sealing and gaskets, including all other bits and pieces necessary for proper installation of the toilet bowl. Calculation as per piece.						
	Type: "Simplon"	piece	2.00	x	170.15 €	=	340
4.02	Purchase and mounting of shower bath, 80x80cm. The shower bath shall be mounted and connected with outflow siphon trap of 5/4", with plug and chain, including chrome plated hot and cool water tap with rise up shower. The shower bath colour shall be purchased as per Employer / Employer's Representative choice. Calculation as per shower bath piece.						
	dimensions 80x80cm	piece	2.00	x	287.00 €	=	574
4.03	Purchase and installation of faucet above concrete lavatory, for cold water only, together with gaskets and all other bits and pieces necessary for assembling.						
	Calculation as per piece.	piece	8.00	x	246.00 €	=	1968
4.04	Purchase and delivery of first class ceramic wall toilette urinal. The toilette urinal shall be fixed by means of rubber spacers, suitable wall plugs and brass screws. To install chrome plated stop valve and siphon trap. The siphon trap shall be ordered as per Employer / Employer's Representative decision. Calculation as per piece.						
	toilette urinal	piece	8.00	x	138.38 €	=	1107

4.05	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network shall be connected by siphon trap of Ø100. Water tank shall be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette shall be ordered as per Employer / Employer's Representative decision.						
	Calculation as per piece.	piece	17.00	x	123.00 €	=	2091
4.06	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation.						
	Calculation as per piece.	piece	17.00	x	138.38 €	=	2352
4.07	Purchase and installation of vertical water heating cylinder of 80 l capacity, a wall mounting type, connectors and other accessories for proper operation.						
	Calculation as per piece.	piece	2.00	x	148.63 €	=	297
	TOTAL SANITARY EQUIPMENT						**8730**

SUMMARY OF COSTS

I	REMOVAL WORKS	1514
II	WATER-SUPPLY INDOOR INSTALLATIONS	1680
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	1423
IV	SANITARY EQUIPMENT	8730
	TOTAL PRICE, VAT EXCLUDED	13347
	VAT (19 %)	2536
	TOTAL PRICE, VAT INCLUDED	**15883**

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GROUP A5.2.1 BILL OF QUANTITIES of building and trade works for energy efficiency improvement in "Ristan Pavlović", Secondary School in Pljevlja		
	Investor:	Ministry of Economy of Montenegro, Energy
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	Facility:	Primary school "Ristan Pavlović", Pljevlja
	Documentation:	Final Architectural Design
	Date:	April 2014.

	GENERAL TERMS
1	Works to be conducted according to applicable technical regulations, standards and required standards applicable for construction of such facilities.
2	Use materials with a quality certificate that meet required standards.
3	Apply measures promptly for safety of the facility and works, equipment and investment material, workers, passengers, traffic and surrounding facilities.
4	Obey technical documentation, based on which a building permit was granted.
5	Item unit price includes all expenses for works, materials, transport, cleaning of the facility after construction, tax liabilities, profits and all other non mentioned expenses for the completion of works under documents of the Agreement, technical regulations and applicable average standards in the construction industry.

Item	Description of the Item	Unit of measur	Quantity		Unit price (€)		Amount (€)
SCHOOL AND GYM							
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings and vertical gutters. Flashings have different developed widths and they are made from galvanized, coloured sheet with double interlocking, d=0,68mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and debris transportation to the town depot. Calculation is based on a m1 of dismantled flashings, gutters, and their supporters.						
	horizontal rain gutters, developed width up to 66 cm						
	Calculation per m1	m1	109.80	x	1.03 €	=	**113**
	-vertical gutters, dim.15x15cm, developed width up to 66cm, including dismantling of top gutter cisterns.						
	Calculation per m1	m1	26.23	x	1.03 €	=	**27**
	-attic-wall flashings, developed width d.w.= 41-50cm.						
	Calculation per m1	m1	124.22	x	1.03 €	=	**127**
	-roof and wall valleys, developed width up to 66cm.						
	Calculation per m1	m1	117.38	x	1.03 €	=	**120**
	-flashing sill, developed width 41-50cm.						
	Calculation per m1	m1	160.05	x	1.03 €	=	**164**
	-funnel flashing, developed width 50cm.						
	Calculation per m1	m1	16.14	x	1.03 €	=	**17**

1.02.	Repair of damages in the parapet walls d=25cm and more, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheet and PVC sills. The unit price includes all works and materials.						
	Calculation per m1	m1	271.85	x	6.66 €	=	**1811**
1.03.	Repair of jamb damages d=25cm, caused by dismantling of the joinery. Surfaces shall be treated with lime cement mortar 1:2:6, previously sprinkled with low density cement mortar, to prepare the item for installation of new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheets and PVC sills. The unit price includes all works and materials.						
	Calculation per m1	m1	640.27	x	6.66 €	=	**4266**
1.04.	Dismantling and re-installation of cameras, lighting, and other facade devices and equipment. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility.						
	Calculation as per piece.	pc	5.00	x	59.45 €	=	**297**
1.05.	Production and installation of the roof eave flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm. Developed width shall be 60cm. The item includes surface preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the Design, sample and the color of the material shall be selected and aproved by the Employer / Employer's Representative.						
	Calculation per m1	m1	151.70	x	14.97 €	=	**2270**
1.06.	Production and installation of funnel flashing, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, developed width 50cm. The item includes base preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the Design, sample and the color of the material shall be selected and approved by the Employer / Employer's Representative.						
	Calculation per m1	m1	5.50	x	14.97 €	=	**82**

1.07.	Production and installation of the parapet sills, made of ready made plastic-laminated galvanized steel metal sheets=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 50 cm. The item includes surface preparation and complete binding following the regulations. Undertake the entire procedure in compliance with the Design, sample and the color of the material shall be selected and approved by the Employer / Employer's Representative.						
	Calculation per m1	m1	271.85	x	14.97 €	=	**4068**
1.08.	Production and installation of horizontal gutters of 150/150mm square section and vertical downpipes, round (d=160mm) plastic-laminated galvanized steel metal sheets d=0,70mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material. The unit price includes manufacturing of top gutter-cisterns at the joint of vertical and horizontal gutters.						
	Calculation per m1	m1	119.89	x	14.97 €	=	**1794**
1.09.	Production and installation of lying horizontal rain gutters, made of ready painted galvanized metal sheets, d=0,68cm, developed width 66 cm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with 0,5% slope towards rainwater downpipes.						
	Calculation per m1	m1	126.42	x	14.97 €	=	**1892**
1.10.	Setting up "Demit" thermal facade. External thermal insulation of the facade walls will be conducted with expanded EPS polystyrene, having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm, produced by the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	Gym facade walls and stone claded facade walls of the ground floor of the main school object (all parapets in the ground floor, pillars and parts of the full wall) will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK.						

	Thermal boards with B1 flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing) to be used. Install panels and vertical breaks of 50 cm width along the entire facade, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.						
	Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the facade opening. Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:						
	* first layer – refined mortar based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene boards will be filled with polyurethane foam.						
	Reinforcing mesh with adequate overlapping and extra protection at the facade openings and corners is placed in a fresh layer of this mortar. In case additional mechanical anchoring is required, impact bolt through the reinforcing mesh shall be used 24 hours after applying this layer.						
	* reinforcing mesh, * second layer of mortar, apply same procedure as with the first layer. This mortar is laid to well- dried first layer and polished afterwards, * contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar,						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour defined by the Employer / Employer's Representative, while the entire procedure will be conducted according to the design details.						
	Before setting up the thermal plates, the following works will be conducted: * All works on the roofs, including sheet metal works, *reduction of windows/glazed areas, * replacement of façade joinery, * placing the entire envisaged installation in the facade,						

	*covering and protection of all non-treated surfaces – glass, stone... *Control and testing of the existing facility surface, including: Use the means of impregnation- basic coating at the most critical points of the facility. When the basic coating dries out, set up the EPS cube of 5x5x5 cm by using polystyrene adhesive. Once the adhesive completely settles, minimum 3 days after the working conditions are adequate, try to separate the cube manually.						
	If in the process of separating expanded polystyrene only the adhesive separates and not parts of the basis - the basis is sufficiently strong, solid and stable.						
	If in the process of separating expanded polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.						
	If in the process of separating expanded polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough, and shall not withstand new layer of thermal insulation.						
	Use the reinforcing mesh or angle profiles for the window corners and jambs. Facade ends along the plinth must have U-profile strip, adjusted to the thickness of thermal-plate.						
	Before setting the plates, thoroughly clean the facade surface from dust, greasy deposits and mortar. At heights over 8 meters, plates need additional anchoring with appropriate bolts.						
	During the works on the facade, surface, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortar shall not be applied in the event of heavy wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Treatment of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be in line with the appropriate EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						

	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	EPS	m2	805.89	x	19.99 €	=	**16108**
	XPS	m2	935.91	x	25.11 €	=	**23503**
	Pressed mineral wool	m2	124.02	x	23.06 €	=	**2860**
1.11.	Setting up "Demit" thermal facade on the ceiling of the bay of the school. All the materials and works shall be in line with description of the item 1.10.						
	Calculation per m2	m2	72.52	x	19.99 €	=	**1449**
1.12.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned (ceiling of canopies at the entrance, porch ceiling in front of the gym entrance). Type and colour of the render will be selected by the Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, and if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	***contact coating** made of the emulsion of synthetic resins and water-glass (liquid sodium silicate) used for impregnation of the set reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This layer shall be made in fine grained and smooth structure, painted in colour determined by the Employer / Employer's Representative, fully in line with the Design details.						
	The openings shall be protected with PVC foil. The unit price includes the purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.						
	Calculation per m2	m2	193.08	x	12.10 €	=	**2335**

1.13.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulie") as splash guard (as indicated on the drawings). Surface shall be cleaned, washed and sprinkled with acrylic base with granulate, color of the base by the color chart of the manufacturer determined by the Employer / Employer's Representative. Render shall be applied on cleaned and dried surface by manufacturer's instruction.						
	Calculation per m2	m2	101.58	x	15.58 €	=	**1583**
1.14.	Closing window opening at the external entrance to the boiler room by gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics) with proper connection to existing wall and reinforcement. Dimension of the opening is 90 / 145 cm. Preparing the surface for installation of thermal facade from the external side and plastering from the internal side. One ventilation opening with fly screen of 100 cm2 shall be inserted in the facade in that area. Ventilation opening shall be sturdy quality.						
	Calculation lump sum.	lump sum	1.00	x	87.13 €	=	**87**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**64974**
II	**THERMAL INSULATION AND ISTALLATION OF THE NEW ROOF ON THE MAIN SCHOOL BUILDING**						
2.01.	Removal of existing roof cover made of painted trapezoid metal-sheet and small beams 8/10cm, lined at the distance up to 1.00 m until the wooden roof structure is reached. The unit price includes all the work and debris transportation to the town landfill.						
	Calculation per m2 actual area of the sloped roof.	m2	748.90	x	4.31 €	=	**3224**
2.02.	Demolition of multi-pitched wooden roof structure (roof posts, rafters, struts, tie beams...). Removed roofing timber to be classified and hand over to the Employer / Employer's Representative. Calculation per m2 of horizontal projection of the roof. The unit price includes all material and transportation of debris to a town landfill.						
	Calculation per m2	m2	756.35	x	3.90 €	=	**2946**
2.03.	Dismantling of the RC horizontal beams and vertical pilars (concrete is old over 10 years). The unit price includes all the work and usage of the scaffold, transportation of the debris to the town landfill.						
	Calculation per m3	m3	9.77	x	77.90 €	=	**761**

2.04.	Dismantling of the gable walls and roof parapet walls made of brick (d=25cm) laid in gauged mortar. Walls are plastered from both sides. The unit price includes all the work and scaffold, transportation of the debris to the town landfill.						
	Calculation per m3	m3	36.48	x	38.95 €	=	**1421**
2.05.	Dismantling the part of the chimney which is going through the attic and above the roof. Chimney is made of compact brick laid in gauged mortar. The unit price includes all the work and debris transportation to the town landfill, as well as usage of the scaffold.						
	Calculation per m3	m3	1.87	x	49.20 €	=	**92**
2.06.	Making the opening in the ceiling slab (made of reinforced concrete d=15cm) for entrance to the attic. Dimension of the opening shall be 60x60 cm.						
	Calculation as per piece	pc	1.00	x	117.88 €	=	**118**
2.07.	Extension of the height of the existing chimney (one which is starting from the boiler room) due installation of the new roof by brick d=25cm laid in the gauged mortar 1:2:6, simultaneously with the plastering of the chimney channel. Joints on the part of the chimney which is higher than roof shall be filled with cement plaster 1:3. The unit price includes all works, materials, usage of the scaffold and also production and installation of the chimney top made of the concrete d=10cm thick.						
	Calculation per m3	m3	4.45	x	169.13 €	=	**753**
2.08.	Installation of RC beams above the second floor and cantilever cornices d=10cm and 30cm width. Beams and cornices shall be made of reinforced concrete MB30 in necessary smooth formwork. The unit price includes all works, materials, anchoring to existing RC beams and usage of necessary scaffold.						
	Calculation per m3	m3	15.14	x	169.13 €	=	**2561**
2.09.	Purchase, straightening, cutting, cleaning, bending and mounting of the armature GA240/360 and RA400/500, all in line with static analysis. Quantity of the armature is calculated approximately, and precise quantity shall be determined through the detailed graphical review of the reinforcement. The unit price includes all works and materials.						
	Calculation per kg	kg	900.00	x	1.23 €	=	**1107**

2.10.	Production and installation of roof trusses with inclination of 30 and 33°. Trusses shall be up to 2,00m distance, made of softwood lumber, class II, dried and coated against insects. Linear bearers in the uper and lower zone of the truss- 16/20 cm, struts- 14/16 cm, bracings and bonding beams- 16/20 cm, to be placed along the whole length. It, also, shall be equiped with necessary shackles, everything in line with structural analysis. The unit price includes all work, material and treatment of wood with 1st class fire-resistant coating. Calculation per m2 of horizontal projection of the roof.						
	Calculation per m2	m2	795.51	x	17.22 €	=	**13699**
2.11.	Procurement and installation of purlins, at 1,80 m distance, made of "Z" profiles 100/50/5 mm. Purlins to be cleaned from the corrosion, treated with red lead coating, and painted with double layer of paint for metal. Quantity of the armature is calculated approximately, and precise quantity shall be determined through the detailed graphical review of the reinforcement. The unit price includes all works and materials.						
	Calculation per kg	kg	5,100.00	x	2.56 €	=	**13069**
2.12.	Covering the multi-pitched roof using pre-painted Al sheet metal Al.Tr. 40/230/0,7 mm. Upon installation, execute the following works: roof ridge flashing, roof hip flashing and gutters flashing and, also, setting up of snowhurdles. Calculation per m2 of actual inclined roof area. The price includes all work and material in line with the description.						
	Calculation per m2	m2	917.83	x	28.50 €	=	**26154**
2.13.	Setting up thermal insulation of the attic will be conducted with mineral wool d=10, having heat transfer coefficient of λmax = 0,037 W/mK. Thermal insulation shall be placed over concrete slab and vapour barier and protected by PVC foil with overlaps 10-15 cm. The unit price includes all the work and materials.						
	Calculation per m2	m2	795.51	x	12.10 €	=	**9622**
2.14.	Making of cement screed in the central area of the attic as the protection for thermal insulation. Calculation per m2. The price includes setting up of the mesh with 5 cm overlap (1,08m2/m2) and smoothing as the final treatment, with 5 cm of creed thickness.						
	Calculation per m2	m2	185.72	x	10.97 €	=	**2037**

2.15.	Production and installation of the metal ladders and climbers for entrance to the attic and roof. Ladders and climbers shall be painted with doble layer of paint and treated with red lead coating.						
	Calculation as per piece.	pc	2.00	x	128.13 €	=	**256**
2.16.	Production and installation of the metal cover for entrance to the attic and roof with all necessary elements. Cover shall be painted with doble layer of paint and treated with red lead coating, and to be thermaly insulated from the bottom side.						
	Calculation as per piece.	pc	1.00	x	117.88 €	=	**118**
	TOTAL FOR THERMAL INSULATION AND WATERPROOFING OF THE ROOF						**77936**
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery.						
	340/180	pc	16.00	x	11.50 €	=	**184**
	200/75	pc	5.00	x	11.50 €	=	**58**
	340/100	pc	1.00	x	11.50 €	=	**12**
	400/135	pc	4.00	x	11.50 €	=	**46**
	400/135	pc	7.00	x	11.50 €	=	**81**
	450/100	pc	1.00	x	11.50 €	=	**12**
	185/100	pc	1.00	x	11.50 €	=	**12**
	390/70	pc	1.00	x	11.50 €	=	**12**
	340/230	pc	16.00	x	11.50 €	=	**184**
	400/230	pc	20.00	x	11.50 €	=	**230**
	366/280	pc	1.00	x	11.50 €	=	**12**
	366/280	pc	1.00	x	11.50 €	=	**12**
	300/220+60	pc	1.00	x	11.50 €	=	**12**
	300/190	pc	1.00	x	11.50 €	=	**12**
	200/140	pc	2.00	x	11.50 €	=	**23**
	300/280	pc	1.00	x	11.50 €	=	**12**
	190/220+80	pc	1.00	x	11.50 €	=	**12**
	300/715	pc	2.00	x	11.50 €	=	**23**

3.02.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frames, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4+16+4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes.						
	- include internal PVC sill of required width in the item, - PVC profile colour - white.						
	1. 340/180	pc	5.00	x	759.00 €	=	**3795**
	2. 200/75	pc	3.00	x	791.20 €	=	**2374**
	3. 340/100	pc	1.00	x	623.30 €	=	**623**
	4. 400/135	pc	4.00	x	702.65 €	=	**2811**
	4'. 400/135	pc	7.00	x	434.70 €	=	**3043**
	5. 450/100	pc	1.00	x	634.80 €	=	**635**
	6. 185/100	pc	1.00	x	282.90 €	=	**283**
	7. 390/70	pc	1.00	x	501.40 €	=	**501**
	8. 340/230	pc	14.00	x	1,050.0 €	=	**14699**
	10. 340/230	pc	2.00	x	718.8 €	=	**1438**
	11. 340/180	pc	1.00	x	580.75 €	=	**581**

3.03.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - low emission, double glazing, 4+16+4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes. NOTE: External glazing to be coated by special low emission layer as protection against sunshine.						
	- include internal PVC sill of required width in the item, - PVC profile colour - white.						
	1'. 340/180	pc	10.00	x	759.00 €	=	**7590**
	2. 200/75	pc	2.00	x	791.20 €	=	**1582**
	9. 400/230	pc	20.00	x	1,179.9 €	=	**23598**
3.04.	Production and installation of the facade aluminium joinery. The unit price includes everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Measures must be taken on site. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2,30 W/m2K - aluminium jealousies if existing in joinery schemes, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium.						
	A1 and A1'. 366/280	pc	2.00	x	2,139.0 €	=	**4278**
	A2. 300/220+60	pc	1.00	x	1,650.3 €	=	**1650**
	A3. 155/190	pc	1.00	x	653.20 €	=	**653**
	A4. 200/140	pc	2.00	x	657.80 €	=	**1316**

	A5. 300/280	pc	1.00	x	1,543.3 €	=	**1543**
	A6. 190/220+80	pc	1.00	x	1,200.60 €	=	**1201**
	A7. 300/715	pc	2.00	x	5,359.0 €	=	**10718**
3.05.	Removal of existing protective bars from the facade in the area of the gym and ground floor of the main school building before replacement of joinery and its refitting, after new joinery is installed. Cleaning and scraping. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted. The unit price includes possible replacement of the defective parts.						
	190/80	pc	1.00	x	57.50 €	=	**58**
	185/100	pc	1.00	x	57.50 €	=	**58**
	200/75	pc	2.00	x	57.50 €	=	**115**
	340/100	pc	1.00	x	92.00 €	=	**92**
	340/180	pc	3.00	x	92.00 €	=	**276**
	390/70	pc	1.00	x	80.50 €	=	**81**
	400/135	pc	8.00	x	103.50 €	=	**828**
	450/100	pc	1.00	x	103.50 €	=	**104**
3.06.	Production and installation of the windshield aluminium joinery. The unit price includes everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - plastic coated aluminium construction system without thermal break, -glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	A8. 634/305	pc	1.00	x	3,313.2 €	=	**3313**
	A9. 200/305	pc	1.00	x	964.9 €	=	**965**
	A10. 200/305	pc	1.00	x	894.7 €	=	**895**

	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper. **NOTE:** Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.						
3.07.	Production and installation of meshes manufactured from ropes. Meshes shall be attached on ceilings / walls over the windows in the gym, as a glass protection. Before installation meshes shall be sampled and approved by Employer / Employer's Representative.						
	opening dim. 400/135cm POS 4 & 4*	pc	11.00	x	74.75 €	=	**822**
	REPLACEMENT OF FACADE JOINERY						**92516**
IV	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
4.01.	Breaking out an opening for boiler room door through stone wall, 55cm thick (built in cement mortar). Wall parts shall be demolished carefully, so the wall structure remains undamaged. The unit price includes all works, removal and loading of debris onto a truck and transportation to a landfill at 5 km distance.						
	Calculation per m3	m3	0.30	x	128.13	=	**38**
4.02.	Demolition of the plain concrete (d=10cm) pavement (plateau), placed over the layer of gravel d= 10 cm, between school and gym entrance. The unit price includes all works, removal and loading of debris onto a truck and transportation to a landfill at 5km distance.						
	Calculation per m2	m2	60.11	x	4.51		**271**
4.03.	Clearing the field for pavement making, 1m width, along with manual excavation 10-20cm of depth. The unit price includes all works, removal and loading of excavated material onto a truck and transportation to a landfill at 5km distance.						
	Calculation per m2	m2	17.25	x	7.18		**124**
4.04.	Gravel filling and compression in the area beneath the floor of the pavement, d=10 cm. Filled layer of gravel shall have accurately determined width and right cross-section, with precision of ±1cm. The unit price includes all works and materials.						
	Calculation per m3	m3	7.73	x	31.78	=	**246**

4.05.	Concrete works shall include putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. In some parts of pavement there will be openings for illumination of basement windows. These parts have to be reinforced by using mesh reinforcement Q 188. Pavement has to be strained into the fields CCA 1,5m2. Expansion joints shall be filled up with joint filler. Note: The concrete structure at the coal reception shall be removed and replaced by concrete pavement. The unit price includes all works and materials.						
	Calculation per m2	m2	77.36	x	17.84	=	**1380**
4.06.	Removal of brick chimneys on the roof of the school building up to the slab level. Closing the chimney flue holes with concrete. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance. Preparing of surfaces for installation of the new roof. Removal works shall be done very carefully, in order to avoid damages of the ceiling RC slab						
	Calculation as per piece.	pc	4.00	x	63.55 €	=	**254**
	EE MEASURES						**2059**
V	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
	RENEVAL OF THE DRESSING ROOMS						
5.01.	Removal of wood trim covering from the walls along with wooden lath substructure and loading of debris onto a truck with transportation to a landfill up to 5 km distance.						
	Calculation per m2	m2	16.20	x	3.59 €	=	**58**
5.02.	Removal of existing rotten plaster from the walls in dressing rooms and the gym- 20% of total area. The unit price includes removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance, and using of the scaffolding.						
	Calculation per m2 511.47*20%	m2	102.29	x	3.59 €	=	**367**
5.03.	Scraping of the old paint from the internal ceilings and walls in dressing rooms and the gym. Removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						

	Calculation per m2	m2	471.00	x	0.51 €	=	**241**
5.04.	Scraping of the old oil based paint from the internal walls in the dressing rooms and the gym using gas burner ("brener"), removal and loading of the debris onto a truck and transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2	m2	259.89	x	1.85 €	=	**479**
5.05.	Dismantling of the existing joinery- doors of dressing rooms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative for storing away. Calculation is done per m2 of dismantled joinery.						
	90/205 pc 2	m2	3.69	x	6.15 €	=	**23**
5.06.	Plastering parts of existing walls and ceilings in dressing rooms and the gym - 20% of total area, with gauged mortar 1:2:6 in two layers, with the previous spraying of cement slurry. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges. The unit price includes usage of scaffold.						
	Calculation per m2	m2	102.29	x	8.00 €	=	**818**
5.07.	Skimming, polishing and painting of the walls and ceilings in dressing rooms and the gym. The Employer / Employer's Representative will select the tone of semi dispersed water-based distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer. Calculation per m2, including all necessary work, materials and scaffolding.						
	dressing rooms	m2	573.28	x	4.00 €	=	**2292**
5.08.	Purchase of materials and painting the dressing rooms and the gym walls using oil based paint, up to the height of 1,5 m in two layers, colour will be selected by the Employer / Employer's Representative.						
	dressing rooms	m2	259.89	x	3.33 €	=	**866**
5.09.	Production and installation of internal single-leaf door, made of PVC. The unit price includes: the purchase of materials, manufacturing, transport and installation of fitting and blind frame. Measures must be taken on site. Calculation is based per piece of the installed joinery.						

	90/205	pc	2.00	x	404.88 €	=	**810**
	PAINTING WORKS OF THE WALLS AND CEILINGS						
5.10.	Stripping off dilapidated plaster (d=2,5cm) of from the walls and ceilings (10%), removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance and scaffolding.						
	Calculation per m2 3837.42x10%	m2	383.74	x	3.59 €	=	**1377**
5.11.	Scraping of the old oil based paint from the internal walls in the classrooms and corridors using gas burner ("brener"), removal and loading of the debris onto a truck and transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2						
	hall, corridors	m2	480.98	x	1.85 €	=	**887**
	classrooms and other premises	m2	851.89	x	1.85 €	=	**1572**
5.11.	Plastering parts of existing ceilings and treatment of damaged surfaces (10% of total area) with cement-lime plaster 1:2:6, previously treating the walls with cement milk. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges. The unit price includes usage of scaffold.						
	Calculation per m2	m2	383.74	x	8.00		**3068**
5.12.	Scraping and skimming of walls and ceilings with emulsion putty. All surfaces need to be scraped and washed and then smoothen, cleaned and impregnated. Inspect and remedy minor damages and cracks using putty. Flatten with putty and skim with emulsion putty for the first time. All surfaces need to be smoothen, then flatten with putty and skimmed with emulsion putty for the second time. Perform all the works using required scaffold.						
	Calculation per m2						
	-hall, corridors						
	ground floor						
	walls	m2	217.47	x	2.36 €	=	**513**
	ceilings	m2	209.07	x	2.36 €	=	**493**
	first floor						
	walls	m2	251.99	x	2.36 €	=	**594**
	ceilings	m2	249.64	x	2.36 €	=	**589**
	second floor						
	walls	m2	251.99	x	2.36 €	=	**594**
	ceilings	m2	249.64	x	2.36 €	=	**589**
	- classrooms and other premises						
	ground floor						
	walls	m2	398.97	x	2.36 €	=	**941**

	ceilings	m2	318.19	x	2.36 €	=	**750**
	first floor						
	walls	m2	368.62	x	2.36 €	=	**869**
	ceilings	m2	442.54	x	2.36 €	=	**1043**
	second floor						
	walls	m2	368.62	x	2.36 €	=	**869**
	ceilings	m2	442.54	x	2.36 €	=	**1043**
5.13.	Treatment of the walls with oil-based paint in height h=1.40m in two layers in colour selected by the Employer / Employer's Representative.						
	Calculation per m2						
	-hall, corridors						
	ground floor	m2	144.98	x	3.33 €	=	**483**
	first floor	m2	168.00	x	3.33 €	=	**560**
	second floor	m2	168.00	x	3.33 €	=	**560**
	- classrooms and other premises						
	ground floor	m2	290.89	x	3.33 €	=	**969**
	first floor	m2	280.50	x	3.33 €	=	**934**
	second floor	m2	280.50	x	3.33 €	=	**934**
5.14.	Painting internal ceilings with semi-dispersed water based distemper, by applying two layers of the paint, in colour selected by the Employer / Employers Representative, using scaffold.						
	Calculation per m2						
	-hall, corridors						
	ground floor						
	walls	m2	217.47	x	1.64 €	=	**357**
	ceilings	m2	209.07	x	1.64 €	=	**343**
	first floor						
	walls	m2	251.99	x	1.64 €	=	**413**
	ceilings	m2	249.64	x	1.64 €	=	**409**
	second floor						
	walls	m2	251.99	x	1.64 €	=	**413**
	ceilings	m2	249.64	x	1.64 €	=	**409**
	- classrooms and other premises						
	ground floor						
	walls	m2	398.97	x	1.64 €	=	**654**
	ceilings	m2	318.19	x	1.64 €	=	**522**
	first floor						
	walls	m2	368.62	x	1.64 €	=	**605**
	ceilings	m2	442.54	x	1.64 €	=	**726**
	second floor						
	walls	m2	368.62	x	1.64 €	=	**605**
	ceilings	m2	442.54	x	1.64 €	=	**726**
5.15.	Cleaning of the construction waste and its dumping to a construction material landfill at 5 km distance.						
	Calculation per m2	m2	1,911.80	x	1.03	=	**1960**
	VARIOUS WORKS						

5.16.	Repairing of the existing parquet floor. Machine sanding and varnishing of the parquet. Conduct these procedures three times by using color free lacquer. Before varnishing, thoroughly clean the surface from dust. Conduct varnishing with a brush, to avoid bubbles. The item includes installation and processing of the angular parquet batten.						
	Calculation per m2	m2	50.00	x	18.66 €	=	**933**
5.17.	Replacement of the collapsed wall ceramic tiles in recently renovated sanitary facilities with ceramic tiles class I. The size, colour and tone of the tiles will be similar to the existing ones sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them fully in line with existing ones with pointing the joints using pointing plaster.						
	Calculation per m2	m2	50.00	x	25.63	=	**1281**
5.18.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers and painting of hydrant and switch boxes in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculation per lump sum	lump sum	1.00	x	225.50 €	=	**226**
5.19.	Production and montage of the metal fences on the ends of the main corridors on the ground, first and second floor. Fences shall be 3m long and 1.10m high. Making and installation of new fences in accordance with the ironmongery scheme. The fences shall be fixed to the floor. The frame shall be made of steel box profiles dimensions 30*30 mm, and inner bars of full profile 10*10 mm. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, determined by Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted. The unit price shall include all works and necessary material for installation of the fences.						
	Calculated as per piece	pc	5.00	x	148.63 €	=	**743**

5.20.	Installation of new canopy (dimensions 300/120cm) above western entrance in the dentist area. Construction of the canopy shall be made of the box steel profiles dimension 40*40 mm and polycarbonate plate "Lexan" as a canopy cover. "Lexan" shall be fixed to the structure with screws with rubber washers. All used materials shall be sampled and aproved by Employer / Employer's Representative. The unit price includes removal of the old canopy and its transportation to the town landfill. Canopy shall be installed, in line with the ETICS facade.						
	Calculation as per lump sum	lump sum	1.00	x	497.13 €	=	**497**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**38005**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3.00	x	11.50 €	=	**35**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1.00	x	11.50 €	=	**12**
6.03.	Purchase and delivery wall / floor mounted door rubber stopper.						
	Calculated as per piece	pc	2.00	x	11.50 €	=	**23**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2.00	x	28.75 €	=	**58**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high.						
	Calculated as per piece	pc	1.00	x	28.75 €	=	**29**
6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high.						
	Calculated as per piece.	pc	5.00	x	28.75 €	=	**144**
	TOTAL FOR SPARE PARTS						**299**

	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing hand over document.						

SUMMARY OF COSTS

	SCHOOL AND GYM	
I	THERMAL INSULATION OF FACADE WALLS	**64974**
II	THERMAL INSULATION AND WATERPROOFING OF THE ROOF	**77936**
III	REPLACEMENT OF FAÇADE JOINERY	**92516**
IV	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	**2059**
V	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	**38005**
VI	SPARE PARTS	**299**
	TOTAL PRICE, VAT EXCLUDED:	**275789**
	VAT (19%):	**52400**
	TOTAL PRICE, VAT INCLUDED:	**328188**

GROUP A5.2.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Primary School "Ristan Pavlovic" in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Ristan Pavlovic" Pljevlja
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: Siemens or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 10 m^3/h						
	Connector: DN40						
		pc	1	x	1,319.05 €	=	1,319.05 €
2	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: Siemens or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	2,472.50 €	=	2,472.50 €
3	Purchase, delivery and installation of electric solids flowmeter in silo.						
	Manufacturer: Siemens or equivalent						
	Type 7ML5440-0AB00-0AC1						
		pc	2	x	3,047.50 €	=	6,095.00 €
4	Software development and staff training.						
		pc	1	x	1,035.00 €	=	1,035.00 €
	TOTAL A - Energy management						**10,921.55 €**

B - HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS							
B.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of existing equipment of the heating system: 2 ribbed coal-fired boilers Vulkan Super 326,4 kW, feeder and return pipes, open expansion vessel, pumps, valves and other fittings and all pipes in the boiler room. The item includes removal and dumping dismantled equipment to a suitable place.						
	Calculated lump-sum	pc	1	x	3,450.00 €	=	3,450.00 €
2	Washing existing walls and floor to remove coal dust deposits in premises of the boiler room and fuel storage facilities. Mending holes in walls through which installations, which will not be used presently, were pulled, plastering walls area 80 m^2, fitting cement screed and tiling 70 m^2 of floor. Construction of wall between the boiler room and pellet storage room using concrete block 20 cm width plastered on both sides 7x2.6m.						
	Calculated lump-sum	pc	1	x	3,740.03 €	=	3,740.03 €
3	Preparation of concrete chimney for installation of new prefabricated funnel - penetration of openings for bonding new chimney, penetration of openings for fitting funnel, construction of chimney base using brick, height 1m, fitting of terminal cap made of steel galvanised sheet metal, removal of debris from the boiler room and its dumping to a suitable location.						
	Calculated lump-sum	pc	1	x	1,150.00 €	=	1,150.00 €
4	Construction of steel doors between the boiler room and pellet storage made of black steel ZP profiles with steel sheet metal infill thickness 0.7 mm, dimensions 1x2.1m with a lock, door know, hinges, painted with double layer of paint and single layer of lacquer.						
	Calculated lump-sum	pc	1	x	138.00 €	=	138.00 €
5	Construction of metal stairs for external doors on the boiler room which will not be fixed. **They are made of black steel box profiles** 40x40x1.5mm with thread made of bent steel sheet metal 3mm thickness (as indicated on detail in the drawings).						
		kg	70	x	2.53 €	=	177.10 €
	TOTAL B.I - Dismantling of existing equipment and preliminary works						**8,655.13 €**

B.II	**Installation of new boiler room equipment**						
1	Purchase, delivery and installation of: biomass-fired boiler - wood pellet HERZ Firematic BioControl 150 or equivalent, rated capacity 150 kW (42,7-155 kW) for production of hot water, maximal temperature 95 °C.						
	HERZ Firematic consists of: - welded structure made of special boiler sheet metal thickness 6 mm - completely insulated body with mineral wool thickness 120 mm - stoker auger - frequency-driven smoke gases fan - safety temperature limiter -heat exchanger automatic cleaning (fire smoke tubes) - usage of remaining heat - two-zone automatic cleaning grate - Burn-back protection RSE flap - intermediate hopper with fuel level maintenance - automatic ignition via electric heaters with hot air - automatic ashes removal from the combustion chamber and heat exchanger - integrated computer for control of boiler and system operating.						
	Microprocessor T-control with touch-LCD screen: - combustion control - heat accumulator control - preparation of domestic hot water - cold end protection with pump and mixing valve - Lambda probe oxygen sensor control - control and operating depending on outdoor conditions with 6 independent heating circuits (1 on) - automatic fuel, air dosing, maintaining necessary flame temperature, smoke gases, boiler temperature, minimal return temperature, hot water temperature in accumulator, water temperature in heating circuits - automatic frost protection - CAN-BUS operating						

	Safety elements : - back burn protection flap, no power, closed - Back-burn inhibitor sprinkler, sprinkler with water tank - back sparking protection, fuel supply block - measuring temperature in the combustion chamber - temperature metering in the storage room, intermediate hopper and dosing augers - safety boiler temperature limiters						
	Technical data for boiler: - Boiler thermal capacity = 150 kW (42,7-155), the boiler modulates between 30-100 % load - Maximal operating pressure = 3 bar - Maximal operating temperature = 95 °C - Boiler efficiency degree = 92 % - Minimal water temperature at entrance into the boiler = 60 °C - Grate area = 0,307 m² - Heat exchanger area = 5,92 m² - Boiler volume = 254 liters - Boiler weight = 1370 kg - Power supply: ~230 V / 50 Hz, 16 A, 2,6 kW						
	HERZ module for heat accumulator control with T-control unit – it is delivered with boiler: - temperature sensor (for metering upper and lower accumulator zone) – 2 pcs - immersion coils for temperature sensors – 2 pcs - sensors are placed in immersion coils and then fitted onto a vessel - T-control unit controls the operating						
	HERZ basic T-control module for 1 heating circuit driven by outdoor temperature.						
		set	2	x	#########	=	65,927.20 €
2	HERZ additional module or equivalent, for control for T-control, for 1 heating circuit driven by outdoor temperature: - 2 x PT 1000 temperature sensor sensor temperature (feed and return) - 1x outlet for room temperature sensor - 3x relay outlet 230VAC: pump and mixing valve - control system T-control for operating control						
		pc	1	x	455.40 €	=	455.40 €
3	HERZ or equivalent cascade operating for T-control						
		pc	1	x	1,989.50 €	=	1,989.50 €

4	HERZ set for protection from cold water for Firematic 150 boiler with boiler pump and 3-way mixing valve - pump WILO Stratos Para 40/1-12 - three-way flanged mixing valve, type HERZ 4037, DN 40, PN 16 - electric motor drive for three-way mixing valve, type 7712 - 2 x ball valve, DN 40, non-return valve						
		pc	2	x	3,153.30 €	=	6,306.60 €
5	HERZ safety thermostatic valves or equivalent, for safety heat exchanger, no auxiliary power drive, 95 °C						
		pc	2	x	89.70 €	=	179.40 €
6	HERZ sound proofing or equivalent, for Firematic 150 boiler						
		pc	2	x	960.25 €	=	1,920.50 €
7	HERZ basic package or equivalent, flexible transportation auger. It consists of : - agitator with press mechanism - climbing screw - electro-motor drive - power supply 230 V						
		pc	2	x	2,208.00 €	=	4,416.00 €
8	Auger axis with pressure release basis - extension L = 0,5 m						
		pc	2	x	212.75 €	=	425.50 €
9	Compact flexible transport hose with flexible screw L = 4 m, flexible screw L = 7,5 m						
		pc	2	x	327.75 €	=	655.50 €
10	HERZ hot water accumulator or equivalent, capacity 2500l, maximal operating pressure 3 bars, made of steel S235JR, with anti-corrosion protection on the outside, dimensions: Ø 1200 x 2443 mm. with connections : - DN80 2 pieces (at the top and bottom), - DN65 1 piece (at the top on the upper side), - DN40 4 pieces (distributed one above the other at equal distance from bottom to top), - DN15 3 pieces (for temperature sensors, at the bottom, middle and top).						
		pc	2	x	2,365.55 €	=	4,731.10 €
11	HERZ thermal insulation or equivalent, for accumulator capacity 2500 l, insulation thickness 100 mm						
		pc	2	x	747.50 €	=	1,495.00 €

12	Purchase, delivery and installation of wooden intermediate hopper for pellet cca 1,3 m³ , dimensions w=1m, l=1.75m, H=1m, with transport agitator at the bottom. Tanks sides are made of univer, thickness 20 mm, and supporting substructure and strengthening frames are made of wooden beams 5x5cm.						
		pc	2	x	1,748.00 €	=	3,496.00 €
13	Purchase, delivery and installation of membrane expansion vessel. Maximum permitted pressure is 6 bars, pre-set pressure is 3.5 bars, maximal permitted temperature is 120 °C.						
	Manufacturer: "Pneumatex", Switzerland or equivalent						
	Type: Statico SG 1000.6						
	Volume: 1000 lit						
	Dimensions:						
	diameter 850mm, height 2189mm weight 290kg, connection 6/4"						
		pc	1	x	4,823.10 €	=	4,823.10 €
14	SCHIEDEL chimney system ICS 25 or equivalent, made of twin-wall stainless steel W.Nr. 1.4404 wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature stable insulation material - Superwool. ICS chimney system includes all required elements: inspection port and boiler connection, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals. ICS system is fully in line with EN 1856.						
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS is made of stainless steel W.Nr. 1.4404 wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus. PRIMA PLUS system is fully in line with EN 1856.						

	All chimney elements are industrially produced in every detail as set out in technical documents for particular building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. The system passed GASTEC corrosion test. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø230mm, total height 2x14.8 m (two risers)						
	Furnace flue ICS25 Ø230 mm, developed length 7.6m+8.7m						
		set	1	x	9,259.80 €	=	9,259.80 €
15	Purchase, delivery and installation of the duplex circulation pump with electronic frequency controller, used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna3 D 40-100 F						
	Flow: 14,6 m^3/h						
	Thrust: 4,5 m						
	Type of connection: Flanged DN40						
	Power supply: V=1~230V						
	Maximum current: I=0,19 - 1,61A						
	Transferred power: P=18 - 361W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
		pc	1	x	2,033.20 €	=	2,033.20 €
16	Purchase, delivery and installation of three-stage circulating pump with fixed number of revolutions, with rotor made of composite materials and casing made of cast iron, for fluid temperatures up to 110°C, following properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: UPS 32-50 F 220						
	Flow: 3,5 m^3/h						
	Thrust: 2 m						
	Type of connection: Flanged DN32						
	Power supply: V=1~230V						
	Maximal current: I = 0.46A						
	Transferred power: P = 105W						
		pc	1	x	249.55 €	=	249.55 €

17	Purchase, delivery and installation of three-way mixing and diverting valve for constant control of systems with hot and cold water, maximal operating temperature of fluid 140°C						
	DN 50 PN16; Kvs=42						
		pc	1	x	207.00 €	=	207.00 €
	DN 32 PN16; Kvs=18.5						
		pc	1	x	172.50 €	=	172.50 €
	Valve electric-motor drive * Power supply: 24V AC/30 VA * control: impulse * max. force: 2000N * max. run: 45mm						
		pc	2	x	287.50 €	=	575.00 €
18	Purchase, delivery and installation of compact water softener. Compact casing contains ion-exchange resin which is being automatically regenerated once its capacity is spent, properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Aquaset 500						
	Max. flow: 1,5 m^3/h						
	Amount of resin: 18 l						
	Softening capacity (for 18°dH) 3.9m^3						
	Salt consumption per regeneration: 3 kg						
	Operating pressure: 1,4 – 8 bar						
	Operating temperature: 4-40 °C						
	Connections 1"						
	Power supply 220V/50Hz						
	Dimensions						
	l: 432 mm, w: 324mm, h: 1060 mm						
	Unit is delivered with protective pre-filter which consists of casing with 25 microns protective mesh.						
		pc	1	x	1,509.95 €	=	1,509.95 €
19	Purchase, delivery and installation of angle valve to be mounted in front of expansion vessel, following properties:						
	Rated outlet: DN32						
	Overflow outlet: DN40						
	Rated pressure: 6 bar						
	Maximal discharge flow 18000 kg/h						
	Operating pressure 4 bars						
	Operating temperature: -10 °C do +220 °C						
	Max. operating pressure: 16 bar						
	Coefficient: K=0,05						
	Overpressure calibration: 10% of set pressure						
	Maximal back-pressure: 1,031 bar						
		pc	1	x	105.80 €	=	105.80 €

20	Purchase, delivery and fitting of feeder and receiver pipes for radiator and air convector heating circuits following dimensions:						
	Diameter 219,1x4,5 mm						
	Feeder length 1300 mm						
	Return pipe length 1200 mm						
	Connections: DN50 x 1pcs DN65 x 1pcs DN80 x 1pcs R3/4" x 2pcs R1/2" x 2pcs						
		pc	2	x	538.20 €	=	1,076.40 €
21	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN80 PN6						
		pc	4	x	85.33 €	=	341.32 €
	DN65 PN6						
		pc	5	x	68.08 €	=	340.40 €
	DN50 PN6						
		pc	15	x	62.45 €	=	936.68 €
22	Purchase, delivery and installation of threaded ball valves, connection size						
	DN40 PN6						
		pc	5	x	39.74 €	=	198.72 €
	DN25 PN6						
		pc	8	x	26.91 €	=	215.28 €
23	Purchase, delivery and installation of pipes and differential pressure controller valves, connection sizes:						
	DN65 PN6 - Kvs 51.2						
		pc	4	x	862.50 €	=	3,450.00 €
	DN50 PN6 - Kvs 41						
		pc	2	x	299.00 €	=	598.00 €
24	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets, following dimensions of connections:						
	DN65 PN6						
		pc	1	x	103.50 €	=	103.50 €
	DN50 PN6						
		pc	3	x	97.75 €	=	293.25 €
25	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets following dimensions of connections						
	DN65 PN6						
		pc	1	x	98.90 €	=	98.90 €
	DN50 PN6						
		pc	3	x	80.50 €	=	241.50 €

26	Purchase, delivery and fitting of fixed aluminium weather louver, size 300x300mm, to be fitted in the boiler room doors (to allow undisturbed air flow for fuel combustion in the boiler), type Hidria Slovenia AZR-3 500x300 or equivalent.						
		pc	2	x	40.25 €	=	80.50 €
27	Purchase, delivery and installation of water gauge at fresh water feeder from the water mains into the softener, with flow control scale and number disk for total flow registration, connection dimensions 1".						
		pc	1	x	102.01 €	=	102.01 €
28	Purchase, delivery and installation of glass thermometer in brass casing and sleeve for fitting into the pipeline, metering range 0-120°C.						
		pc	6	x	28.75 €	=	172.50 €
29	Purchase, delivery and installation of pressure gauge complete with manometer flow-through valve, metering range 0-6 bars.						
		pc	6	x	29.90 €	=	179.40 €
30	Purchase, delivery and installation of threaded backflow preventer, connection size:						
	DN25 PN6						
		pc	1	x	13.23 €	=	13.23 €
31	Purchase, delivery and installation of automatic valve for water fill in the system, with block valve and ball backflow valve filter and manometer with following characteristics:						
	Connection dimensions 1"						
	Control range 0.3 – 4 bar						
	Maximal flow at inlet 16bar						
	Maximal temperature at inlet 50°C						
		pc	1	x	46.00 €	=	46.00 €
32	Purchase, delivery and assemblage of air-release vessels with overflow pipe and valve DN 15, made of black steel pipe, DN150 length 300 mm.						
		pc	4	x	54.05 €	=	216.20 €
33	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	8	x	9.60 €	=	76.82 €

34	Purchase of material and installation of piping for connecting boiler room equipment made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø 88,9x3,2						
		m	30	x	22.77 €	=	683.10 €
	Ø 76,1x2,9						
		m	35	x	18.63 €	=	652.05 €
	Ø 60,3x2,9						
		m	50	x	14.95 €	=	747.50 €
35	Joining, tightening material and brackets, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 60% of the previous item.		0.6	x	2,082.65 €	=	1,249.59 €
36	Purchase of material and production of insulation for pipes, feeders and receivers using rock wool, thickness 50 mm in AL coating thickness 0.5 mm, complete with fitting material. Fire resistance flammability class A1 in line with SIST EN 13501-1 i JUS U.J1.050. Calculated as per m^2 of insulation measured on the exterior of the pipe.						
		m^2	55	x	33.35 €	=	1,834.25 €
37	Purchase and installation of PP-R water pipes for connecting equipment for chemical water treatment, for operating pressure of 10 bars with all required fittings. Pipes need to be fixed to walls with double pipe clips at every 1.5 to 2.0 m. Pipes on branching need to be insulated with "plamafleksom" to prevent condensation. Pipes are welded with butt welded joint. Pipe diameter is rated diameter of DN25.						
		m	12	x	10.35 €	=	124.20 €
	TOTAL B.II - Installation of new boiler room equipment						**125,004.89 €**
C - EFFICIENCY OF THE DISTRIBUTION SYSTEM							
C.I	**Installation of thermostatic and balancing valves**						
1	Purchase, delivery and installation of thermostatic radiator valve connection size						
	1/2"						
		pc	73	x	12.49 €	=	911.70 €
	3/4"						
		pc	10	x	20.01 €	=	200.10 €

2	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without having to remove protective cap. The thermostat has liquid sensor.						
	Temperature range from 8 °C to 26 °C						
	No. of channels: four						
	Closing time 24 min.						
		pc	83	x	15.67 €	=	1,300.98 €
3	Purchase, delivery and installation of radiator angle valves, connection size:						
	1/2"						
		pc	73	x	12.49 €	=	911.70 €
	3/4"						
		pc	10	x	16.79 €	=	167.90 €
4	Purchase, delivery and installation of riser control valves with metering outlets in brass casing, presetting with digital reading (fitted on feeder of the manifold), size and properties:						
	DN32 PN6 - Kvs 14.2						
		pc	2	x	78.20 €	=	156.40 €
	DN25 PN6 - Kvs 8.7						
		pc	3	x	54.05 €	=	162.15 €
5	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
	DN32, Kvm 8.5						
		pc	2	x	149.50 €	=	299.00 €
	DN25, Kvm 5.5						
		pc	3	x	102.35 €	=	307.05 €
	TOTAL C.I - Installation of thermostatic and balancing valves						**4,416.98 €**
C.II	**New branch of heating system in the gym**						
1	Purchase, delivery and installation of wall-mounted hot water air convectors, properties:						
	Manufacturer: "Hidria" Slovenia or equivalent						
	Mark: UniKal 250-2 W tip M						
	Thermal power at t=10°C inlet air and no, of revolutions 1350 o/min: 18.2kW						
	Heating medium: hot water 80-60 °C						
	Total air Flow: 3100 m^3/h						

	Dimensions: 640x705x515mm						
	Electricity power: 0.69 A						
	Electrical connection: 230V, 50 Hz						
	Calorifer weight with mixing box and filter: 29+21+14 kg						
	Hot water connection : 1"						
	The item includes basic filter 60% class EU2, mixing box for fresh and used air with ratio setting, as well as connection duct made of galvanized steel sheet metal thickness 0.5 mm from the roof and connecting to the calorifer, duct size 400x400mm length 1m.						
		pc	4	x	1,437.50 €	=	5,750.00 €
2	Purchase, delivery and installation of flow controller - damper for fitting on fresh air intake from the ventilation turret to air convector, type "Hidria" Slovenia RŽ3 400x400mm or equivalent.						
		pc	4	x	74.75 €	=	299.00 €
3	Purchase, delivery and installation of on/off electric actuator for closing control jealousies with a switch "Belimo Joventa" Italia B6 J6 or equivalent. The item includes cables for connecting the actuator to the switch, 150m total length.						
		pc	4	x	1,135.05 €	=	4,540.20 €
4	Purchase, delivery and installation of monophase transformer five-stage controller of number of revolutions for current up to 2A, power supply 220V, 50Hz, type Hidria Slovenia RMT2 or equivalent.						
		pc	4	x	74.75 €	=	299.00 €
5	Purchase, delivery and installation of room thermostat for switching the convector fan, type Hidria Slovenia RAA30 or equivalent.						
		pc	4	x	47.15 €	=	188.60 €
6	Purchase, delivery and installation of ON/OFF anti-frost thermostat, voltage 240V, load breaking current 2A, temperature control range -5 to 15 °C						
		pc	4	x	143.75 €	=	575.00 €
7	Purchase, delivery and installation of cables for feeding and connecting the air convector to control equipment and connecting to existing outlets for existing air convectors, 3x1.5mm² - 200m, 5x1.5mm² - 10m. Cable to be laid in OG hard PVC tube.						
		set	1	x	920.00 €	=	920.00 €

8	Purchase, delivery and installation of overpressure light aluminium facade jealousies type "Hidria" Slovenia ANŽ-3 500x400mm or equivalent, for releasing surplus air from the gym.						
		pc	2	x	74.75 €	=	149.50 €
9	Purchase, delivery and installation of fixed façade aluminium jealousies, dimensions 400x400mm, for installation in duct towards air convector, typeHidria Slovenia AZR-3 400x400 or equivalent.						
		pc	2	x	56.35 €	=	112.70 €
10	Purchase, delivery and installation of inclined control valves in brass cone, dimensions and properties:						
	DN25, with drainage 1/4" Kvs=10,4						
		pc	4	x	55.20 €	=	220.80 €
11	Purchase, delivery and installation of threaded block-ball valves, in brass cone, dimensions 1" (DN25)						
		pc	12	x	13.23 €	=	158.70 €
12	Purchase, delivery and installation of bracket tray holders and bolts for mounting air convectors to the gym wall.						
		pc	4	x	69.00 €	=	276.00 €
13	Making opening in the wall for fresh air supply to hot water air convectors, size 40x40cm and openings for transfer grill 50x40cm.						
		pc	6	x	57.50 €	=	345.00 €
14	Purchase, delivery and installation of cast ribbed radiators, following properties:						
	Manufacturer: Termik Zrenjanin or equivalent						
	Mark: 580/4						
	No. of channels: four-channeled rib						
	Height: 580mm						
	Rib width: 160mm						
	Axis separation: 500mm						
	Rib length: 60mm						
	Heating surface: 0,268m2						
	Water capacity: 1,2lit						
	Rib weight: 6,28kg						
	Thermal power per rib at 90/70°C: 139,1W						
		pc	71	x	12.42 €	=	881.82 €
15	Purchase, delivery and installation of radiator cap, size 5/4"						
		pc	11	x	1.38 €	=	15.18 €
16	Elements for reduction of pipes diameter 5/4" to 1/2".						

		pc	13	x	1.38 €	=	17.94 €
17	Purchase, delivery and installation of brackets for heat emitters.						
		pc	6	x	9.20 €	=	55.20 €
18	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	1	x	4.83 €	=	4.83 €
19	Purchase of material and installation of steel seamless pipeline (distribution manifold) in line with JUS standard C.B5.221 or DIN 2448, dimensions:						
	Ø 60,3x2,9						
		m	75	x	14.95 €	=	1,121.25 €
	Ø 48,3x2,6						
		m	35	x	11.39 €	=	398.48 €
	Ø 33,7x2,6						
		m	52	x	8.34 €	=	433.55 €
	Ø 26,9x2,3						
		m	25	x	7.06 €	=	176.53 €
	Ø 21,3x2,0						
		m	80	x	6.44 €	=	515.20 €
20	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures.						
	Calculated as 60% of the previous item.		0.6	x	2,645.00 €	=	1,587.00 €
21	Purchase of material and coating the pipes with insulation made of mineral wool, thickness 50 mm, with AL sheeting thickness 0.5 mm, complete with installation kit. Fire-resistance class flammability A1 in line with SIST EN 13501-1 & JUS U.J1.050. Calculated per m2 of insulation measured on the external side of the pipe.						
		m^2	30	x	33.35 €	=	1,000.50 €
22	Dismantling of existing gym heating equipment, set of manifolds consisting of feeder and return pipe, 35m length, 2 hot water air convectors with connection channels, 4 pipe radiators, 5 radiators, one air-release vessel and piping in the gym and ancillary premises.						
	Calculated lump-sum	set	1	x	575.00 €	=	575.00 €
	TOTAL C.II - New branch of heating system in the gym						**20,616.97 €**
C.III	**Repair of existing heating system**						

1	Purchase, delivery and installation of cast ribbed radiators instead of dismounted in lavatories, properties:						
	Manufacturer: Termik Zrenjanin or equivalent						
	Mark: 580/4						
	No. of channels: four-channeled rib						
	Height: 580mm						
	Rib width: 160mm						
	Axis separation: 500mm						
	Rib length: 60mm						
	Heating surface: 0,268m2						
	Water capacity: 1,2lit						
	Rib weight: 6,28kg						
	Thermal power per rib at 90/70°C: 139,1W						
		pc	42	x	12.42 €	=	521.64 €
2	Purchase, delivery and installation of radiator cap, size 5/4"						
		pc	8	x	1.38 €	=	11.04 €
3	Elements for reduction of pipes diameter 5/4" to 1/2".						
		pc	8	x	1.38 €	=	11.04 €
4	Purchase, delivery and installation of brackets for heat emitters.						
		pc	4	x	9.20 €	=	36.80 €
5	Flushing entire heating system in the classrooms. Dismantling of all radiators (73 ribbed radiators with 10 to 38 ribs) and removal of residue from the bottom of ribs, cleaning air release valves and remounting with installation of new radiator brackets.						
	Calculated lump-sum	pc	1	x	2,875.00 €	=	2,875.00 €
6	Purchase of material and installation of steel seamless pipeline in line with JUS standard C.B5.221 or DIN 2448, dimensions:						
	ø 48,3x2,6						
		m	10	x	11.39 €	=	113.85 €
	ø 42,4x2,6						
		m	20	x	9.78 €	=	195.50 €
	ø 33,7x2,6						
		m	50	x	8.34 €	=	416.88 €
	ø 26,9x2,3						
		m	60	x	7.06 €	=	423.66 €
	ø 21,3x2,0						
		m	20	x	6.44 €	=	128.80 €

7	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures.						
	Calculated as 60% of the previous item.		0.6	x	1,278.69 €	=	767.21 €
	TOTAL C.III - Repair of existing heating system						**5,501.42 €**
C.IV	**Preliminary and finishing works**						
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
		lump-sum	1	x	460.00 €	=	460.00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves.						
		lump-sum	1	x	460.00 €	=	460.00 €
3	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.						
		lump-sum	1	x	230.00 €	=	230.00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.						
		lump-sum	1	x	172.50 €	=	172.50 €
5	Issuing of certificate for entire installed material and equipment.						
		lump-sum	1	x	230.00 €	=	230.00 €
6	Preparation of "As-built" design.						
		lump-sum	1	x	575.00 €	=	575.00 €
7	Installation of framed and glazed scheme of connections on a visible place in the boiler room.						
		lump-sum	1	x	230.00 €	=	230.00 €
8	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with the fire protection standards.						
		lump-sum	1	x	115.00 €	=	115.00 €
9	Making holes in walls for putting pipes for the new heating system, including mending works at penetration points for bringing walls and ceilings in proper condition.(7						

		lump-sum	1	x	575.00 €	=	575.00 €
10	Mending walls behind: -4 radiators and 2 calorifers in the gym, -5 radiators in the auxillary rooms, which shall be removed.						
		lump-sum	1	x	172.50 €	=	172.50 €
	TOTAL C.IV - Preliminary and finishing works						**3,220.00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**10,921.55 €**
B	**HEATING SYSTEM THERMAL EFFICIENCY AND COAL-FIRED BOILERS REPLACEMENT WITH PELLET-FIRED BOILERS**	**133,660.02 €**
B.I	Dismantling of existing equipment and preliminary works	8,655.13 €
B.II	Installation of new boiler room equipment	125,004.89 €
C	**EFFICIENCY OF THE DISTRIBUTION SYSTEM**	33,755.36 €
C.I	Installation of thermostatic and balancing valves	4,416.98 €
C.II	New branch of heating system in the gym	20,616.97 €
C.III	Repair of existing heating system	5,501.42 €
C.IV	Preliminary and finishing works	3,220.00 €
	TOTAL PRICE, VAT EXCLUDED	**178,336.93 €**
	VAT (19 %)	**33,884.02 €**
	TOTAL PRICE, VAT INCLUDED	**212,220.94 €**

GROUP A5.2.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Primary School "Ristan Pavlovic" in Pljevlja*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Ristan Pavlovic" Pljevlja
	Doc. origin:	Final Electrical Design
	Date:	30 April 2014

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	7.00				
	Works and material:	pc	226	x	26.57	=	6,003.69 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	14.00				
	Works and material:	pc	13.00	x	53.13	=	690.69 €
1.3.	Delivery and laying of electrical cables for lighting in bathrooms at first and second floor. The cables shall be powered from the closest distribution board in front of the bathroom. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	25.00				
	Works and material:	pc	2.00	x	94.88	=	189.75 €

1.4.	Delivery and laying of electrical cables for lighting in the gym. The cables shall be powered from the closest distribution board. Cables to be laid in walls/ceilings in PVC channels 16x16. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	13.00				
	Works and material:	pc	8.00	x	49.34	=	394.68 €
1.5.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	190	x	3.80	=	721.05 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	118	x	101.20	=	11,941.60 €
1.7.	Delivery and mounting of ceiling mounted luminaries 2/35W T16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	11	x	126.50	=	1,391.50 €
1.8.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	17	x	173.31	=	2,946.19 €
1.9.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	51	x	113.85	=	5,806.35 €
1.10.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	5	x	113.85	=	569.25 €

1.11.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	24	x	111.32	=	2,671.68 €
1.12.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit:	pc	8	x	290.95	=	2,327.60 €
1.13.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	7	x	226.44	=	1,585.05 €
1.14.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	3	x	226.44	=	679.31 €
1.15.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP65 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	3	x	232.76	=	698.28 €
1.16.	Delivery and installation of modular accessories, white						
	PVC box ø 60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 2M - pcs 1						
	Total for works and material	lump sum	15	x	6.33	=	94.88 €
1.17.	Delivery and installation of modular installation accessories, white						
	PVC box ø 60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 1M - pcs 2						
	Total for works and material	lump sum	5	x	7.59	=	37.95 €
1.18.	Delivery and installation of modular installation accessories, white						
	PVC box ø 60						
	armature 2M						
	decorative mask 2M						
	two-way switch 2M - pcs 1						
	Total for works and material	lump sum	4	x	6.96	=	27.83 €
1.19.	Delivery and installation of modular installation accessories, white						
	PVC box 3M						
	armature 3M						
	decorative mask 3M						
	ordinary switch 1M - pcs 3						
	Total for works and material	lump sum	17	x	10.12	=	172.04 €

1.20.	Delivery and installation of modular installation accessories, white						
	PVC box 4M						
	armature 4M						
	decorative mask 4M						
	ordinary switch with indication 1M - pcs 4						
	Total for works and material	lump sum	1	x	13.92	=	13.92 €
	Total for lighting installation						**38,963.27 €**
2	**ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION**						
2.1.	Marking the route, excavation and backfilling of the trench with dimensions of 0.4x0.8m for the purpose of laying cables. The excavation should be done by mechanical machines in the soil of III and IV category. This item includes: -delivery and spreading the sand at cable trench. The two layers of sand shall be laid, thickness of 10cm, before and after laying of cable. The sand is laid across the entire width of the trench, -delivery and placing PVC "gal"-protector for mechanical protection of cables at soil trench, after spreading second layer of sand. The protector should be laid to each other, lengthwise, overlapping for by 10 centimeters, completely covering the cable, -delivery and placing warning tape made of soft polyvinyl chloride, which is placed at 20cm from the surface. -delivery and laying of Zink-plated steel tape, Fe/Zn 25x4mm in the cable trench and connecting of the tape on outlet of foundation grounding unit,as shown in the drawings. The tape shall be laid at filling of the trench, after the first layer of excavation. Total for work, calculated per one meter of the trench:	m	42	x		=	
2.2.	Delivery and mounting of cabinet marked as PMO, which shall be mounted at LV post, as shown in the drawings. PMO is made of pressed polyester with IP 54 protection, IK 10, class of isolation II. Cabinet is equipped with the door which can be closed in three points, with half-cylinder lock. The following equipment shall be installed inside:						
	three-phase two-tariff counter for direct measurement of the DB2-60A	pc	1				
	ISFT NV00 100/50A	pc	1				
	V25-B/3 + NPE, producer OBO-Betterman or equivalent	pc	1				
	The price includes all material required for installation of this equipment. Total for cabinet "PMO":	pc	1	x	860.20	=	860.20 €

2.3.	Delivery and installation of switchbox "GRT", ready-made with a lock. The board is wall recessed for the installation of 72 modules (3x24M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	disconnector switch INS 1-0, 63A, 3P	pc	1				
	automatic switch iC60N 25A, 6 kA, 1P	pc	9				
	automatic switch iC60N 20A, 6 kA, 1P	pc	9				
	automatic switch iC60N 16A, 6 kA, 1P	pc	12				
	automatic switch iC60N 10A, 6 kA, 1P	pc	11				
	automatic switch iC60N 6A, 6 kA, 1P	pc	2				
	differential current protective device iID 25/0,(	pc	1				
	contactor iCT 3NO, 16A, 230V	pc	1				
	contactor iCT 1NO, 16A, 230V	pc	2				
	selector switch CM 1-0-2, 10A	pc	1				
	Programmable time switch IHP 24 hours + 7 days	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "GRT":	pc	1	x	771.65	=	771.65 €
2.4.	Delivery and installation of switchbox "**RT-PO**", ready-made with a lock. The board is wall recessed for the installation of 18 modules (1x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	automatic switch iC60N 16A, 6 kA, 3P	pc	1				
	automatic switch iC60N 16A, 6 kA, 1P	pc	5				
	automatic switch iC60N 10A, 6 kA, 1P	pc	4				
	The price includes all material required for installation of this equipment. Total switch box "RT-PO":	pc	1	x	164.45	=	164.45 €
2.5.	Delivery and installation of switchbox "**RT-S**", ready-made with a lock. The board is wall recessed for the installation of 18 modules (1x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	automatic switch iC60N 16A, 6 kA, 1P	pc	2				
	automatic switch iC60N 10A, 6 kA, 1P	pc	7				
	automatic switch iC60N 6A, 6 kA, 1P	pc	1				
	contactor iCT 1NO, 16A, 230V	pc	1				
	Selector switch CM 1-0-2, 10A	pc	1				
	Programmable time switch IHP 24 hours + 7 days	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-S":	pc	1	x	316.25	=	316.25 €
2.6.	Delivery and installation of switchbox "**RT-I**", ready-made with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						

	automatic switch iC60N 16A, 6 kA, 1P	pc	9				
	automatic switch iC60N 10A, 6 kA, 1P	pc	9				
	differential current protective device iID 25/0,(	pc	2				
	contactor iCT 3NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-I":	pc	1	x	436.43	=	436.43 €
2.7.	Delivery and installation of switchbox "**RT-II**", ready-made with a lock. The board is wall recessed for the installation of 36 modules (2x18M). The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	automatic switch iC60N 16A, 6 kA, 1P	pc	9				
	automatic switch iC60N 10A, 6 kA, 1P	pc	9				
	differential current protective device iID 25/0,(	pc	2				
	contactor iCT 3NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment. Total switch box "RT-II":	pc	1	x	436.43	=	436.43 €
2.8.	Delivery and installation of power supply cables from PMO to GRT and from GRT to RT-S. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. The price shall include complete delivery with installation, connection and testing of conductors:						
	PP00-y 5x16 mm2	m	46	x	15.18	=	698.28 €
	PP00-y 5x6 mm2	m	70	x	6.96	=	487.03 €
2.9.	Delivery and installation of power supply cables from GRT to RT-K, RT-PO, RT-I and RT-II. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. The price shall include complete delivery with installation, connection and testing of conductors:						
	PPY 5x6 mm2	m	39	x	6.33	=	246.68 €
	PPY 5x4 mm2	m	48	x	5.06	=	242.88 €

2.10.	Delivery and mounting of three phase connection points with PPY 5x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average length of laid cable per one connection point is 12m. The price shall include complete work and material:	pc	1	x	60.72	=	60.72 €
2.11.	Delivery and mounting of single phase connection points with PPY 3x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average length of laid cable per one connection point is 14m. The price shall include complete work and material:	pc	75	x	53.13	=	3,984.75 €
2.12.	Delivery and installation of installation modular accessories, white						
	PVC box ø 60						
	armature 2M						
	decorative mask 2M						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	73	x	7.59	=	554.07 €
2.13.	Delivery and installation of installation modular accessories, white						
	PVC box ø 60						
	armature 2M						
	decorative and protection mask 2M IP 55						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	2	x	10.12	=	20.24 €
2.14.	Delivery and installation of three phase outlet 16A/400V, JUS N.EO.350. Total for works and material:	pc	1	x	10.12	=	10.12 €
	Total electrical installations for general consumption						**9,290.16 €**

3	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
3.1.	Delivery and mounting of prefabricated wall mounted IP 55 switchbox in boiler room "RT KO" with appropriate dimensions and completely equipped with following parts:						
	disconnector switch INS 1-0, 40A, 3P	pc	1				
	motor protection switch GV2 ME, 0,4 - 0,63 A	pc	1				
	motor protection switch GV2 ME, 1.6 - 2.5 A	pc	1				
	automatic switch 3p iC60N 16A 6 kA	pc	3				
	automatic switch 1p iC60N 16A 6 kA	pc	10				
	automatic switch 1p iC60N 10A 6 kA	pc	5				
	The price includes all material required for installation of this equipment.						
	Total switch box "RT-KO"	pc	1.00	x	569.25	=	569.25 €
3.2.	Delivery and laying of cables in wall installations with PVC rigid installation pipes and galvanized cable trays in boiler room, for construction of the electrical circuits of electrical consumers in the boiler room through cable trays and partly through rigid PVC pipes in wall installation. Works and material are calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	107.00	x	2.40	=	257.17 €
	PP-Y 3x2,5 mm2	m	216.00	x	3.04	=	655.78 €
	PP-Y 5x2,5 mm2	m	43.00	x	3.42	=	146.87 €
	Outlet three phase 3P+N+PE 16A/400V IP55	m	3.00	x	10.12	=	30.36 €
	Outlet 2P+E / 230V/ IP 55	pc	14.00	x	8.86	=	123.97 €
	Ordinary switch 10A, IP44	pc	1.00	x	6.33	=	6.33 €
	Two-way switch IP44 10A	pc	2.00	x	7.59	=	15.18 €
	Serial switch 10A IP44	pc	1.00	x	6.33	=	6.33 €
	Double two-way switch IP44 10A	pc	1.00	x	10.12	=	10.12 €
	Delivery and mounting of ceiling mounted emergency luminaries with electronic control gear, 8W,IP 65, 1h.Works and material to be included per unit:	pc	1.00	x	44.28	=	44.28 €
3.3.	Delivery and mounting of deep galvanized cable trays according to the drawing layouts. Works include delivery, mounting of all necessary materials for connection and mounting. The unit measure is m' per the cable tray 100 mm.						
	PNK 100	m	13.00	x	16.45	=	213.79 €
	Total for power supply and electrical installation for boiler room and heating equipment						**2,079.41 €**

4	**POTENTIAL EQUALIZATION INSTALLATION**						
4.1.	Delivery and mounting of deep galvanized tape Fe-Zn 25x4 mm for potential equalization in boiler room, according to the installation drawing layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	31.00	x	2.53	=	78.43 €
4.2.	Delivery and mounting of Fe-Zn 25x4mm tape for creating ring for potential equalization installation in the boiler room, with foundation grounding unit of the building. The tape should be placed partially in prepared soil trench and partially at tape holders C.L.JUS N.B4.925-P. Works and material are calculated per measure unit.	m	10.00	x	2.30	=	23.00 €
4.3.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	32.00	x	6.33	=	202.40 €
4.4.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	m	7.00	x	5.06	=	35.42 €
4.5.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	14.00	x	3.80	=	53.13 €
4.6.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	40.00	x	6.33	=	253.00 €
	Total potential equalization installation						**645.38 €**
5	**LIGHTING AND GROUNDING INSTALLATION**						
5.1.	Delivery and installation of lightning descending system, round conductors made of Al/Mg with diameter of 10 mm, for the replacement of obsolete lightning descending conductors. Lightning descending conductors shall be mounted from outlet of foundation grounding system to the position of lightning installations at the roof, according to technical recommendation and regulations. Works and material to be calculated per unit:	m	45.00	x	2.5		113.85 €

5.2.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	40.00	x	6.33	=	253.00 €
5.3.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-wire	pc	2.00	x	6.33	=	12.65 €
	linking clamp wire-wire	pc	4.00	x	6.33	=	25.30 €
	groove clamp (for crossing over horizontal gutters)	pc	8.00	x	6.33	=	50.60 €
		pc					
5.4.	Delivery and mounting of prefabricated lightning installation system with air terminal SI60 INTERCEPTOR ERITECH or equivalent. Sections of the mast are 2m and 1 x 2m. Mast is connected to the wall in accordance to the technical drawings. Works and material to be included in price:						
	AIR TERMINAL INTERCEPTOR SI 60	pc	1	x	1834.3	=	1,834.25 €
	2M section 1	pc	1	x	12.7	=	12.65 €
	2M section 2	pc	1	x	12.7	=	12.65 €
	console for air terminal	pc	3	x	63.3	=	189.75 €
	junction part for connection with grounding tape	pc	1	x	12.7	=	12.65 €
	NOTE: Before mounting lightning air terminal, examine the continuity of existing down conductors and in the case of interruption, repair and restore them to their proper condition.						
5.5.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	150.00	x	2.53	=	379.50 €
5.8.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measurement unit.	pc	12.00	x	10.12	=	121.44 €
	Total for lighting and grounding installation						**3,018.29 €**
6	**SPARE PARTS**						
6.1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	7.1	=	14.17 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	5.9	=	11.89 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	5.9	=	11.89 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	5.8	=	11.64 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	5.7	=	11.39 €

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	Total for spare parts:						**60.97 €**
7	**TESTING**						
7.1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	253.00 €	=	253.00 €
7.2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	379.50 €	=	379.50 €
	Total for testing:						**632.50 €**
8	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**379.50 €**	=	**379.50 €**

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	38,963.27 €
2	ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION	9,290.16 €
3	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	2,079.41 €
4	POTENTIAL EQUALIZATION INSTALLATION	645.38 €
5	LIGHTING AND GROUNDING INSTALLATION	3,018.29 €
6	SPARE PARTS	60.97 €
7	TESTING	632.50 €
8	PREPARATION OF MAINTENANCE DESIGN	379.50 €
	TOTAL PRICE, VAT EXCLUDED	55,069.48 €
	VAT (19%)	10,463.20 €
	TOTAL PRICE, VAT INCLUDED	**65,532.68 €**

GROUP A5.3.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Secondary School "Miloje Dobrašinović" in Bijelo Polje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	Facility:	Secondary School "Miloje Dobrašinović", Bijelo Polje
	Documentation:	Final Architectural Design
	Date:	30 May 2013

Item	Description of the Item	Unit of measure	Quantity		Unit price (€)		Amount (€)
	SCHOOL AND GYM HALL						
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings and vertical gutters. Flashings have different developed widths and they are made from galvanized, coloured sheet with double interlocking, d=0,68mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and debris transportation to the town depot. Calculation is based on a m of dismantled flashing, gutters, and their supporters.						
	horizontal rain gutters, developed width up to 66 cm						
	Calculation per m	m	200.55	x	1.03 €	=	**206**
	-vertical gutters, dim.15x15cm, developed width up to 66 cm, including dismantling of top gutter cisterns.						
	Calculation per m	m	184.70	x	1.03 €	=	**189**
	-attic-wall flashings, developed width d.w.= 41-50cm.						
	Calculation per m	m	62.46	x	1.03 €	=	**64**
	-parapet flashing on the RC cantilever slab, developed width up to 25cm.						
	Calculation per m	m	48.50	x	1.03 €	=	**50**
	-roof and wall valleys, developed width up to 50cm.						
	Calculation per m	m	93.64	x	1.03 €	=	**96**
	-flashing sill, developed width 41-50cm.						
	Calculation per m	m	422.15	x	1.03 €	=	**433**

1.02.	Repair of damages in the parapet walls d=20cm and more, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheet and PVC sills. The unit price includes all works and materials, including possible skimming and painting, to bring the jambs in previous condition.						
	Calculation per m	m	422.15	x	6.66 €	=	**2813**
1.03.	Repair of jamb damages d=20cm, caused by dismantling of the joinery. Surfaces shall be treated with lime cement mortar 1:2:6, previously sprinkled with low density cement mortar, to prepare the item for installation of new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheets and PVC sills. The unit price includes all works and materials, including skimming and painting, to bring the jambs in previous condition.						
	Calculation per m	m	1,071.65	x	6.66 €	=	**7140**
1.04.	Dismantling and re-installation of cameras, lighting, and other facade devices and equipment. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility. NOTE: For reinstallation of AC units, consider possible mounting of new metal support brackets and small extension of electric and Freon lines due to position of external AC units.						
	Calculation as per piece.	pc	10.00	x	59.45 €	=	**595**
1.05.	Production and installation of the attic cornice flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 60cm. The item includes surface preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the Design and sample selected by the Employer / Employer's Representative.						
	Calculation as per m	m	156.10	x	14.97 €	=	**2336**

1.06.	Production and installation of flashing on the small parapet wall on the RC cantilever slab, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 33-40 cm. The item includes surface preparation and complete binding following the regulations. The entire process shall be carried out in line with the Design and sample selected by the Employer / Employer's Representative.						
	Calculation per m.	m	48.50	x	14.97 €	=	**726**
1.07.	Production and installation of the drips on the façade, in the area of "Y" supporters. Drips shall be made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width of the drips is 60 cm. The item includes surface preparation and complete binding following the regulations. The entire process shall be carried out in line with the Design and sample selected by the Employer / Employer's Representative.						
	Calculation per m.	m	40.54	x	14.97 €	=	**607**
1.08.	Production and installation of the parapet sills, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 50cm. The item includes surface preparation and complete binding following the regulations. The entire process shall be carried out in line with the design, and sample selected by the Employer / Employer's Representative.						
	Calculation per m	m	422.15	x	14.97 €	=	**6317**
1.09.	Production and installation of the vertical and horizontal gutters of 150/150mm square section, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material.						
	Calculation per m	m	397.75	x	14.97 €	=	**5952**
1.10.	Purchase and installation of profiled standard flexible, vertical and horizontal expansion joints at wall-to-wall contact, for dilatation width of 5 cm, fully in line with technology of the manufacturer.						
	Calculation per m	m	75.65	x	21.53 €	=	**1628**

1.11.	Setting up "Demit" thermal facade. External thermal insulation of the facade reinforced concrete (hereinafter RC) and brick walls will be conducted with expanded EPS polystyrene, having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm, produced by the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade walls at the level of the ground floor (all parapets in the ground floor, pillars and parts of the full wall) will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK.						
	Thermal boards with B1 flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing) to be used. Install panels and vertical breaks of 50 cm width along the entire facade, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.						
	Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the facade opening. Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:						
	* **first layer** – refined mortar based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene boards will be filled with polyurethane foam.						
	Reinforcing mesh with adequate overlapping and extra protection at the facade openings and corners is placed in a fresh layer of this mortar. In case additional mechanical anchoring is required, impact bolt through the reinforcing mesh shall be used 24 hours after applying this layer.						

	* **reinforcing mesh,** * **second layer** of mortar, apply same procedure as with the first layer. This mortar is laid to well- dried first layer and polished afterwards, * **contact coating** made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar,						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour defined by Employer / Employer's Representative, while the entire procedure will be conducted according to the design details.						
	Before setting up the thermal plates, the following works will be conducted: * all works on the roofs, including sheet metal works, *reduction of windows/glazed areas, * replacement of façade joinery, * placing the entire envisaged installation in the facade, * partial / total closing of the openings described in the tender documents,						
	*covering and protection of all non-treated surfaces – glass, stone... *Control and testing of the existing facility surface, including: Use the means of impregnation- basic coating at the most critical points of the facility. When the basic coating dries out, set up the EPS cube of 5x5x5 cm by using polystyrene adhesive. Once the adhesive completely settles, minimum 3 days after the working conditions are adequate, try to separate the cube manually.						
	If in the process of separating expanded polystyrene only the adhesive separates and not parts of the basis - the basis is sufficiently strong, solid and stable.						
	If in the process of separating expanded polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.						
	If in the process of separating expanded polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough, and shall not withstand new layer of thermal insulation.						
	Use the reinforcing mesh or angle profiles for the window corners and jambs. Facade ends along the plinth must have U-profile strip, adjusted to the thickness of thermal-plate.						

	Before setting the plates, thoroughly clean the facade surface from dust, greasy deposits and mortar. At heights over 8 meters, plates need additional anchoring with appropriate bolts.						
	During the works on the facade, surface, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortar shall not be applied in the event of heavy wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Treatment of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be in line with the appropriate EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	EPS	m2	1,161.24	x	19.99 €	=	**23210**
	XPS	m2	1,109.49	x	25.11 €	=	**27862**
	Pressed mineral wool	m2	184.73	x	21.83 €	=	**4033**
1.12.	Setting up "Demit" thermal facade on the "Y" supporters of the gym roof. External thermal insulation of this part of facade will be executed with EPS expanded polystyrene, thickness 10 cm in line with item 1.11.						
	Calculation per m2	m2	72.97	x	19.99 €		**1458**
	NOTE: During installation of the ETICS therma façade ("Demit"), proper treatment of the main power cable at the external rear wall is required.						

1.13.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned (reinforced concrete brise-soleil, roof cantilever slabs, cornice-gutter fuse, ceiling of canopies at the entrance, chimney). Type and colour will be selected by Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, and if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	***contact coating** made of the emulsion of synthetic resins and water-glass (liquid sodium silicate) used for impregnation of the set reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This layer shall be made in fine grained and smooth structure, painted in colour determined by the Employer / Employer's Representative, fully in line with the Design details.						
	The openings shall be protected with PVC foil. The unit price includes purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.						
	Calculation per m2	m2	249.17	x	12.10 €		**3014**
1.14.	Plastering of plinth with cement mortar 1:3, d=3 cm, with periodical stripping dilapidated plaster off, 20% of total plinth area. Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulir plast") as splash guard (as indicated on the drawings). Surface shall be cleaned, washed and sprinkled with acrylic base with granulate. Render shall be applied on cleaned and dried surface by manufacturer's instruction. The color shall be determined by the Employer / Employer's Representative, according to the color chart of manufacturer.						
	Calculation per m2	m2	300.39	x	23.58 €	=	**7082**
1.15.	Striping off the decayed plaster from the parapet on the cantilever slab with debris removal, loading and transporting to the town landfill up to 5 km distance. This item also includes use of façade scaffold.						

	Calculation per m2	m2	29.25	x	3.59 €	=	105
1.16.	Plastering of parapet on cantilever slab with gauged mortar 1:2:6 in two layers (total thickness 2,5cm) with the previous spraying of cement slurry. Calculation is based on a m2 of the plastered area. The unit price includes all necessary materials, transportation and works.						
	Calculation per m2	m2	29.25	x	8.00 €	=	234
1.17.	Closing the window opening to the lavatory area below the stair case (indicated on the drawing MD-01-ARH-08) by gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics) with proper connection to existing wall and reinforcement. Dimension of the opening is 70 / 210 cm. Preparing the surface for installation of ETICS thermal facade from the external side. One ventilation opening with fly screen of 100 cm2 shall be inserted in the facade in mentioned area (indicated on the drawing MD-01-ARH-17). Ventilation opening shall be sturdy quality sampled and approved by Employer / Employer's Representative.						
	Calculation lump sum.	lump sum	1.00	x	87.13 €	=	87
1.18.	Existing windows which to be dismantled and their openings shall be partially or totally closed with gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics) with proper connection to existing wall and reinforcement, and vertical and horizontal beams in line with regulations. The unit price includes all required material, transport, scaffolding and work.						
	Calculation per m2	m2	20.92	x	39.565	=	828
1.19.	Plastering of newly built walls from the inner side of walls with lime-cement plaster 1:2:6 by applying two layers with previous cleaning and flush mortar joining and fitting edge galvanized strips. Sand for plaster correction is made of sifted gravel size 0-4 mm. Plastered surfaces need to be smooth, with sharp edges and without deducted openings. The unit price includes all required material with strips, transport, scaffolding and work.						
	Outer side of the new parapets shall be prepared for installation of the ETICS facade.						
	Calculation per m2	m2	20.92	x	8.00 €	=	167
	TOTAL FOR THERMAL INSULATION OF FACADE WALL						**97231**
II	**THERMAL INSULATION AND WATERPROOFING OF THE ROOF**						

2.01.	Removal of the existing roof covering from the canopies made of zinc-plated metal sheets and tar-paper placed over cantilever boards (as shown on the drawings). The unit price includes all necessary works and transporting debris to the town landfill.						
	Calculation per m2	m2	170.83	x	6.46 €	=	**1103**
2.02.	Installation of horizontal waterproofing and thermal insulation on the flat roof in part of the ground floor canopy. Following layers shall be applied on prepared base:						
	a) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil, b) Vapour barrier of the post bituminized aluminium foil lined with glass fibre fleece, c) Thermal insulation made of extruded polystyrene boards XPS d = 10 cm with heat transfer coefficient of λmax = 0.033 W / mK (on top of already placed foil),						
	d) Layer used for separating from PVC foil, e) Sloping layer made of light-weight concrete d=5-16cm, sloped by 1%, f) Layer for equalizing the pressure, made of vapour-permeable and waterproofed foil,						
	g) Waterproofing made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is placed freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing.						
	h) Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel.						
	Calculation is based on a m2 of the roof basis. The unit price includes all required material following the description from a) to h), including the making of a required cove and installation of the edge perforated metal sheet drip with vertical seam (gravel supporter).						
	Calculation per m2	m2	82.87	x	57.40 €	=	**4757**

2.03.	Waterproofing of the eaves above old and new school entrance with cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is put freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Waterproofing must be put up the walls at minimum 15 cm height. Pay special attention to the connections between horizontal and vertical waterproofing.						
	Calculation per m2	m2	87.96	x	19.99 €	=	**1758**
2.04.	Protect waterproofing on eaves, which is not protected with gravel, with "Krovoplast" or similar coating with equal or better technical characteristics. The unit price includes complete work and material, following the description.						
	Calculation per m2	m2	87.96	x	1.54 €	=	**135**
2.05.	Dismantling of the part of the chimney which is going through the attic and above the roof. Chimney is made of compact brick with gauged mortar. The unit price includes all the work and debris transportation to the town landfill, as well as usage of the scaffold.						
	Calculation per m2	m2	5.53	x	38.44 €	=	**213**
2.06.	Removal of the existing roof covering of the main school building and the gym hall's annex made of tiles type "Mediteran" and battens 4/6 cm, up to the existing wooden roof structure. The unit price includes all the work and debris transportation to the town landfill.						
	Calculation per m2 actual area of the sloped roof.	m2	1,121.47	x	2.77 €	=	**3104**
2.07.	Removal of the existing roof covering of the gym roof, made of arched trapezoid metal-sheets. The removal shall be performed up to the reinforced concrete "Y" supporters. The unit price includes all the work and debris transportation to the town landfill to 5km distance.						
	Calculation per m2	m2	715.82	x	2.77 €	=	**1981**
2.08.	Dismantling of the front mask of the prefabricated "Y" supporters (0,76m2/pc) on the roof of the gym hall. The unit price includes all the work and debris transportation to the town landfill to 5km distance.						
	Calculation per m2	m2	715.82	x	2.77 €	=	**1981**

2.09.	Replacement of over aged parts of wooden roof structure (roof posts, columns, rafters, struts...), which have to be of the same shapes and dimensions as the existing ones, and in total 10% of the whole roof area of the main school building and the gym hall's annex. The unit price includes all the work and materials.						
	Calculation per m2 of orthogonal projection.	m2	101.90	x	17.22 €	=	**1755**
2.10.	Putting of 5/8 cm battens over wooden roof structure, at distance up to 1m. Calculation per m2 actual area of the sloped main school's building roof and the gym hall's annex. The unit price includes all the work and materials.						
	Calculation per m2	m2	1,121.47	x	3.49 €	=	**3908**
2.11.	Hipped roof structure shall be covered by painted Al sheets Al.Tr.40/230/0.7mm. The next operation, after covering, is installation of the flashing of all roof and wall valleys, ridges, hips and gutters with mounting of snow shields, using all necessary joining materials. Calculation per m2 of the of the sloped main school building's roof and the gym hall's annex roof. The unit price includes all the work and materials.						
	Calculation per m2.	m2	1,121.47	x	27.47 €	=	**30807**
2.12.	Thermal insulation of the walls of the school attic and gym hall's annex, using expanded polystyrene EPS d=10cm, 20kg/m3 and d=3cm in line with details 5 and 6, laid down over reinforced concrete slab and vapour barrier, with PVC foil protection and overlaps of 10-15cm. The unit price includes all the work and materials. Calculation per m2.						
	EPS, d=10cm	m2	1,019.17	x	9.12 €	=	**9297**
	EPS, d=3cm	m2	128.78	x	3.90 €	=	**502**
2.13.	Installation of a thermal insulation boards 10cm thick and vapour barrier on the attic's wall to the gym's annex. Thermal insulation shall be protected by PVC foil with overlaps 10-15 cm. Thermal plates are attached to the wall with appropriate enriched mineral adhesive and anchoring with appropriate bolts. The unit price includes all the work and material.						
	Calculation per m2.	m2	38.48	x	9.12 €	=	**351**

2.14.	Covering the roof with the roof of the gym with polyurethane composite panels, d=10cm thickness, heat transfer coefficient λmax = 0.025 W/mK, of standard modular width 1000mm. The panels are fastened to the steel "U" profiles 60/40/3mm, placed at 60-150cm distance, over reinforced concrete "Y" supporters. The upper metal-sheet of panel is of unique trapezoid shape d = 0.5mm, and the lower one is standard SNV d = 0.5mm.						
	After covering the roof with the roof polyurethane composite panels, install flashing of all wall valleys, gable edges and gutters, using all necessary bonding material (stainless steel screws, washers and EPDM sealings). The unit price includes all works and material in line with description.						
	Calculation per m2	m2	715.82	x	69.29 €	=	**49599**
2.15.	Installation of the EPS thermal insulation boards, 10cm thick, on the slopes and front of the eaves of the gym's roof. EPS boards shall be installed on the base made of plasterboards 1.25 cm thick on metal sub-construction (galvanized steel profiles). Thermal plates are attached to the wall with appropriate enriched mineral adhesive and anchoring with appropriate bolts.The unit price includes all the work and materials.						
	Calculation per m2	m2	138.38	x	32.19 €	=	**4454**
	NOTE: An alternative technology for flat roof covering can be offered as a deviation.						
	TOTAL FOR THERMAL INSULATION AND WATERPROOFING OF THE ROOF						**115704**
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery.						
	255/200	pc	93.00	x	11.50	=	**1070**
	255/180	pc	12.00	x	11.50	=	**138**
	260/180	pc	3.00	x	11.50	=	**35**
	350/200	pc	3.00	x	11.50	=	**35**
	230/180	pc	2.00	x	11.50	=	**23**
	245/200	pc	8.00	x	11.50	=	**92**
	245/175	pc	3.00	x	11.50	=	**35**
	240/175	pc	1.00	x	11.50	=	**12**
	245/75	pc	6.00	x	11.50	=	**69**
	245/135	pc	2.00	x	11.50	=	**23**
	220/55	pc	2.00	x	11.50	=	**23**

	200/150	pc	2.00	x	11.50	=	23
	200/120	pc	8.00	x	11.50	=	92
	75/50	pc	2.00	x	11.50	=	23
	80/75	pc	4.00	x	11.50	=	46
	130/130	pc	1.00	x	11.50	=	12
	290/100	pc	2.00	x	11.50	=	23
	595/220	pc	5.00	x	11.50	=	58
	205/125	pc	1.00	x	11.50	=	12
	215/205	pc	2.00	x	11.50	=	23
	250/205+70	pc	2.00	x	11.50	=	23
	195/190+40	pc	1.00	x	11.50	=	12
	420/220+50	pc	1.00	x	11.50	=	12
	275/180	pc	1.00	x	11.50	=	12
	210/180	pc	1.00	x	11.50	=	12
	275/320	pc	2.00	x	11.50	=	23
	210/320	pc	2.00	x	11.50	=	23
3.02.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4 +16 +4 mm, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes.						
	- include internal PVC sill of required width in the item, - PVC profile colour - white.						
	1. 255/200	pc	45.00	x	552.00 €	=	24840
	2. 255/180	pc	12.00	x	514.05 €	=	6169
	3. 260/180	pc	3.00	x	519.80 €	=	1559
	4. 322/200	pc	3.00	x	587.65 €	=	1763
	5. 230/180	pc	2.00	x	508.30 €	=	1017
	6. 245/200	pc	4.00	x	538.20 €	=	2153
	9. 245/75	pc	6.00	x	318.55 €	=	1911
	10. 245/135	pc	2.00	x	339.25 €	=	679
	11&11' 220/55	pc	2.00	x	254.15 €	=	508
	12. 200/50	pc	2.00	x	250.70 €	=	501
	13. 200/120	pc	8.00	x	372.60 €	=	2981
	14. 75/50	pc	2.00	x	165.60 €	=	331
	15. 80/75	pc	4.00	x	188.60 €	=	754
	16. 130/130	pc	1.00	x	273.70 €	=	274
	17. 290/100	pc	2.00	x	541.65 €	=	1083

	18. 595/220	pc	5.00	x	1,197.2 €	=	**5986**
	19. 205/125	pc	1.00	x	307.05 €	=	**307**
	20. 215/205	pc	2.00	x	428.95 €	=	**858**
3.03.	Production and installation of the facade PVC joinery. The unit price includes everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: - production and installation, - 6-chamber PVC profiles, - heat transfer coefficient of U = 1.5 W / m2 K, - minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, - double low-emission glass 4 +16 +4 mm, **NOTE:** External glass has to be coated with low-emission coating as a protection from sunlight, - fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with "tilt-and-turn" mechanism, in line with drawings - joinery schemes,						
	- include internal PVC sill of required width in the item, - PVC profile colour - white.						
	1'. 255/200	pc	48.00	x	552.00 €	=	**26496**
	6'. 245/200	pc	4.00	x	535.90 €	=	**2144**
	7. 245/175	pc	3.00	x	508.30 €	=	**1525**
	8. 240/175	pc	1.00	x	494.50 €	=	**495**
3.04.	Production and installation of the facade aluminium joinery. The unit price includes everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Measures shall be taken on site. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2,8 W/m2K, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium.						
	A1 i A1'. 250/205+70	pc	2.00	x	1,522.6 €	=	**3045**
	A2. 195/190+40	pc	1.00	x	1,009.70 €	=	**1010**

	A3.	420/220+50	pc	1.00	x	1,044.2 €	=	**1044**
	A4.	275/180	pc	1.00	x	737.15 €	=	**737**
	A5.	210/180	pc	1.00	x	578.45 €	=	**578**
	A6.	275/200	pc	2.00	x	1,616.9 €	=	**3234**
	A7.	210/200	pc	2.00	x	1,296.1 €	=	**2592**
3.05.	Production and installation of the aluminium windshield joinery. The unit price includes everything from the description: the purchase of material, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break, - glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.							
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.							
	Calculation as per piece.							
	- building A							
	dim. 245/205+70cm	pc	1	x	2,214.90 €	=	**2215**	
	dim. 245/205+70cm	pc	1	x	2,214.90 €	=	**2215**	
	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper. **NOTE:** Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.							
	TOTAL FOR REPLACEMENT OF FACADE JOINERY							**96574**
IV	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**							

4.01.	Partial repair of pavement (court corner of old building, back side of the gym). Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. Pavement has to be strained into the fields cca1,5m2. Expansion joints shall be filled up with joint filler. The unit price includes all works and materials, including demolition of old concrete slabs, transportation to a landfill up to 5 km distance and finishing works.						
	Calculation per m2	m2	50.00	x	17.8 €	=	**892**
4.02.	Cleaning the whole surface water drainage system around school building in order to get an overflow to the old entrance area. The unit price shall also include cleaning of canals for the rainwater from leaves and dirt.						
	Calculated as per m	m	150.00	x	**5.125**	=	**769**
4.03.	Supply and installation of smooth wooden boards for covering the expansion joints inside the building, along the walls and ceilings. Boards shall be 2,5 cm thick and 15cm width. After installing, boards shall be varnished (process: filling and grinding, primer, two layers of synthetic resin paint).						
	Calculated as per m.	m	24.20	x	**13.735**	=	**332**
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						**1993**
V	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
	RECONSTRUCTION OF SANITARY FACILITIES						
5.01.	Removal of the existing floor tiles from the toilets, including all sub-layers to the existing waterproofing, removal and loading of debris onto a truck and transportation to landfill up to 5 km distance.						
	Calculation per m2	m2	39.62	x	4.92 €	=	**195**
5.02.	Removal of the existing ceramic wall tiles jointly with base layer from the walls in sanitary facilities. Removal and loading of debris onto a truck and transportation to landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of the floor area.	m2	155.27	x	4.92 €	=	**764**

5.03.	Removal of existing rotten plaster from the walls, removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m2	m2	37.03	x	3.59 €	=	**133**
5.04.	Scraping of the old paint from the internal ceiling and walls, removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2	m2	43.26	x	0.51 €	=	**22**
5.05.	Dismantling of the existing joinery - doors in sanitary facilities, including transportation to the town landfill or handing over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery. 70/205 pc 12 80/205 pc 3 120/100 pc1						
	Calculation per m2	m2	23.34	x	6.15 €	=	**144**
5.06.	Making of the scrimmed cement screed for a sloping layer in the toilets. The unit price includes installation of the mesh (1kg/m2) with and overlap 5cm (1,08 m2/m2). Floated coat is used as finishing layer. Screed thickness is d = 4 cm.						
	Calculation per m2	m2	39.62	x	10.05 €	=	**398**
5.07.	Setting up of horizontal waterproofing in the toilets, on different floors, in the following layers (from the bottom up): - bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos.						
	Put the waterproofing at least 10 cm up the wall. Calculation is based on a m2 of the basis (section pulled up the walls is included in the unit price). The unit price includes all works and materials, in line with the description, including the cleaning and surface preparation for a quality installation of a new waterproofing.						
	Calculation per m2	m2	39.62	x	19.99 €	=	**792**
5.08.	Plastering of internal toilet walls with cement mortar 1:3 in two layers with the previous spraying of cement slurry to prepare the wall for ceramic tiles. Calculation is based on a m2 of the plastered wall, without the openings. The unit price includes all necessary works, materials with battens, transportation and scaffolding.						
	Calculation per m2	m2	192.30	x	8.00 €	=	**1537**

5.09.	Tiling the toilet walls with the class I ceramic tiles, while the size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster. Ceramics will be placed up to the ceiling height, h=3,60m. Coating of the jambs and niches is included in the item unit price and it won't be calculated separately.						
	Calculation per m2	m2	239.10	x	23.06 €	=	**5514**
5.10.	Floor tiling in the toilets and other premises with the class I anti-slip tiles. The size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative. Line the tiles in the waterproof adhesive layer joint bonding manner, by using pointing plaster. In the toilets, where there is a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2	m2	39.62	x	28.19 €	=	**1117**
5.11.	Polishing and painting of the ceilings in sanitary facilities and dressing rooms. The Employer / Employer's Representative will select the tone of semi dispersed distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer.						
	Calculation per m2, including all necessary work, materials and scaffolding.	m2	39.62	x	2.87 €	=	**114**
5.12.	Production and installation of internal single leaf PVC compact doors. The unit price includes: the purchase of materials, manufacturing, transport and installation of fitting and blind frame. Measures must be taken on site. Calculation is based per piece of the installed joinery.						
	70/205	pc	12.00	x	364.90 €	=	**4379**
	80/205	pc	3.00	x	386.43 €	=	**1159**
	120/100	pc	1.00	x	262.40 €	=	**262**
	RENEWAL / COMPLETION OF THE FLOORS						

5.13.	Repairing of the existing parquet floor. Apply machine sanding and varnishing of the parquet. Conduct these procedures 3 times by using color free lacquer. Before varnishing, thoroughly clean the surface from dust. Conduct varnishing with a brush, to avoid bubbles. The item includes installation and processing of the angular parquet batten.						
	Calculation per m2	m2	100.00	x	18.66 €	=	**1866**
	PAINTING OF WALLS AND CEILINGS						
5.14.	Stripping off the damaged gauged plaster (2.5cm thick) off the walls and ceilings (5% of total area), removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance. Scaffold to be included in price.						
	Calculation per m2 5442.21x5%	m2	272.11	x	3.59 €	=	**976**
5.15.	Plastering of walls and ceilings in the areas of previosly stripped plaster (5% of total area) with cement-lime plaster 1:2:6 in two layers in total 2.5cm thick. Previously treat the walls with cement milk. The first layer shall be applied roughly and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges. The unit price includes all works, necessary material, transportation and scaffolding.						
	Calculation per m2	m2	272.11	x	8.00 €		**2176**
5.16.	Scraping and skimming of old walls and ceilings with emulsion putty. All surfaces need to be scraped and washed and then smoothened, cleaned and impregnated. Inspect and remedy minor damages and cracks using putty. Flatten with putty and skim with emulsion putty for the first time. All surfaces need to be smoothen, then flatten with putty and skimmed with emulsion putty for the second time. Perform all the works using required scaffold.						
	Calculation per m2						
	- hall, comunications						
	ground floor						
	walls	m2	627.93	x	2.36 €	=	**1480**
	ceilings	m2	385.92	x	2.36 €	=	**910**
	first floor						
	walls	m2	536.31	x	2.36 €	=	**1264**
	ceilings	m2	230.40	x	2.36 €	=	**543**
	second floor						
	walls	m2	543.70	x	2.36 €	=	**1282**
	ceilings	m2	245.90	x	2.36 €	=	**580**
	-classrooms and other premices						
	ground floor						
	walls	m2	494.14	x	2.36 €	=	**1165**
	ceilings	m2	289.82	x	2.36 €	=	**683**

	first floor						
	walls	m2	567.19	x	2.36 €	=	**1337**
	ceilings	m2	314.70	x	2.36 €	=	**742**
	second floor						
	walls	m2	774.20	x	2.36 €	=	**1825**
	ceilings	m2	431.80	x	2.36 €	=	**1018**
5.17.	Painting the walls with oil-based paint up to the height h=1.40m in two layers in colour selected by the Employer / Employers Representative.						
	Calculation per m2						
	- hall, comunications						
	ground floor	m2	273.30	x	3.33 €	=	**910**
	first floor	m2	236.19	x	3.33 €	=	**787**
	second floor	m2	240.06	x	3.33 €	=	**800**
	-classrooms and other premices						
	ground floor	m2	213.75	x	3.33 €	=	**712**
	first floor	m2	245.16	x	3.33 €	=	**817**
	second floor	m2	335.25	x	3.33 €	=	**1117**
	- painting the areas behind the radiators, which will be dismantled, rinsed and re-installed (in the rooms which are not planed to be painted).	m2	19.60	x	3.33 €	=	**65**
5.18.	Painting internal walls and ceilings with semi-dispersed distemper, by applying two layers of the paint, in colour selected by the Employer / Employers Representative, using scaffold.						
	Calculation per m2						
	- h all, comunications						
	ground floor						
	walls	m2	354.61	x	1.64 €	=	**582**
	ceilings	m2	385.92	x	1.64 €	=	**633**
	first floor						
	walls	m2	300.11	x	1.64 €	=	**492**
	ceilings	m2	230.40	x	1.64 €	=	**378**
	second floor						
	walls	m2	303.62	x	1.64 €	=	**498**
	ceilings	m2	245.90	x	1.64 €	=	**403**
	-classrooms and other premices						
	ground floor						
	walls	m2	280.39	x	1.64 €	=	**460**
	ceilings	m2	289.82	x	1.64 €	=	**475**
	first floor						
	walls	m2	322.02	x	1.64 €	=	**528**
	ceilings	m2	314.70	x	1.64 €	=	**516**
	second floor						
	walls	m2	438.95	x	1.64 €	=	**720**
	ceilings	m2	431.80	x	1.64 €	=	**708**
5.19.	Painting of hydrant and switch boxes, painting of steel handrails of staircases in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculated as per lump sum.	lump sum	1.00	x	128.13 €	=	**128**

5.20.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative. Trees shall be planted on min 5 m distance and min. 4 m distance from the buildings and 3m high. Dig a pit for planting throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of with 3 kg of peat enriched fertilizer per tree. Having completed the planting of the seedlings, trees shall be well watered.						
	Calculation per piece	pc	4.00	x	51.25 €	=	**205**
5.21.	Removal and loading of debris from the ground floor, 1st and 2 nd floor onto a truck and transportation to landfill up to 5 km distance.						
	Calculation per m2	m2	1,898.54	x	1.03 €	=	**1946**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**48257**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3.00	x	11.50 €	=	**35**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1.00	x	11.50 €	=	**12**
6.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece	pc	2.00	x	11.50 €	=	**23**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2.00	x	28.75 €	=	**58**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5.00	x	28.75 €	=	**144**
6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5.00	x	28.75 €	=	**144**

6.07.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						
	wall	m2	1.00	x	11.50 €	=	**12**
	floor	m2	1.00	x	11.50 €	=	**12**
	TOTAL FOR SPARE PARTS						**437**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

SUMMARY OF COSTS

SCHOOL AND GYM		
I	THERMAL INSULATION OF FACADE WALLS	97231
II	THERMAL INSULATION AND WATERPROOFING OF THE ROOF	115704
III	REPLACEMENT OF FAÇADE JOINERY	96574
IV	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASUR	1993
V	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	48257
VI	SPARE PARTS	48257
	TOTAL PRICE, VAT EXCLUDED	408015
	VAT (19 %):	77523
	TOTAL PRICE, VAT INCLUDED	**485538**

GROUP A5.3.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Secondary School "Miloje Dobrasinovic" in Bijelo Polje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Miloje Dobrasinovic" Bijelo Polje
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 shall be delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: "Siemens" or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 10 m^3/h						
	Connection size DN40						
		pc	1	x	1,127.00 €	=	1,127.00 €
2	Purchase, supply and installation of electronic flow gauge for light distillated oil .						
	Manufacturer: "Aqua metro" or equivalent						
	Type: "VZO 4 RE"						
	Nominal flow: 25 l/h						
	Minimum flow: 0.5 l/h						
		pc	1	x	511.75 €	=	511.75 €
3	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: "Siemens" or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	2,472.50 €	=	2,472.50 €
4	Software development and staff training.						
		pc	1	x	690.00 €	=	690.00 €
	TOTAL A - Energy management						**4,801.25 €**

B - INSTALLATION OF THERMOSTATIC AND BALANCING VALVES							
1	Purchase, delivery and installation of thermostatic radiator valves, connection size 1/2".						
		pc	116	x	13.94 €	=	1,616.81 €
2	Purchase, delivery and installation of thermostatic radiator valves, connection size 3/4".						
		pc	16	x	20.01 €	=	320.16 €
3	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without need to remove the protective cap. Thermostat has the liquid sensor.						
	Setting range from 8 °C to 26 °C						
	Closing time 24 min.						
		pc	132	x	15.67 €	=	2,069.03 €
4	Purchase, delivery and installation of the radiator angular valves, size 1/2"						
		pc	116	x	12.49 €	=	1,448.72 €
5	Purchase, delivery and installation of the radiator angular valves, size 3/4"						
		pc	16	x	16.79 €	=	268.64 €
6	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
a)	DN50, KVm=24,4						
		pc	1	x	299.00 €	=	299.00 €
a)	DN25, KVm=5,5						
		pc	4	x	102.35 €	=	409.40 €
b)	DN20, KVm=3,1						
		pc	1	x	79.35 €	=	79.35 €
7	Purchase, delivery and installation valves for riser pipes with meter gauges in brass casing, pre-setting with digital reading (fitted on the feed pipe of the manifold), size and properties:						
	DN50 PN6 - Kvs 33						
		pc	1	x	109.25 €	=	109.25 €
	DN25 PN6 - Kvs 8.7						
		pc	4	x	54.05 €	=	216.20 €
	DN20 PN6 - Kvs 5.7						
		pc	1	x	43.70 €	=	43.70 €

	TOTAL B - Installation of thermostatic and balancing valves						**6,880.27 €**
C - MEASURES FOR IMPROVEMENT OF COMFORT AND BETTER FUNCTIONALITY							
C.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of boiler room equipment that is out of function (solid-fuel boiler capacity 500 kW and open expansion vessel capacity 1000l with connecting pipes).						
	Item to be calculated as lump-sum.	set	1	x	575.00 €	=	575.00 €
2	Repair of openings in walls and damages, plastering of walls, tiling floors with ceramic tiles (25 m^2). Fitting of concrete base of the boiler, dimensions 165 x 90 x 10 cm. Base will be coated with ceramic tiles.						
	Item to be calculated as lump-sum.	set	1	x	1,150.00 €	=	1,150.00 €
3	Adaptation of existing flue for installation of new prefabricated flue through the old chimney, chimney cleaning, waste removal and fitting of terminal on top of the old chimney inside which new chimney will be installed, including repair of plaster on the external side at the top of the chimney.						
	Item to be calculated as lump-sum.	set	1	x	402.50 €	=	402.50 €
4	Fitting of single-leaf metal doors, size 90x205cm, in the opening behind the existing coal-fired boiler. The doors will be made of steel box profiles infilled with sheet metal thickness 0.7 mm. Doors are delivered with double coating of protective primary colour and one layer of protective lacquer.						
		kg	80	x	2.53 €	=	202.40 €
5	Flushing the entire heating system in the school with gym. Dismounting of functional radiators (132 pieces), flushing deposits from the bottom of the ribs, cleaning air-extraction network in the second floor of the old section of the school and cleaning air-release radiator valves (42) pieces, remounting with installation of new radiator brackets.						
	Item to be calculated as lump-sum.	set	1	x	6,900.00 €	=	6,900.00 €
6	Dismounting of existing radiator (19 ribs 680/160) in the upstairs office and its re-mounting into the ground floor hallway of the old section of the school on existing connection points.						
	Item to be calculated as lump-sum.	set	1	x	862.50 €	=	862.50 €

	TOTAL C.I - Dismantling of existing equipment and preliminary works					**10,092.40 €**
C.II	**Boiler room elements and fittings**					
1	Purchase, delivery and installation of condensing light distilled oil-fired boiler VIESSMANN Vitoradial 300-T VR3 or equivalent, rated thermal output 263kW for 50/30°C and 245kW for 80/60°C, efficiency 103% (Hi) when working on light distilled oil. For heating systems with flow temperatures (= ultimate temperatures) up to 110°C. Boiler for economical operating with variable boiler water temperature.					
	The compact condensing three-pass boiler with Therm-Control for operating without additional function for return water temperature increase. Boiler body fully insulated with stiff insulation.					
	Dimensions:					
	Length 2900 mm Width 905mm Height 1460 mm					
	Weight with insulation 870 kg					
	Boiler water capacity 490 lit					
	Flue gas connection 200 mm					
	Permissible operating pressure: 4bar Combustion chamber temperature resistance: 2,4mbar					
	Digital control Vitotronic 300 typeGW2B included, for up to 2 heating circuits with mixers. Weather-compensated boiler and heating circuit control unit. with digital built in watch, daily and weekly operating mode, for power with two-stage or modulated burners. with iluminated pushbuttons, simplified putting into operation via sockets, flexible DHW temperature control, integrated diagnosis system and switching to summer, economic modes.					
	Vitotronic 300 contains: heating system on/off switch, test button, electronic maximal temperature limiter, temperature controller and safety temperature limiter, operating status and fault indicator, Optolink laptop connection, boiler water temperature button, domestic hot water temperature button, mixing circuits, pump shunt protection and switching onto economy mode. with water temperature sensor in boiler. External unit connected to Rast 5 - system socket.					
	Boiler complete with two-stage burner for light distilled oil Vitoflame 100. burner is fabric preset to nominal boiler capacity.					

	Delivery scope: Boiler body with fitted boiler door and cleaning cover, virbulators, mating flanges with screws and gasket, thermal insulation, inspection glass for combustion chamber, virbulator extraction tool, control and light distilled oil burner Vitoflame 100 with burner cover.						
		set	1	x	#########	=	22,154.75 €
2	Purchase, delivery and installation of device for neutralisation of condensed water from gas flues GENO-Neutra V NO-24 or equivalent, for light distilled oil condensing boilers capacity 545kW, activated carbon and neutralisation granulate filling. Neutralisation granulate filling 16kg is included.						
		pc	1	x	876.30 €	=	876.30 €
3	Purchase, delivery and installation of "Vitoset" membrane safety valve or equivalent, type MS 1 1/4 with activation pressure of 3 bar. For closed heating installations thermal capacity up to 350 kW. Brass casing. Connection: G 1 1/4, Outlet: G 1 1/2.						
		pc	1	x	78.20 €	=	78.20 €
4	Purchase, delivery and installation of System temperature sensor (NTC 10 kOhm) for metering temperature on pipe, with connection pipe (5,8 m long) and plug.						
		pc	2	x	86.25 €	=	172.50 €
5	Purchase, delivery and installation of gases temperature sensor (NTC 20 kOhm, 100 mm long). For reading and monitoring safety temperatures with connection pipe (3,5 m long) and a plug.						
		pc	1	x	149.50 €	=	149.50 €

6	Purchase, delivery and installation of remote control unit for setting one to three heating circuits, Vitotrol 300A or equivalent: - for setting defined room temperature and lowered defined room temperature, and also hot water temperature, - with operating programs, holiday programs, and function for party operating and economy operating - with switching time for one of three heating circuits, DW water heater and circulating pump - with illuminated graphic display for reading outdoor temperature and indoor temperature, operating states and support in form of text - with room temperature sensor in premises for starting via room temperature (solely for one mixer circuit)						
		pc	1	x	385.25 €	=	385.25 €
7	SCHIEDEL chimney system ICS 25 or equivalent, made of twin-wall stainless steel W.Nr. 1.4404 wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature stable insulation material - Superwool. ICS chimney system includes all required elements: inspection port and boiler connection, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals. ICS system is fully in line with EN 1856.						
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS or equivalent, is made of stainless steel W.Nr. 1.4404 wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus. PRIMA PLUS system is fully in line with EN 1856.						

	All chimney elements are industrially produced in every detail as set out in technical documents for particular building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. The system passed GASTEC corrosion test. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø200mm, total height 16.5 m						
	Furnace flue ICS25 Ø200 mm, developed length 3.4m						
		set	1	x	2,558.75 €	=	2,558.75 €
8	Purchase, delivery and installation of the duplex circulation pump with electronic frequency controller used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna 3 D 40-80 F						
	1st pump flow 7, 2nd pump flow 6 m^3/h						
	1st pump thrust 4.5, 2nd pump 4 m						
	Type of connection: Flanged DN40						
	Power supply: V=1x230V~						
	Maximum current: I=0,19 - 1.21A						
	Transferred power: P=17 - 269W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
		pc	2	x	1,688.20 €	=	3,376.40 €
9	Purchase, delivery and installation of membrane expansion vessel. Maximum permitted pressure is 6 bars, pre-set pressure is 3.5 bars, maximum permitted temperature is 120 °C.						
	Manufacturer: "Pneumatex", Switzerland or equivalent						
	Type: Statico SU 800.6						
	Volume: 800 lit						
	Dimensions:						
	diameter 740mm, height 2044mm, weight 105kg, connection 3/4"						
		pc	1	x	2,409.25 €	=	2,409.25 €
10	Purchase, delivery and installation of service valve, brass for maintenance and dismounting of expansion vessel, ball valve with DN 15 outlet for fast discharge hose.						
	Outlet size: 3/4"						

	Operating temperature: -10 °C do +120 °C						
	Max. operating pressure: 16 bar						
		pc	1	x	17.25 €	=	17.25 €
11	Purchase, delivery and installation of three-way mixing and diverting valve for constant control of cooling and heating water, with drive power motor as drive unit, connection size:						
	DN40 PN6, Kvs-28,5						
		pc	2	x	80.50 €	=	161.00 €
12	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN80 PN6						
		pc	2	x	85.33 €	=	170.66 €
	DN65 PN6						
		pc	8	x	68.08 €	=	544.64 €
13	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets PN6, with following dimensions of connections:						
	DN65 PN6						
		pc	2	x	103.50 €	=	207.00 €
14	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets, with following dimensions of connections:						
	DN80 PN6						
		pc	1	x	127.65 €	=	127.65 €
	DN65 PN6						
		pc	1	x	98.90 €	=	98.90 €
15	Purchase of material and fitting of piping (corrections on connecting pipes in boiler room) made of seamless steel pipes in accordance with JUS C.B5.221 or DIN 2448, dimensions:						
	ø114,3x3,6						
		m	5	x	29.67 €	=	148.35 €
	ø88,9x3,2						
		m	5	x	22.77 €	=	113.85 €
	ø76,1x2,9						
		m	15	x	18.63 €	=	279.45 €
	ø48,3x2,6						
		m	10	x	11.39 €	=	113.85 €
	ø42,4x2,6						
		m	5	x	9.78 €	=	48.88 €

16	Binding, hanging and joining material, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and finishing layer of paint resistant to high temperatures.						
	Calculated as 60% of the previous item.		0.6	x	704.38 €	=	422.63 €
17	Purchase and delivery of copper pipes Ø12x0.8mm 15m long for light distilled oil. These are connected to the existing pipes. The item includes installation of ball valves on both pipes, back-flow preventers and oil filters on feeder.						
		set	1	x	230.00 €	=	230.00 €
18	Purchase of material and pipework insulation with plate prefabricated insulation on the base of expanded rubber with closed cell structure. insulation is 25cm thick for temperature range up to 105°C. To be used for insulation of part of the existing piping and new pipes installed in the boiler room. Item is calculated as per m^2 of insulation measured on the external side of the pipe.						
		m^2	15	x	23.00 €	=	345.00 €
19	Installation of steel cast ribbed radiator in the hallway on the second floor, axial distance from ribs h=600mm, depth d=160mm, rib width s=60mm thermal effectiveness at branching of 90/70°C 157W (the item includes fitting of new sets for brackets mounting with spacers). Item to be calculated per number of ribs.						
		pc	20	x	4.60 €	=	92.00 €
20	Purchase, delivery and installation of radiator cap, dimensions 5/4" .						
		pc	6	x	1.38 €	=	8.28 €
21	Purchase, delivery and installation of reduction elements connection diameter 5/4" to 1/2".						
		pc	8	x	1.38 €	=	11.04 €
	TOTAL C.II - Boiler room elements and fittings						**35,301.32 €**
C.III	**Preliminary and finishing works**						
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
		lump-sum	1	x	460.00 €	=	460.00 €

2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves.						
		lump-sum	1	x	460.00 €	=	460.00 €
3	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.						
		lump-sum	1	x	230.00 €	=	230.00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.						
		lump-sum	1	x	172.50 €	=	172.50 €
5	Issuing of certificate for entire installed material and equipment.						
		lump-sum	1	x	230.00 €	=	230.00 €
6	Preparation of "As-built" design.						
		lump-sum	1	x	575.00 €	=	575.00 €
7	Installation of framed and glazed scheme of connections on a visible place in the boiler room.						
		lump-sum	1	x	230.00 €	=	230.00 €
8	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with the fire protection standards.						
		lump-sum	1	x	115.00 €	=	115.00 €
9	Mending wall behind the radiator in the office on the first floor which shall be dismantled and installed on the diferent position.						
		lump-sum	1	x	34.50 €	=	34.50 €
	TOTAL C.III - Preliminary and finishing works						**2,507.00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**4,801.25 €**
B	**INSTALLATION OF THERMOSTATIC AND BALANCING VALVES**	**6,880.27 €**
C	**EFFICIENCY OF THE DISTRIBUTION SYSTEM**	47,900.72 €
C.I	Dismantling of existing equipment and preliminary works	10,092.40 €
C.II	Boiler room elements and fittings	35,301.32 €
C.III	Preliminary and finishing works	2,507.00 €
	TOTAL PRICE, VAT EXCLUDED	**59,582.24 €**

	VAT (19 %)	11,320.62 €
	TOTAL PRICE, VAT INCLUDED	**70,902.86 €**

GROUP A5.3.3 ***BILL OF QUANTITIES*** *of electrical services for energy efficiency improvement in Secondary School "Miloje Dobrasinovic" in Bijelo Polje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Miloje Dobrasinovic" Bijelo Polje
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures above blackboards in classrooms and for light fixtures in toilets for handicapped persons. Connect cables for light fittings in classrooms to existing junction box in classrooms. Connect cables for light fittings in toilets for handicapped persons to junction box in adjacent toilet. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Control for light fixture above blackboard shall be done from existing control point. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	4.00				
	Works and material:	pc	34	x	15.18	=	516.12 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	12.00				
	Works and material:	pc	20.00	x	45.54	=	910.80 €
1.3.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	309	x	3.80	=	1,172.66 €

1.4.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	130	x	101.20	=	13,156.00 €
1.5.	Delivery and mounting of ceiling mounted luminaries 2/35W T16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	11	x	126.50	=	1,391.50 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	34	x	173.31	=	5,892.37 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	4	x	113.85	=	455.40 €
1.8.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	66	x	144.21	=	9,517.86 €
1.9.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	15	x	94.88	=	1,423.13 €
1.10.	Delivery and mounting of ceiling mounted light fitting 2/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	3	x	107.53	=	322.58 €
1.11.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	21	x	113.85	=	2,390.85 €

1.12.	Delivery and mounting of ceiling mounted luminaries 1/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	8	x	96.14	=	769.12 €
1.13.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	13	x	111.32	=	1,447.16 €
1.14.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof, completely equipped with mounting gear and light source, certified by DIN 18032. Works and material to be calculated per unit:	pc	16	x	290.95	=	4,655.20 €
1.15.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	15	x	226.4	=	3396.5
1.16.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	3	x	226.4	=	679.3
1.17.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	2	x	232.8	=	465.5
	Total for lighting installation						**48,562.09 €**
2	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
2.1.	Delivery and laying of cables in wall installations with PVC rigid installation pipes and galvanized cable trays in boiler room, for power supply of electrical consumers in the boiler room. Works and material are calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	45.00	x	2.40	=	108.16 €
	PP-Y 3x2,5 mm2	m	60.00	x	3.04	=	182.16 €
	PP-Y 5x2,5 mm2	m	15.00	x	3.42	=	51.23 €
	Outlet three phase 3P+N+PE 16A/400V IP55	pc	1.00	x	10.12	=	10.12 €
	Outlet 2P+E / 230V/ IP 55	pc	2.00	x	8.86	=	17.71 €
	Switch IP44 10A	pc	1.00	x	6.33	=	6.33 €
2.2.	Delivery and mounting electrical parts in existing switchbox in boiler room , "RT KO", completely equipped with following parts:						
	disconnector switch INS 1-0, 40A, 3P	pc	1.00				
	automatic switch 1p,iC60N-C/16A, 6kA	pc	7.00				
	automatic switch 1p,iC60N-C/10A, 6kA	pc	3.00				

	The price includes all material required for installation of this equipment.						
	Total "RT KO"	pc	1.00	x	120.18	=	120.18 €
	Total for power supply and electrical installation for boiler room and heating equipment						**495.88 €**
3	**POTENTIAL EQUALIZATION INSTALLATION**						
3.1.	Delivery and mounting of deep galvanized tape Fe-Zn 25x4 mm for potential equalization in boiler room, according to the drawing layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	20.00	x	2.53	=	50.60 €
3.2.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	pc	18.00	x	6.33	=	113.85 €
3.3.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	pc	1.00	x	5.06	=	5.06 €
3.4.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room, for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	12.00	x	3.80	=	45.54 €
3.5.	Perform galvanic connecting of all metal parts in school with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...), which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded.	m	50.00	x	6.33	=	316.25 €
3.6.	Delivery and mounting box for discharge of static electricity. The box is mounted at facade wall of boiler room. Installed equipment within the box:						
	disconnector switch 16A,250V SKX 12/21 0-1, Ex ed II CT6 Tep-EX	pc	1.00				
	P/F 25 mm2 with pliers for connection at end of the wire	m	10.00				
		pc	1.00	x	480.70	=	480.70 €
	Total potential equalization installation						**1,012.00 €**
4	**LIGHTING AND GROUNDING INSTALLATION**						
4.1.	Dismantling of existing lightning protection system.	lump sum	1.00	x	253.0	=	253.00 €
4.2.	Delivery and installation of lightning descending system and lightning reception system, made of round conductor which is made of Al/Mg with diameter of 8mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	560.00	x	2.53	=	1,416.80 €

4.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	445.00	x	6.33	=	2,814.63 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	72.00	x	6.33	=	455.40 €
	Lightning conductor holder for wall installation:	pc	12.00	x	6.33	=	75.90 €
	Holders for vertical mechanical protection of lightning conductors:	pc	18.00	x	6.33	=	113.85 €
4.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	14.00	x	6.33	=	88.55 €
	linking clamp strip-wire	pc	15.00	x	6.33	=	94.88 €
	linking clamp wire-wire	pc	54.00	x	6.33	=	341.55 €
	groove clamp (for crossing over horizontal gutters)	pc	37.00	x	6.33	=	234.03 €
4.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	9.00	x	31.63	=	284.63 €
4.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	18.00	x	12.65	=	227.70 €
4.7.	Delivery and mounting of wet-preventing clamp. Works and material to be calculated per unit:	pc	19.00	x	12.65	=	240.35 €
4.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	lump sum	1.00	x	822.25	=	822.25 €

4.9.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measure unit.	pc	16.00	x	10.12	=	161.92 €
4.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	120.00	x	2.53	=	303.60 €
	Total for lighting and grounding installation						**7,929.02 €**
5	**SPARE PARTS**						
5.1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2.00	x	7.1	=	14.17 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2.00	x	5.9	=	11.89 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2.00	x	5.9	=	11.89 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2.00	x	5.8	=	11.64 €
	compact fluorescent light bulb TC-L 18W	pc	2.00	x	5.7	=	11.39 €
	Total for spare parts:						**60.97 €**
6	**TESTING**						
6.1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1.00	x	253.00 €	=	253.00 €
6.2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1.00	x	379.50 €	=	379.50 €
	Total for testing:						632.50 €
7	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1.00	x	**379.50 €**	=	379.50 €

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	48,562.09 €
2	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	495.88 €
3	POTENTIAL EQUALIZATION INSTALLATION	1,012.00 €
4	LIGHTING AND GROUNDING INSTALLATION	7,929.02 €
5	SPARE PARTS	60.97 €
6	TESTING	632.50 €
7	PREPARATION OF MAINTENANCE DESIGN	379.50 €
	TOTAL PRICE, VAT EXCLUDED	59,071.96 €
	VAT (19%)	11,223.67 €
	TOTAL PRICE, VAT INCLUDED	**70,295.63 €**

GROUP A5.3.4 BILL OF QUANTITIES on Indoor Water Supply and Sewerage Services in Secondary School "Miloje Dobrašinović" in Bijelo Polje		
	Client:	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Secondary School "Miloje Dobrašinović", Bijelo Polje, Montenegro
	Documentation:	Final Design of Interior Water Supply and Sewerage Services
	Date:	30 May 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1.01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	2.00	x	10.25 €	=	21
1.02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	10.00	x	10.25 €	=	103
1.03	Removal of existing faucets above concrete lavatories, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	4.00	x	10.25 €	=	41
1.04	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per m'	m'	25.23	x	7.18 €	=	181
1.05.	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2.00	x	15.38 €	=	31
	TOTAL REMOVAL WORKS						**376**

II	WATER-SUPPLY INDOOR INSTALLATIONS						
2.01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints should be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes should be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, should be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dø20mm(DN15)	piece	8.70	x	3.59 €	=	31
	dø25mm(DN20)	piece	9.79	x	4.61 €	=	45
	dø32mm(DN25)	piece	6.74	x	5.74 €	=	39
2.02	Purchase and installation of straight stop valves. The valves should be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dø20mm(DN15)	piece	6.00	x	14.35 €	=	86
	dø25mm(DN20)	piece	4.00	x	14.35 €	=	57
	dø32mm(DN25)	piece	1.00	x	20.50 €	=	21
2.03	Purchase and installation of "EK" angle valves DN 20mm. The valves should be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	10.00	x	12.30 €	=	123
2.04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report should be made. The Report should be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	25.23	x	2.05 €	=	52
2.05	Disinfection of complete water supply installations. The following actions should be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works should be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	25.23	x	3.59 €	=	91
2.06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1.00	x	358.75 €	=	359
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						903

III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
3.01	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1.00	x	410.00 €	=	410
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	2.00	x	30.75 €	=	62
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**472**
IV	**SANITARY EQUIPMENT**						
4.01	Purchase and installation of faucet above concrete lavatory, for cold water only, together with gaskets and all other bits and pieces necessary for assembling.						
	Calculation as per piece.	piece	4.00	x	246.00 €	=	984
4.02	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network should be connected by siphon trap of Ø100. Water tank should be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette should be ordered as per Employer / Employer's Representative decision.						
	Calculation as per piece.	piece	10.00	x	123.00 €	=	1230
4.03	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation.						
	Calculation as per piece.	piece	2.00	x	138.38 €	=	277
	TOTAL SANITARY EQUIPMENT						**2491**

SUMMARY OF COSTS

I	REMOVAL WORKS	376
II	WATER-SUPPLY INDOOR INSTALLATIONS	903
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	472
IV	SANITARY EQUIPMENT	2491
	TOTAL PRICE, VAT EXCLUDED	4241
	VAT (19 %)	806
	TOTAL PRICE, VAT INCLUDED	**5047**

GROUP A5.4.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Primary School "Mustafa Pećanin" in Rožaje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	Facility:	Primary school "Mustafa Pećanin", Rožaje
	Documentation:	Final Architectural Design
	Date:	30 May 2013

Item	Description of the Item	Unit of measure	Quantity		unit price (€)		Amount (€)
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Stripping of old plaster from the facade, along with base preparation. Removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m2 of stripped and prepared facade area.						
	Note/see enclosure 1						
	school building	m2	2,400.00	x	2.87 €	=	**6888**
	administrative building	m2	493.00	x	2.87 €	=	**1415**
1.02.	Setting up of "Demit" thermal facade.						
	Thermal insulation of the facade will be made of expanded EPS polystyrene						
	having heat transfer coefficient of λmax = 0,037 W/mK, thickness δmin=10cm, produced in line with the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade walls reaching up to the height of h=1,6m from ground floor will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with heat transfer coefficient of λ=0,035-0,04 W/mK. Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the openings.						
	Thermal plates are folding, attached to facade wall by using the relevant enriched mineral adhesive, anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:						
	***the first layer** enriched plaster based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene plates will be filled with polyurethane foam.						

	Reinforcing mesh with adequate overlapping and extra protection at the openings and corners is laid in a fresh layer of this mortar. In case of need for the additional mechanical anchoring, use impact bolt through the reinforcing mesh 24 hours after applying this layer.						
	* reinforcing mesh						
	***the secont layer of mortar** apply same procedure as with the first layer. This mortar is laid to well-settled first layer and polished with a screed afterwards.						
	* **contact coating** made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour selected by the Employer / Employer's Representative, while the entire procedure will be conducted in line with the design details.						
	Before setting up the thermal plates, the following works will be conducted:						
	* All works on the roofs, including the covering and sheet metal works,						
	* Windows and doors replacement,						
	* Plastering of inside wall and ceiling surfaces,						
	*Concrete pavement,						
	*Setting up of all installations on the façade,						
	*Covering and protection of all non-treated surfaces – glass, wood, aluminium...						
	*Planed closing of widows of the sanitaries.						
	*Control and testing of the existing facility surface: Use impregnation- basic coating at the most critical points of the facility. When the basic coating sets, place the EPS cube of 5x5x5 cm using polystyrene adhesive. Once the adhesive has completely settled, minimum 3 days if working conditions are adequate, try to separate the cube manually.						

	If in the process of separating polystyrene, only the adhesive separates and not parts of the basis- the basis is sufficiently strong, solid and stable. If in the process of separating polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong. If in the process of separating polystyrene, part of the adhesive and cradling is separated - it means that the basis is not strong enough and it will withstand a new layer of thermal insulation.						
	Use the reinforcing mesh or corner profiles for the window corners and jambs. To complete the facade along the plinth, use reinforced layer or install U profile of the batten adjusted to thickness of a thermal boards.						
	At heights exceeding 8 meters, plates need additional anchoring with appropriate bolts.						
	During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortars must not be applied in case of strong wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE:						
	Processing of jambs is included in the unit price, it won't be calculated separately.						
	The planned facade systems shall be aligned with the appropriate EN standards.						
	External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate. ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	school and gym						
	EPS 10cm	m2	1,596.85	x	19.99 €	=	**31917**
	XPS 10cm	m2	449.87	x	25.11 €	=	**11297**
	pressed mineral wool A1 d=10cm	m2	351.99	x	21.83 €	=	**7685**

	administrative building						
	EPS 10cm	m2	209.10	x	19.99 €	=	**4179**
	XPS 10cm	m2	60.48	x	25.11 €	=	**1519**
	pressed mineral wool A1 d=10cm	m2	73.80	x	23.06 €	=	**1702**
1.03.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, 'Bavalit' type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned.						
	Type and colour will be selected by the by Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	***contact coating** made of the emulsion of synthetic resins and water-glass used for impregnation of the set reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, in colour determined by the by Employer / Employer's Representative, while the entire procedure will be conducted under the design details.						
	The openings shall be protected with PVC foil.						
	Use angle profiles to treat corners and window jambs.						
	The unit price includes the purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding. Calculation is per m2 of the installed façade.						
	Main school building- columns and walls of outdoor staircases.	m2	22.00	x	12.10 €	=	**266**
	Administrative building-funnel, walls of fuel store room.	m2	168.00	x	12.10 €	=	**2032**

1.04.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulir plast") as splash guard (as indicated on the drawings). Surface shall be cleaned, washed and sprinkled with acrylic base with granulate. Render shall be applied on cleaned and dried surface by manufacturer's instruction. The color shall be determined by the Employer / Employer's Representative, according to the color chart of manufacturer. Calculation per m2.						
	School and the gym	m2	227.15	x	15.58 €	=	**3539**
	Administrative building	m2	57.97	x	15.58 €	=	**903**
1.05.	Installation of drip batten at the plinth, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative, with anchoring. Anchor bolts can be direct or indirect. On the front side, overhang of the drip shall be 3cm.						
	Calculation per m						
	Main school building	m	279.00	x	12.92 €	=	**3603**
	Administrative building	m	54.00	x	12.92 €	=	**697**
1.06.	Repair of damages in the facade by using repairing mortar, along with preparations for setting up of "Demit" thermal facade. Surface shall be smooth, without bumps and wraps and with no sharp edges. Calculation per m2. The quantity is given approximately.						
	Note: See enclosure 1						
	Main school building-30%	m2	720.00	x	9.94 €	=	**7159**
	Administrative building-30%	m2	144.00	x	9.94 €	=	**1432**
1.07.	Making of the facade frame (sembrana) around the windows of the main school building (on the main and two lateral facades). The width of the frame is 15cm, and it is made of EPS board 3cm thick. Processing with "Bavalit" is already included in item "installation of thermal insulation facade "Demit".						
	Calculation per m of installed sambrano.	m	514.00	x	5.54 €	=	**2845**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**89078**
II	**REPLACEMENT OF FACADE JOINERY**						
2.01.	Dismantling of façade joinery and all its elements and mechanisms. Transportation to the town landfill or hand-over to the Employer / Employer's Representative (according to the agreement) for storing. Calculation as per piece of dismantled joinery.						
	Main school building and gym:						

	dim.140/335cm -door	pc	2.00	x	11.50 €	=	23
	dim.165/245cm -window	pc	22.00	x	11.50 €	=	253
	dim.125/245cm -window	pc	10.00	x	11.50 €	=	115
	dim.105/125cm -window	pc	2.00	x	11.50 €	=	23
	dim.50/245cm -window	pc	4.00	x	11.50 €	=	46
	dim.150/220cm -window	pc	8.00	x	11.50 €	=	92
	dim40/40cm -window	pc	8.00	x	11.50 €	=	92
	dim.290/135cm -window	pc	2.00	x	11.50 €	=	23
	dim.260/275cm -glass panel	pc	2.00	x	11.50 €	=	23
	dim.265/135cm -window	pc	5.00	x	11.50 €	=	58
	dim.135/145cm -window	pc	4.00	x	11.50 €	=	46
	dim.85/145cm -window	pc	2.00	x	11.50 €	=	23
	dim.130/210cm -door	pc	1.00	x	11.50 €	=	12
	dim.380/150cm -window	pc	9.00	x	11.50 €	=	104
	dim.460/150cm -window	pc	3.00	x	11.50 €	=	35
	dim.110/205cm -door	pc	1.00	x	11.50 €	=	12
	dim.171/135cm -window	pc	2.00	x	11.50 €	=	23
	dim.275/145cm -window	pc	1.00	x	11.50 €	=	12
	dim.280/135cm -window	pc	4.00	x	11.50 €	=	46
	dim.266/135cm -window	pc	2.00	x	11.50 €	=	23
	dim.211/135cm -window	pc	1.00	x	11.50 €	=	12
	dim.290/135cm -window	pc	1.00	x	11.50 €	=	12
	dim.215/135cm -window	pc	1.00	x	11.50 €	=	12
	dim.245/135cm -window	pc	1.00	x	11.50 €	=	12
	dim.75/65cm -window	pc	1.00	x	11.50 €	=	12
	dim.195/145cm -window	pc	1.00	x	11.50 €	=	12
	dim.180/135cm -window	pc	4.00	x	11.50 €	=	46
	dim.170/205cm -window	pc	24.00	x	11.50 €	=	276
	dim.125/205cm -window	pc	8.00	x	11.50 €	=	92
	dim.110/115cm -window	pc	1.00	x	11.50 €	=	12
	dim.150/130cm -window	pc	12.00	x	11.50 €	=	138
	dim.180/130cm -window	pc	2.00	x	11.50 €	=	23
	dim.265/135cm-protective net	pc	3.00	x	11.50 €	=	35
	dim.275/145cm-protective net	pc	1.00	x	11.50 €	=	12
	dim.600*400cm-protective net with door	pc	1.00	x	11.50 €	=	12
	Total length of the window drips which shall be dismantled from the façade (within the windows which shall not be changed).	m	7.95	x	5.75 €	=	46
	Administrative building:						
	dim.100/205cm-door	pc	1.00	x	11.50 €	=	12
	dim.154/240cm-door	pc	1.00	x	11.50 €	=	12
	dim.70/60cm -window	pc	1.00	x	11.50 €	=	12
	dim.122/122cm -window	pc	2.00	x	11.50 €	=	23
	dim.300/300cm-door	pc	1.00	x	11.50 €	=	12
	dim.185/155cm -window	pc	10.00	x	11.50 €	=	115
	dim.119/125cm -window	pc	1.00	x	11.50 €	=	12
	dim.90/90cm -window	pc	1.00	x	11.50 €	=	12
	Total length of the window drips which shall be dismantled from the façade (within the windows which shall not be changed).	pc	2.80	x	11.50 €	=	32
2.02.	Production and installation of the facade PVC joinery. The unit price includes everything from description:						

	- Production and assembling, - 6-chamber PVC profiles reinforced on the inside with galvanized steel U profiles, no thermal bridge, - Non-recycled PVC to be used, - Heat transfer coefficient Umax = 1,5 W/m¸K, - Minimal required solar energy transmittance factor for glazed surfaces is g≤65%, - Glass - double-glazed 4+16+4 mm low emission with argon or some other inert gas between glass panels, - Fittings: required set for hanging and closing, - Opening - as shown on the annexed joinery schemes. -The unit price also includes: blind frames, decorative stripes, external Al drip with lateral plugs. -Colour of the profile shall be light brown (wood), sampled and aproved by Employer / Employer's Representative. NOTE:The items marked with ' include glass coated with low emission coating as the protection against sunshine.						
	Measures to be taken onsite. Calculation per piece of installed joinery fully in line with the description.						
	note- see detail D10						
	Main school building and gym:						
	POS2 - glass panel 170/252cm-unit price includes window frames	pc	6.00	x	748.65 €	=	**4492**
	POS2' - glass panel 170/252cm-unit price includes window frames	pc	16.00	x	748.65 €	=	**11978**
	POS3 - glass panel 130/252cm-unit price includes window frames	pc	10.00	x	495.65 €	=	**4957**
	POS4 - glass panel 105/125cm-unit price includes window frames	pc	2.00	x	257.60 €	=	**515**
	POS5 - glass panel 150/195cm-unit price includes window frames	pc	8.00	x	485.30 €	=	**3882**
	POS24 -glass panel 170/205cm- unit price includes window frames	pc	6.00	x	533.60 €	=	**3202**
	POS24' -glass panel 170/205cm- unit price includes window frames	pc	18.00	x	533.60 €	=	**9605**
	POS25 - glass panel 125/205cm- unit price includes window frames	pc	10.00	x	445.05 €	=	**4451**
	POS26 - glass panel 110/120cm- unit price includes window frames	pc	1.00	x	221.95 €	=	**222**
	POS27 - glass panel 150/130cm- unit price includes window frames	pc	10.00	x	387.55 €	=	**3876**
	POS29 - glass panel 110/120cm- unit price includes window frames	pc	1.00	x	247.25 €	=	**247**
2.03.	Production and installation of the facade PVC joinery. The unit price includes everything from description:						

	- Production and assembling, - 6-chamber PVC profiles reinforced on the inside with galvanized steel U profiles, no thermal bridge, - Non-recycled PVC to be used, - Heat transfer coefficient Umax = 1,5 W/m¸K, - Minimal required solar energy, transmittance factor for glazed surfaces is g≤65%, - Glass - double-glazed 4+16+4 mm low emission with argon or some other inert gas between glass panels, - Fittings: required set for hanging and closing, - Opening - as shown in the annexed joinery schemes, - To be included within the item: blind frames, decorative stripes, external Al drip with lateral plugs, - Profile colour: white. **NOTE:** The items marked with ' include glass coated with low emission coating as the protection against sunshine.						
	Calculation per piece.						
	Main school building and gym:						
	POS 6 -window 80/60cm	pc	5.00	x	174.80 €	=	**874**
	POS 7 -glass panel 291/135cm	pc	4.00	x	761.30 €	=	**3045**
	POS -9- glass panel 265/135cm	pc	1.00	x	652.05 €	=	**652**
	POS 10- window 160/145cm	pc	3.00	x	294.40 €	=	**883**
	POS 11- window 145/145m	pc	3.00	x	381.80 €	=	**1145**
	POS 13- glass panel 380/150cm	pc	4.00	x	549.70 €	=	**2199**
	POS 13* -glass panel 330/150cm	pc	2.00	x	549.70 €	=	**1099**
	POS 13' -glass panel 330/150cm	pc	3.00	x	748.65 €	=	**2246**
	POS 14 -glass panel 460/150cm	pc	3.00	x	1,036.15 €	=	**3108**
	POS 16- glass panel 171/135cm	pc	2.00	x	415.15 €	=	**830**
	POS 17- glass panel 275/145m	pc	2.00	x	685.40 €	=	**1371**
	POS 18- glass panel 280/140cm	pc	2.00	x	745.20 €	=	**1490**
	POS 18*- - glass panel 280/145cm	pc	1.00	x	772.80 €	=	**773**
	POS 19 - glass panel 190/140cm	pc	1.00	x	473.80 €	=	**474**
	POS 20 - glass panel 260/140cm	pc	2.00	x	645.15 €	=	**1290**
	POS 21 - glass panel 228/135cm	pc	1.00	x	584.20 €	=	**584**
	POS 22 - glass panel 180/135cm	pc	1.00	x	427.80 €	=	**428**
	POS 22* - glass panel 180/125cm	pc	1.00	x	410.55 €	=	**411**
	POS 23 -glass panel 175/125cm	pc	1.00	x	392.15 €	=	**392**
	POS 28 -glass panel 180/130cm	pc	4.00	x	417.45 €	=	**1670**
	Administrative building:						
	POS 34 - glass panel 122/122cm	pc	2.00	x	335.80 €	=	**672**
	POS 35* - window 185/155cm	pc	1.00	x	501.40 €	=	**501**
	POS 35 - window 185/155cm	pc	9.00	x	588.80 €	=	**5299**
	POS 36 - window 90/90cm	pc	1.00	x	289.80 €	=	**290**
	POS 37 - widow 120/125	pc	1.00	x	325.45 €	=	**325**
2.04.	Production and installation of main entrance doors at the main school building. Doors shall have skylights and shall be made of Al profiles with thermal break. Calculation, fully in line with the description:						

	* production and assembling, * self-closing mechanism, * profiles- aluminium, with thermal break * infill- combination of the glass and Al thermal-panels with polyurethane infill. * glass- double- glazed 4+16+4 mm, with argon or some other inert gas between the panels (one glass panel shall be low emission), * heat transfer coefficient Umax = 2.8 W/m^{2}K, * solar energy transmittance factor g≤65% * fittings: required set for hanging and closing, * knob - chrome plated - mate, * fit rubber door stoppers on the floor, * Opening as shown in the joinery schemes annexed, * Profile colour shall light brown (wood), sampled and aproved by Employer / Employer's Representative.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	POS 1 - glass panel 141/335cm	pc	1.00	x	1,198.30 €	=	**1198**
	POS 1* - glass panel 141/335cm	pc	1.00	x	1,198.30 €	=	**1198**
2.05.	Production and installation of the aluminium windshield. The unit price includes everything from the description: the purchase of material, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break, -glass system: single glazing 4 mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation per piece.						
	POS 1a - glass panel 141/335cm	pc	1.00	x	875.15 €	=	**875**
	POS 1a* - glass panel 141/335cm	pc	1.00	x	875.15 €	=	**875**

2.06.	Production and installation of entrance door made of Al profiles with thermal break. The unit price includes everything from the description:						
	* production and assembling, * self-closing mechanism, * profiles- aluminium, with thermal break * infill- combination of the glass and Al thermal-panels with polyurethane infill. * glass- double- glazed 4+16+4 mm, with argon or some other inert gas between the panels (one glass panel shall be low emission), * heat transfer coefficient Umax = 2.8 W/m$_c$K, * solar energy transmittance factor g≤65%, *fittings: required set for hanging and closing, * knob - chrome plated - mate, * fit rubber door stoppers on the floor, * opening as shown in the joinery schemes annexed, *profile colour - natural aluminium.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	The unit price also includes: blind frames, decorative stripes, external Al drip with lateral plugs. In the given dimensions blind frames are already included.						
	Main school building and gym:						
	POS 8 - glass panel 268/213cm (double leaf door 140/213 with lateral skylights)	pc	2.00	x	1,260.40 €	=	**2521**
	POS 12 - door 131/210cm	pc	1.00	x	737.15 €	=	**737**
	POS 15 - door 110/205cm	pc	1.00	x	618.70 €	=	**619**
	Administrative building:						
	POS 30 - door 110/210cm	pc	1.00	x	611.80 €	=	**612**
2.07.	Production and installation of facade aluminium joinery, made of aluminium profiles coated in plastic layer, without thermal break, with panel infill and wing fitted with jalousie. Colour of the profiles: white.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	Administrative building:						
	POS 31 - door 150/240cm	pc	1.00	x	652.05 €	=	**652**
2.08.	Production and installation of weather louvers made of Al white profiles. Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	POS 32-weather louvers 70/60cm	pc	1.00	x	140.30 €	=	**140**

2.09.	Purchase of material and installation of double-leaf, metal, garage door, made of rectangular tube profiles covered with sheet metal d=3 mm. Door shall be equipped with all necessary shackles and mechanism for manual opening. Door shall be properly painted, firstly with anti-corrosive paint, then with paint in the same colour as the door of the nearby administrative building - grey color.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	Administrative building:						
	POS 33 - door 300/300cm	pc	1.00	x	971.75 €	=	**972**
	NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.						
	NOTE: Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.						
2.10.	Purchase and installation of external flashing sills, made of ready-made plastic-laminated galvanized steel metal sheets, within side sills which shall be preserved. Carefully dismantle existing flashing sills, prior to installation of new ones. Replacement is needed due to the thickness change of facade covering.						
	Measures to be taken on site. Flashing sills shall be 26 cm width, i.e. maximum 3 cm beyond facade surface. Calculation is per piece of installed flashing sill, fully in line with the description.						
	Main school building:						
	l=265	pc	3.00	x	51.98 €	=	**156**
	Administrative building:						
	l=80cm	pc	2.00	x	18.17 €	=	**36**
	l=60cm	pc	2.00	x	18.17 €	=	**36**
2.11.	Production and installation of protective mesh for windows in the basement and ground floor. The mesh is made of steel rectangular tube profiles 60*60 mm, which form external frame. Inner bars are made of rectangular steel tube profiles 40*40 mm and it's position is in line with the window leafs. Mesh is used as infill (stretched metal of approximate dimensions of a rhomb cca 85*35mm). The mesh is welded to angle profiles L30*30 and then fitted into the frame so that L profile is visible on the external side. The entire structure is anchored, appropriately protected and painted in white.						

	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	POS m- 125/245cm	pc	3.00	x	442.75 €	=	1328
	POS m2 - 165/245cm	pc	3.00	x	563.50 €	=	1691
2.12.	Installation of safety meshes, previously dismantled from the object. There is a possibility of reduction of mesh dimensions, so they could fit into the new windows. Meshes shall be painted in white. Upon approval of the Employer / Employer's Representative mounted on the building.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	mesh, dim. 265/135	pc	3.00	x	97.75 €	=	293
	mesh and door 600/400	pc	1.00	x	241.50 €	=	242
	mesh, dim. 275/145	pc	3.00	x	120.75 €	=	362
2.13.	Production and installation of new internal wooden sills on new windows in main school building. New wooden sills shall have the same or similar colour as the colour of profile used for new windows and they shall be placed over battens and layer of tar paper, as described in detail D10.						
	Measures to be taken onsite.						
	Calculation per piece, all complete.						
	165/43cm	pc	22.00	x	66.70 €	=	1467
	125/43cm	pc	6.00	x	52.90 €	=	317
2.14.	Production and installation of meshes made of ropes. Meshes shall be attached on ceilings / walls over the windows in the gym, as a glass protection. Before the installation, meshes shall be sampled and approved by Employer / Employer's Representative.						
	opening dim. 380/150cm POS 13 & 13*	pc	9.00	x	396.75 €	=	3571
	opening dim. 460/150cm POS 14	pc	3.00	x	419.75 €	=	1259
	TOTAL FOR FACADE JOINERY REPLACEMENT						**101457**
III	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
3.01.	Dismantling of vertical gutters round cross-section Ø10cm made of galvanized sheet metal with its dumping at landfill. The unit price shall include all the work, material and transport.						
	Calculation per m.	m	193.20	x	1.03 €	=	198
3.02.	Dismantling of facade installations (cables, lightning, lightning rod etc.), their storing away to a place set by the Employer / Employer's Representative and their re-installation upon facade installation.						
	Calculation per lump sum.	lump sum	1.00	x	348.50 €	=	349

3.03.	Dismantling of roof coverings from canopies over ancillary entrances, together with horizontal rain gutters and vertical rain downpipes, flashings, plasterboards and battens which form suspended ceilings (both sides: front and lateral). Dismantling of existing structure shall be foreseen too, since it was not possible to determin it' s exact condition.						
	Calculation per m2 of real roof area.						
	East side canopy	m2	9.60	x	9.74 €	=	**93**
	West side canopy	m2	8.50	x	9.74 €	=	**83**
	Canopy of the gym main entrance	m2	4.86	x	9.74 €	=	**47**
	Canopy of the gym ancillary entrance	m2	2.00	x	9.74 €	=	**19**
3.04.	Openings, as specified in the Drawings, shall be walled-up using perforated bricks d=20 cm , laid in gauged mortar 1:2:6.						
	Calculation per m2, all complete.	m2	6.00	x	24.19 €	=	**145**
3.05.	Production and installation of the vertical gutters of 120/120 mm square section, made of ready made galvanized plastic-laminated steel metal sheets d=0,70 mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material.						
	Calculation per m.						
	Main school building	m	228.00	x	14.97 €	=	**3412**
	Administrative building	m	49.00	x	14.97 €	=	**733**
3.06.	Renovation / construction of the pavement around school and administrative building and construction of the new pavement of the rear school yards. The works include, where necessary, preparation works such as: cleaning off the overgrowth, stripping of the humus layer, preparation of the terrain for the construction of the pavement. The works include purchase and transportation of materials for gravel filling and concrete works. Layer of gravel to be 10 cm of thickness. Gravel shall be rammed manually and by machine if necessary to achieve complete compactness. Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. Expansion joints shall be filled up with joint filler. The unit price includes all works and materials. Calculation is per m2.						
	Renewal of the pavement around school building	m2	110.00	x	14.56 €	=	**1601**

	Renewal of the pavement around ancillary building	m2	15.00	x	14.56 €	=	218
	New pavement in the rear school yards	m2	80.00	x	17.84 €	=	1427
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						8326
IV	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
4.01.	Removal of the existing floor tiles from the toilets, including all sub-layers to the slab, removal and loading of debris onto a truck and transportation to landfill up to 5 km distance.	m2	132.72	x	4.92 €	=	653
4.02.	Removal of the existing ceramic wall tiles with undercoat layer from the walls in sanitary facilities. Removal and loading of debris onto a truck and transportation to landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of the floor area.	m2	654.48	x	4.92 €	=	3220
4.03.	Removal of existing rotten plaster from the walls, removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of removed plaster.	m2	145.70	x	3.59 €	=	523
4.04.	Scraping of the old paint from the internal ceilings in sanitary facilities, removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation as per m2 of scraped area.	m2	142.40	x	0.51 €	=	73
4.05.	Removal of internal single leaf, double layer plywood door. The unit price includes transportation to a landfill up to 5 km distance. Calculation is per piece.						
	- dim. 66/200cm	pc	22.00	x	138.38 €	=	3044
	- dim. 88/200cm	pc	9.00	x	158.88 €	=	1430
4.06.	Demolition of partition walls d=24cm in line with drawing detail D10. The unit price includes transportation to a landfill up to 5 km distance.						
	Calculation m3	m3	1.00	x	69.70 €	=	70
4.07.	Dismantling existing barriers beetwen the showers in the sanitary facilities of the gym. Barriers are made of metal profiles. The unit price includes transportation to the landfill up to 5 km distance.						
	Calculation as per piece.						
	- dim. 70/200cm	pc	8.00	x	15.38 €	=	123

4.08.	Dismantling of existing plinths around showers in the sanitary facilities of the gym. Plinths are 15 cm high and thick. The unit price includes transportation to the landfill up to 5 km distance.						
	Calculation per m	m	12.24	x	14.35 €	=	**176**
4.09.	Purchase and delivery of the materials for construction of partition walls beetwen the showers and plinth wall on the front side of the shower in the sanitary facilities of the gym. Walls, 6.5 cm thick shall be made of the bricks laid in the gauged mortar 1:2:6 with proper connection to existing wall and reinforcement, and vertical and horizontal beams in line with regulations. The unit price includes RC beams and collumns with reinforcement. Height of the partition walls is 220 cm, and height of the front parapets is 12 cm.						
	Calculation as per m2 .	m2	7.31	x	26.24 €	=	**192**
4.10.	Purchase of the materials and building the partition wall in the area of reconstruction of toilets for disabled persons. The walls shall be built by bricks / "giter" blocks in gauged mortar 1:2:6 in line with Design. During construction, connection shall be achieved by "working on a half-element" and the connection to the existing wall shall be done in line with regulations. The unit price includes necessary reinforcement beams above doors and usage of the scaffold. Calculated per m2.						
	wall 12 cm	m2	8.40	x	24.19 €	=	**203**
	wall 24 cm	m2	8.00	x	25.22 €	=	**202**
4.11.	Making of the scrimmed cement screed for a sloping layer in the toilets. The unit price includes installation of the mesh (1kg/m2) with and overlap 5cm (1,08 m2/m2). Floated coat is used as finishing layer. Screed thickness is d = 4 cm. Calculation per m2 of finished surface, including all works and material.	m2	138.12	x	10.05 €	=	**1387**
4.12.	Setting up of horizontal waterproofing in the toilets, in the following layers (from the bottom up):						
	- bitulith + polyasbestos + glass mesh,						
	- polyasbestos + glass mesh,						
	- polyasbestos .						
	Put the waterproofing at least 10 cm up the wall. Calculation is based on a m2 of the basis (section pulled up the walls is included in the unit price). The unit price includes all works and materials, in line with the description, including the cleaning and surface preparation for a quality installation of a new waterproofing.						

	NOTE: Entire waterproofing overlapping and putting the waterproofing up the walls shall be included in the unit price of works.						
	floor	m2	138.22	x	19.99 €	=	**2763**
4.13.	Setting up the vertical waterproofing on the walls in shower cubicles (including the newly built partition and plinth walls), from floor level up to the height of 2,2 m, using "Texaspenetrat" or equivalent material. Calculation is per m2.						
	wall	m2	80.48	x	14.15 €	=	**1138**
4.14.	Plastering interior walls of sanitary facilities (including the newly built partition and plinth walls) with cement mortar 1:3, in two layers, with previous spraying of cement slurry to prepare the item for tiling to walls with ceramic tiles. The unit price includes all works, material with strips, transportation and use of scaffold.						
	Calculation is per m2 of plastered wall, with deduction of total openings areas.	m2	772.08	x	8.00 €	=	**6173**
4.15.	Tilling to walls of sanitary facilities with ceramic tiles class I. The size, colour and tone of the tiles will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in layer of adhesive, placing them joint bonding manner by pointing the joints using pointing plaster.						
	Ceramics will be placed up to the ceiling.						
	Coating of the jambs and niches is included in the item unit price and it won't be calculated separately.						
	Calculation per m2 fully completed item.	m2	772.08	x	23.06 €	=	**17806**
4.16.	Tiling to floor in the toilets and other premises with the class I anti-slip tiles. The size, colour and tone will be will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in the waterproof adhesive layer joint bonding manner, by using pointing plaster.						
	In the toilets, consisting a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2 fully completed item.	m2	142.40	x	28.19 €	=	**4014**
4.17.	Polishing and painting of the ceilings in sanitary facilities and dressing rooms. The Employer / Employer's Representative will select the tone of semi dispersed distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer.						

	Calculation per m2, including all necessary work, materials and scaffolding.	m2	142.40	x	4.82 €	=	**686**
4.18.	Production and installation of internal joinery. The unit price includes everything from the description:						
	Purchase of material and mounting of indoor joinery, produced of hard and high resistant PVC profiles, reinforced by zinc plated steel „ U" profiles, strictly according to joinery drawings and details, including high quality of accessories, hinges, opening / closing handles etc. PVC panels shall be used for doors and float glass for fan lights above the doors. This item implicates all needed cleanings and transportation of waste materials to the waste depot, as well as all necessary works for joinery mounting (proper fitting, needed wall chase cutting, plastering, painting and use of jamb sills). Stick the plate dim.13 * 4cm on the door, with written purpose of the room, and fix in the floor the rubber stoppers. Calculation is per completely finished item. The profiles are white. Prior to manufacture of joinery, the Contractor is obliged to take „on site" measures.						
	Measures must be taken onsite. Calculation per piece of installed joinery, in line with the description.						
1u	- dim. 66/180cm	pc	22.00	x	436.65 €	=	**9606**
2u	- dim. 88/200cm	pc	9.00	x	493.03 €	=	**4437**
2u	- dim. 90/205cm	pc	1.00	x	496.10 €	=	**496**
4u	- dim. 105/205cm	pc	1.00	x	523.78 €	=	**524**
4.19.	Purchase and installation of the shower curtains in the shower cubicles of the gym. Curtains will be hanged on the metal bars wich are included in the unit price. Before the installation samples shall be approved by the Employer / Employer's Representative.						
	Calculation as per piece	pc	8.00	x	87.13 €	=	**697**
4.20.	Removal of the existing gypsum board cover of horizontal installations within the sanitary facilities. There are two sides of cascades, lateral side and bottom side, average developed width 80 cm. Calculation per m, including transportation of debris to a landfill.						
	Removal of the existing gypsum cover.	m	24.00	x	4.31 €	=	**103**

4.21.	Installation of the new gypsum board cover of horizontal installations within the sanitary facilities. There are two sides of cascades, lateral side and bottom side, average developed width 80 cm. Calculation per m, including all the materials, substructure, bandaging, tools, scaffold etc.						
	Calculation is per m.	m	24.00	x	18.04 €	=	**433**
4.22.	Skimming and painting of the plaster cascades in sanitary facilities. Use semi-dispersed water-based paint. Colour of the paint will be selected by the Employer / Employer's Representative. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer. Calculation per m2, including all necessary work, materials and scaffolding.	m2	24.60	x	4.00 €	=	**98**
4.23.	Installation of new canopy as per enclosed drawing detail D6. The item includes everything from described detail D6, up to the final completion, together with all necessary material, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1.00	x	486.88 €	=	**487**
4.24.	Installation of new canopy as per enclosed details D7. The item includes all other items from described details D7, up to the final completion, along with all necessary materials, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1.00	x	486.88 €	=	**487**
4.25.	Installation of new canopy as per enclosed detail D8. The item includes all other items from described detail D8, up to the final completion, along with all necessary materials, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1.00	x	589.38 €	=	**589**
4.26.	Installation of new canopy as per enclosed detail D9. The item includes all other items from described detail D9, up to the final completion, along with all necessary materials, tools, works and transportation in accordance with the code of practice.						
	Calculation per piece, all complete.	pc	1.00	x	589.38 €	=	**589**

4.27.	Replacement of the suspended ceiling panels with new ones, finally painted in white using water-based paint. The panels shall be hooked up to the wooden ceiling joists using profiles. Prior this work, the existing ceiling needs to be removed and put off to the landfill. Calculation per m2, including all the materials, works and scaffolding.						
	Dismantling and storage	m2	1,200.00	x	1.90 €	=	**2276**
	Procurement and installation	m2	1,200.00	x	13.94 €	=	**16728**
	Painting	m2	1,200.00	x	4.36 €	=	**5228**
4.28.	Scraping and skimming with emulsion putty of complete old walls within the main school building (the gym is excluded), on which the joinery shall be replaced and walls with cracks and dammages (20% of total area). All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Flattening and skimming with putty minor damages and cracks. Flattening and skimming with emulsion putty first time. All the surfaces must be finally glassed, then flattened and skimmed with putty for the second time, using required scaffold.						
	Calculation per m2						
	ground floor						
	walls	m2	495.09	x	2.36 €	=	**1167**
	ceilings	m2	220.06	x	2.36 €	=	**519**
	level +2,40						
	walls	m2	120.42	x	2.36 €	=	**284**
	ceilings	m2	50.18	x	2.36 €	=	**118**
	first floor						
	walls	m2	598.88	x	2.36 €	=	**1412**
	ceilings	m2	219.46	x	2.36 €	=	**517**
4.29.	Painting walls and ceilings with double layer of semi-dispersed paint. Colour of the paint will be selected by the Employer / Employer's Representative. The unit price includes usage of scaffold.						
	Calculation per m2						
	ground floor						
	walls	m2	1,371.18	x	1.64 €	=	**2249**
	ceilings	m2	1,100.29	x	1.64 €	=	**1804**
	level dig +2,40						
	walls	m2	213.25	x	1.64 €	=	**350**
	ceilings	m2	250.88	x	1.64 €	=	**411**
	first floor						
	walls	m2	1,977.84	x	1.64 €	=	**3244**
	ceilings	m2	1,097.31	x	1.64 €	=	**1800**
4.30.	Painting walls with double layer of oil based paint up to the height of 1,55 m. Colour of the paint will be selected by the Employer / Employer's Representative.						
	Calculation per m2						
	ground floor	m2	1,104.25	x	3.33 €	=	**3679**
	level dig +2,40	m2	388.86	x	3.33 €	=	**1295**
	floor	m2	1,016.57	x	3.33 €	=	**3386**

	painting the areas behind the radiators, which will be dismantled, rinsed and re-installed (in the rooms which are not planed to be painted).	m2	30.00	x	3.33 €	=	**100**
4.31.	Repaire of the existing parquet floor. Machine sanding and varnishing of the parquet is included. Conduct these procedures 3 times by using color free lacquer. Before varnishing, thoroughly clean the surface from dust. Conduct varnishing with a brush, to avoid bubbles. The item includes installation and processing of the angular parquet batten.						
	Calculation per m2	m2	20.00	x	18.66 €	=	**373**
4.32.	Purchase of materials and installation of new vinyl floor in the storage room next to the toilets for disabled persons. Works shall include: *Demolition of the existing floor in the storage room next to the toilets for disabled persons up to the slab level. The unit price shall include loading of debris onto a truck and transportation to a landfill up to 5 km distance, *Applying self leveling mass. Before applying the mass thoroughly clean the surface from dust. *Purchase and applying of vinyl floor. Adhesive shall be adequate for this type of floor. Before applying the adhesive thoroughly clean the surface from dust. *The stripes for vinyl floor on the room edges shall be installed.						
	Calculation per m2	m2	8.00	x	35.06 €	=	**280**
4.33.	Purchase and installation of self-supporting network cable, category 5E outdoor, and accessories for hanging on both sides, 100m long.						
	Calculated as per piece	pc	4.00	x	240.88 €	=	**964**
4.34.	Delivery and installation of the RJ45 socket, category 5E. Usage of installation tools shall be included in calculation.						
	Calculated as per piece	pc	8.00	x	66.63 €	=	**533**
4.35.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers. The item also includes painting of metal hydrant and switch boxes, painting of steel handrails of staircases in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculated as per lump sum.	lump sum	1.00	x	230.63 €	=	**231**

4.36.	Purchase and installation of wall pad coating for concrete columns in the gym. Wall padding features an 18 mm thick wafer boards base onto which the padding foam is bonded. Pads to be upholstered with closed cell expanded polyethylene and coated with vinyl fabric. The finishing material needs to be flexible, highly resistant against moisture and bacteria, and easy to maintain. Installation with appropriate connection to the wall.						
	Calculated as per piece	pc	12.00	x	59.45 €	=	**713**
4.37.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative. Trees shall be planted on min 5 m distance and min. 4 m distance from the buildings and 3m high. Dig a pit for planting throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of 3 kg of peat enriched fertilizer per tree. Having completed the planting of the seedlings, trees shall be well watered.						
	Calculation per piece	pc	10.00	x	51.25 €	=	**513**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**112596**
V	**RECONSTRUCTION OF THE ROOF ABOVE MAIN SCHOOL BUILDING**						
5.01.	Dismantling- removal of existing roof cover made of: plastic coated metal sheet, tar-paper (roof paper), wooden boards, together with the belonging horizontal rain gutters, flashings and snow hurdles. Calculation is per m2 of inclinated roof area. Classification and storage to be done in line with the instruction of the Employer / Employer's Representative. Transportation of debris to a landfill up to 5 km distance to be included in price.						
	Main school building	m2	1,500.00	x	5.95 €	=	**8918**
5.02.	Removal of existing, damaged wooden roof substructure and storage in place determined by the Employer / Employer's Representative. Transportation of debris to a landfill up to 5 km distance to be included in price.						
	Calculation per m2 of horizontal roof projection.						
	main school building	m2	1,305.00	x	3.28 €	=	**4280**

5.03.	Removal of existing, damaged attic substructure and storage in place determinate by the Employer / Employer's Representative. Transportation of debris to a landfill up to 5 km distance to be included in price.						
	Calculation per m2 of horizontal roof projection.						
	main school building	m2	1,305.00	x	2.56 €	=	**3344**
5.04.	Purchase of material and installation of wooden attic and roof substructure made of dry white wood, everything in accordance with standards for roof cover made of galvanized and plastic coated metal sheet. Calculation includes setting up of connections between bearing elements in accordance with the code of practice, with use of nails, bolts and other strengthening steel elements.						
	Protect the anchors with two layers of antirust paint. Wooden elements shall be treated with different coats against decay, wormholes and fire. Fireproof coating shall consist of expanding water-soluble coating designed for fire protection of interior wood. It is necessary that the coating protects the wooden structure from fire for a time interval of at least 45 minutes. Obtain necessary test certificate.						
	Calculation per m2 of horizontal projection.						
	After the structure is removed, the precise measuring shall be done, as well as the check of the technical solution given in the Design.						
	Expected wood grain volume is cca 120m3.						
	Main school building	m2	1,305.00	x	38.54 €	=	**50295**
5.05.	Purchase of material and setting up thermal insulation in the school attic, above the classrooms and over the gypsum boards.						
	Calculation per m2.						
	Main school building	m2	1,044.00	x	9.84 €	=	**10273**
5.06.	Purchase of material and setting up wooden boards over the ceiling joists with proper connection.						
	Calculation per m2.						
	Main school building	m2	1,044.00	x	9.64 €	=	**10059**
5.07.	Purchase of material and setting up of roof cover, made of the following layers: wooden boards d=24 mm, placed over rafters and roofing paper, battens 3/3 cm, and plastic coated galvanized steel metal sheet. The item includes installation of all necessary flashings and snow hurdles.						
	Calculation per m2 of actual inclined roof area.						

	Main school building	m2	1,500.00	x	24.81 €	=	**37208**
5.08.	Purchase of material and installation of suspended horizontal gutters, R=15 cm, made of ready made galvanized plastic-laminated steel metal sheets d=0,70 mm. This item includes all necessary connection elements, gutter hooks, at max. distance of 80 cm, with inclination of 0,5 % to the drain. Calculation is per m, all together.						
	Main school building	m2	183.00	x	14.97 €	=	**2739**
5.09.	Partial reconstruction of the roof cover in places where replacement of the roof substructure is not foreseen. Item includes removal and transportation of debris to a landfill as well as the purchase and installation of new galvanized and plastic coated metal sheet panels. Calcu						
	Calculation is per m2 of actual inclined roof area. Quantity of works is calculated as lump sum.						
	Main school building	m2	70.00	x	19.68 €	=	**1378**
	RECONSTRUCTION OF THE ROOF ABOVE MAIN SCHOOL BUILDING						**128492**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3.00	x	11.50 €	=	**35**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1.00	x	11.50 €	=	**12**
6.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece	pc	2.00	x	11.50 €	=	**23**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2.00	x	28.75 €	=	**58**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5.00	x	28.75 €	=	**144**

6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high points.						
	Calculated as per piece	pc	5.00	x	28.75 €	=	**144**
6.07.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						
	wall	m2	1.00	x	11.50 €	=	**12**
	floor	m2	1.00	x	11.50 €	=	**12**
	TOTAL FOR SPARE PARTS						**437**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

SUMMARY OF COSTS

I	THERMAL INSULATION OF FACADE WALLS	89078
II	REPLACEMENT OF FAÇADE JOINERY	101457
III	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	8326
IV	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	112596
V	RECONSTRUCTION OF THE ROOF ABOVE MAIN SCHOOL BUILDING	128492
VI	SPARE PARTS	437
	TOTAL PRICE, VAT EXCLUDED:	440386
	VAT (19%):	83673
	TOTAL PRICE, VAT INCLUDED:	**524060**

GROUP A5.4.2 ***TABLE OF QUANTITIES*** ***of thermal-technical (heating) services for energy efficiency improvement in Primary School "Mustafa Pecanin" Rozaje***	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Mustafa Pecanin" Rozaje
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: Siemens or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 25 m^3/h						
	Connector: DN65						
		pc	1	x	1,658.30 €	=	1,658.30 €
2	Purchase, supply and installation of electronic flow gauge for light fuel oil.						
	Manufacturer: Aqua metro or equivalent						
	Type VZO 4 RE						
	Nominal flow 50 l/h						
	Minimum flow 1 l/h						
		pc	2	x	517.50 €	=	1,035.00 €
3	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: Siemens or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	2,472.50 €	=	2,472.50 €
4	Software development and staff training.						
		pc	1	x	690.00 €	=	690.00 €
	TOTAL A - Energy management						**5,855.80 €**

B - HEATING SYSTEM OPTIMISATION							
B.I	**Installation of new equipment and repair of existing equipment**						
1	Flushing of the entire heating system in the school with the gym. Dismantling of all radiators (153 steel ribbed radiators with 10 to 38 ribs), flushing of the deposits from the bottom of radiators, cleaning air-release valves, remounting of radiators with installation of new radiator brackets.						
	Calculated as lump-sum.	pc	1	x	5,577.50 €	=	5,577.50 €
2	Purchase, delivery and installation of thermostatic radiator valves connection size 1/2" (angle or flat).						
		pc	155	x	13.94 €	=	2,160.39 €
3	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without need to remove the protective cap. Thermostat has the liquid sensor.						
	Setting range from 8 °C to 26 °C						
	Closing time 24 min.						
		pc	155	x	15.67 €	=	2,429.55 €
4	Purchase, delivery and installation of the radiator angular valves, size 1/2"						
		pc	155	x	12.49 €	=	1,935.80 €
5	Purchase, delivery and installation of the circulation pump with electronic frequency-driven controller used to supply the radiator heating, with integrated cooler and ability to control pressure at the feeder, proportionally and constantly, having the following characteristics:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna3 65-120 F						
	Flow: 24,5 m^3/h						
	Thrust: 6.0 m						
	Type of connection: Flanged DN65						
	Power supply: V=1x230V~						
	Maximum current: I=0.18 - 3.38A						
	Transferred power: P=16-769W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
	The item includes dismounting of existing pumps, main and back-up, manufacturer WILO Germany, model type top - S100/10						
		pc	2	x	2,766.90 €	=	5,533.80 €

6	Repair of water softener manufactured by MIP TIMO Serbia, model MOV-2. Adding 25 kg of salt for softening into the softener, provision of same amount of salt reserves.						
		pc	1	x	287.50 €	=	287.50 €
7	Purchase of material and insulation of entire boiler room equipment, pipes, valves, feed and return pipes, as well as front and rear side of boilers using mineral wool, 50 mm thickness in AL sheet metal formwork thickness 0,5mm, with mounting material. Flammability fire resistance class A1 according to SIST EN 13501-1 and JUS U.J1.050. Item is calculated per m^2 of insulation measured on the external side of the pipe.						
		m^2	35	x	33.35 €	=	1,167.25 €
8	Purchase, delivery and installation of preinsulated seamless steel pipe, spirally welded (weld V=1, tested to 40 bars permanently with surges of 80 bar at 10 sec) material St 37.0 i.e. Č0361 in accordance with DIN 1626, dimensions and mass according to DIN 2458, pipe terminals ready for welding in accordance with DIN 2559. Thermal insulation made of polyurethane foam average density 80 kg/m3. Waterproofing made of corona charged high-density polyethylene. Fully in accordance with EN 253 for preinsulated pipes.						
	Ø114,3x3,6mm, external Ø 250mm						
	L=6m	pc	2	x	408.25 €	=	816.50 €
9	Purchase, delivery and fitting of steel preinsulated steel bend (non-segmented) made of seamless pipe material St 35.8, i.e. Č1212 in accordance with valid European standard EN 448, insulated with polyurethane foam in HDPE coating.						
	Ø114,3x3,6mm, external Ø 250mm α=135°; R=1,5D						
		pc	2	x	109.25 €	=	218.50 €
10	Purchase, delivery and installation of HDPE connecting coupler for preinsulated pipes made of cross-link polyethylene, minimum length 700mm, with supporting equipment (strips, connectors, spacers, caps, HDPE foam), in accordance with EN489.						
	Ø114.3mm, external Ø 250mm						
		pc	2	x	48.30 €	=	96.60 €

11	Purchase, delivery and installation of sealant at penetrations through the wall to prevent water leakage at wall penetrations. It consists of special profiled neoprene rink in accordance with DIN 18337.						
	For pipe DN100:						
		pc	2	x	17.25 €	=	34.50 €
12	Purchase of material and installation of pipework made of steel seamless pipes, in accordance with JUS C.B5.221 or DIN 2448, (the item includes dismantling of existing pipes from the boiler room to the school, 6.7m long) dimensions:						
	Ø114,3x3,6						
		m	6	x	35.88 €	=	215.28 €
13	Purchase, delivery and fitting of air release vessel, with overflow pipe and tap DN 15, made of black seamless pipe DN150 length 250 mm, together with 3 m long pipe, diameter 3/8".						
		pcs	2	x	40.25 €	=	80.50 €
14	Purchase, delivery and installation valves for riser pipes with meter gauges in brass casing, pre-setting with digital reading (fitted on the feed pipe of the manifold), size and properties:						
	DN40 PN6 - Kvs 19.2						
		pc	1	x	89.70 €	=	89.70 €
	DN32 PN6 - Kvs 14.2						
		pc	1	x	78.20 €	=	78.20 €
	DN25 PN6 - Kvs 8.7						
		pc	4	x	54.05 €	=	216.20 €
	DN20 PN6 - Kvs 5.7						
		pc	2	x	43.70 €	=	87.40 €
15	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
a)	DN40, Kvm 12.8						

		pc	1	x	166.75 €	=	166.75 €
b)	DN32, Kvm 8.5						
		pc	1	x	149.50 €	=	149.50 €
a)	DN25, Kvm 5.5						
		pc	4	x	102.35 €	=	409.40 €
b)	DN20, Kvm 3.1						
		pc	2	x	79.35 €	=	158.70 €
16	Purchase, delivery and installation of radiator cap, dimensions 5/4" . Item includes dismantling of existing air-release valves on radiators at the ground floor and mezzanine.						
		pc	25	x	1.73 €	=	43.13 €
17	Reduction elements for connection of 5/4" to 1/2" pipe diameter.						
		pc	10	x	1.38 €	=	13.80 €
18	Purchase, delivery and installation of valve locks with automatic air-release valves connection size 1", maximum operating temperature 100°C, max operating pressure 10bar, max gas release pressure 6 bars, EPDM rubber tightness, with hygroscopic safety air vent cap and protective casing.						
		pc	10	x	19.55 €	=	195.50 €
19	Purchase, delivery and fitting of threaded ball valves (valves are fitted instead of existing stop valves, which need to be removed), connection size:						
	DN50 PN6						
		pc	4	x	40.25 €	=	161.00 €
	DN32 PN6						
		pc	6	x	25.30 €	=	151.80 €
20	Installation of steel cast ribbed radiators, total 2 radiators, from rib axial distance of outlets, h=500mm, depth d=160mm, ribs width s=60mm thermal effectiveness at 90/70°C water manifold 139.1W (item includes installation of new sets of radiator brackets with spacers, caps and reducing tees). Item calculated as per number of ribs.						
		pc	30	x	4.60 €	=	138.00 €
	TOTAL B.I - Installation of new equipment and repair of existing equipment						**22,612.74 €**
B.II	**Preliminary and finishing works**						
1	Preparation of the construction site for construction works on thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
		lump-sum	1	x	460.00 €	=	460.00 €

2	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency. Issuing of certificate for entire installed material and equipment.						
		lump-sum	1	x	460.00 €	=	460.00 €
3	Drilling holes in wall and slabs for fitting pipes DN100 from boiler room through the office above and in ancillary building. The item includes mending works at penetration points for bringing walls and ceilings in proper condition.						
		lump-sum	1	x	230.00 €	=	230.00 €
4	Cleaning of the existing burners (2pcs), chimneys (2pcs) and boilers (2pcs).						
		lump-sum	1	x	920.00 €	=	920.00 €
	TOTAL B.II - Preliminary and finishing works						**2,070.00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**5,855.80 €**
B	**HEATING SYSTEM OPTIMISATION**	**24,682.74 €**
B.I	Installation of new equipment and repair of existing equipment	22,612.74 €
B.II	Preliminary and finishing works	2,070.00 €
	TOTAL PRICE, VAT EXCLUDED	**30,538.54 €**
	VAT (19 %)	**5,802.32 €**
	TOTAL PRICE, VAT INCLUDED	**36,340.86 €**

GROUP A5.4.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Primary School "Mustafa Pećanin" in Rožaje*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	P.S. "Mustafa Pecanin" Rozaje
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures above blackboards in classrooms and for light fixtures in toilets for handicapped persons. Connect cables for light fittings in classrooms to existing junction box in classrooms. Connect cables for light fittings in toilets for handicapped persons to junction box in adjacent toilet. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Control for light fixture above blackboard shall be done from existing control point. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	4.00				
	Works and material:	pc	28	x	15.18	=	425.04 €
1.2.	Delivery and laying of cables for anti panic lighting circuits and additional positions of lighting fixtures, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings, electrical connection on both sides and reparation of damaged surfaces. Average amount of cable per one light fitting:						
	PP-Y 3x1,5 mm2	m	6.00				
	Works and material:	pc	12.00	x	22.77	=	273.24 €
1.3.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	248	x	3.80	=	941.16 €

1.4.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	29	x	101.20	=	2,934.80 €
1.5.	Delivery and mounting of ceiling mounted luminaries 2/49W T16 F840 [STD] T16 x 2/49W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	114	x	145.48	=	16,584.15 €
1.6.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from the wall with board mounted on it. Works and material to be calculated per unit:	pc	27	x	173.31	=	4,679.24 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16, with IP50 protection, with electronic high frequency ballast, completely equipped with mounting gear and light sources. Works and material to be calculated per unit:	pc	25	x	113.85	=	2,846.25 €
1.8.	Delivery and mounting of ceiling mounted luminaries with electronic control gear 2/35 W, T16, IP50, completely equipped with mounting gear and light source. Works and material to be calculated per unit:	pc	31	x	154.33	=	4,784.23 €
1.9.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16, IP50, with electronic high frequency ballast, completely equipped with fluo tubes, and mounting gear. Works and material to be calculated per unit:	pc	2	x	88.55	=	177.10 €
1.10.	Delivery and mounting of ceiling mounted luminaries 1/28 W T16, IP54, with opaline protector and electronic high frequency ballast, completely equipped with fluo tubes and mounting gear. Works and material to be calculated per unit:	pc	25	x	94.88	=	2,371.88 €

1.11.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L , IP50 with opaline protector and electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	7	x	103.73	=	726.11 €
1.12.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L, IP54 with opaline protector and electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	6	x	113.85	=	683.10 €
1.13.	Delivery and mounting of ceiling mounted luminaries with electronic control gear 2/35 W T16, IP65, completely equipped with mounting gear and light source. Works and material to be calculated per unit:	pc	16	x	111.32	=	1,781.12 €
1.14.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG, impact resistant for lighting source T16, surface mounted, direct distribution of light, certificate by DIN 18032. Works and material to be calculated per unit:	pc	10	x	290.95	=	2,909.50 €
1.15.	Delivery and mounting of ceiling mounted anti panic luminaries LED 5W which illuminates 12m of radius with 1lux. Works and material to be calculated per unit:	pc	3	x	226.4	=	679.31 €
1.16.	Delivery and mounting of wall mounted anti panic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with 1lux. Works and material to be calculated per unit:	pc	21	x	232.8	=	4,887.96 €
	Total for lighting installation						**47,684.18 €**
2	**LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION**						
2.1.	Dismantling of existing lightning protection system.	lump sum	1	x	253.0	=	253.00 €
2.2.	Delivery and installation of lightning descending system and lightning reception system, made of round conductor which is made of Al/Mg with diameter of 8mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	920.00	x	2.53	=	2,327.60 €
2.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						

	Lightning conductor holder for roof installation:	pc	680.00	x	6.33	=	4,301.00 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	240.00	x	6.33	=	1,518.00 €
	Lightning conductor holder for wall installation:	pc	45.00	x	5.75	=	258.75 €
	Holders for vertical mechanical protection of lightning conductors:	pc	52.00	x	6.33	=	328.90 €
2.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	16.00	x	6.33	=	101.20 €
	linking clamp strip-wire	pc	26.00	x	6.33	=	164.45 €
	linking clamp wire-wire	pc	56.00	x	6.33	=	354.20 €
	groove clamp (for crossing over horizontal gutters)	pc	40.00	x	6.33	=	253.00 €
2.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	26.00	x	31.63	=	822.25 €
2.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	25.00	x	12.65	=	316.25 €
2.7.	Delivery and mounting of wet-preventing clamp. Works and material to be calculated per unit:	pc	26.00	x	12.65	=	328.90 €
2.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	lump sum	1.00	x	822.25	=	822.25 €
2.9.	Delivery and mounting of prefabricated tape junction elements for gutters with radius of 120mm according to JUS and IEC standards and technical report. Works and material to be calculated per unit:	pc	18.00	x	10.12	=	182.16 €
2.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	160.00	x	2.53	=	404.80 €
2.11.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	55.00	x	6.33	=	347.88 €
	Total for lighting, grounding installation and potential equalization installation						**13,084.59 €**

3	**SPARE PARTS**						
3.1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	7.1	=	14.17 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	5.9	=	11.89 €
	fluorescent light bulb T16 x 1/49W, 840	pc	2	x	5.9	=	11.89 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	5.9	=	11.89 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	5.8	=	11.64 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	5.7	=	11.39 €
	Total for spare parts:						**72.86 €**
4	**TESTING**						
4.1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	253.00 €	=	253.00 €
4.2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	379.50 €	=	379.50 €
	Total for testing:						**632.50 €**
5	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**379.50 €**	=	**379.50 €**

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	47,684.18 €
2	LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION	13,084.59 €
3	SPARE PARTS	72.86 €
4	TESTING	632.50 €
5	PREPARATION OF MAINTENANCE DESIGN	379.50 €
	TOTAL PRICE, VAT EXCLUDED	61,853.62 €
	VAT (19%)	11,752.19 €
	TOTAL PRICE, VAT INCLUDED	**73,605.81 €**

GROUP A5.4.4 **BILL OF QUANTITIES** *on Indoor Water Supply and Sewerage Services in Primary School "Mustafa Pećanin" in Rožaje*	*Client:*	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Primary School "Mustafa Pećanin", Rožaje
	Documentation:	Final Design of Interior Water Supply and Sewerage Services
	Date:	30 May 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1.01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	31.00	x	10.25 €	=	318
1.02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	20.00	x	10.25 €	=	205
1.03	Removal of existing toilet bowels with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	2.00	x	10.25 €	=	21
1.04	Removal of existing shower faucets, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	8.00	x	15.38 €	=	123
1.05	Removal of existing urinals, with siphon trap and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	10.00	x	10.25 €	=	103
1.06.	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	19.00	x	15.38 €	=	292
1.07.	Removal of existing water heating cylinders, and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	4.00	x	10.25 €	=	41

1.08.	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per m'	m'	134.24	x	7.18 €	=	963
	TOTAL REMOVAL WORKS						**2065**
II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
2.01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dØ20mm(DN15)	piece	84.13	x	3.59 €	=	302
	dØ25mm(DN20)	piece	56.31	x	4.61 €	=	260
2.02	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dØ20mm(DN15)	piece	62.00	x	12.30 €	=	763
	dØ25mm(DN20)	piece	11.00	x	14.35 €	=	158
2.03	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	33.00	x	12.30 €	=	406
2.04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						

	Calculation as per m of tested pipeline	m	140.44	x	2.05 €	=	288
2.05	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works shall be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	140.44	x	3.59 €	=	504
2.06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1.00	x	512.50 €	=	513
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**3192**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
	Toilets 1-11:						
3.01.	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1.00	x	512.50 €	=	513
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	19.00	x	30.75 €	=	584
	Toilet 12 (for disabled persons):						
3.03.	Breaking concrete slabs in a width of 50cm, excavation, removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance. Backfill the floor installations trench (width 50cm) and make concrete slabs. The unit price includes the full set of drilling the wall.						
	Calculated per m	m	5.00	x	71.75 €	=	359
3.04.	Purchase and installation of PP sewage pipes for interior installations, together with all required sealing equipment for proper network operation. Pipe connecting shall performed by rubbers. Upon finished pipes assembling to rinse pipelines and performed distribution lines has to be waterproof tested. All chase cuttings and hole perforations within walls and structures, as well as bringing the walls back into original state shall be incalculated within the unit price. Calculation as per m' of installed pipes.						
	DN50mm	m	2.20	x	6.15 €	=	14
	DN110mm	m	3.80	x	9.02 €	=	34

3.05.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pieces	1.00	x	30.75 €	=	31
3.06.	Conducting water pressure test of all newly installed sewage pipes, as per appicable regulation (refer to chapter "Technical conditions for works execution" of this tender document). Pump the water into the respective foul drainage network. If the network is defective, all deficiencies must be repaired.						
	Calculation per m'.	m	6.00	x	153.75 €	=	923
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**2457**
IV	**SANITARY EQUIPMENT**						
4.01	Purchase and installation of toilet bowl completely made of ceramics, type "simplon", with plastic low mounted water tank, connection pipes, sealing and gaskets, including all other bits and pieces necessary for proper installation of the toilet bowl. Calculation as per piece.						
	Type: "Simplon"	piece	3.00	x	170.15 €	=	510
4.02.	Purchase and delivery of first class ceramic wall toilette urinal. The toilette urinal shall be fixed by means of rubber spacers, suitable wall plugs and brass screws. To install chrome plated stop valve and siphon trap. The siphon trap shall be ordered as per Employer / Employer's Representative decision. Calculation as per piece.						
	toilette urinal	piece	10.00	x	138.38 €	=	1384

4.03.	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network shall be connected by siphon trap of Ø100. Water tank shall be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette shall be ordered as per Employer / Employer's Representative decision.						
	Calculation as per piece.	piece	20.00	x	123.00 €	=	2460
4.05	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation.						
	Calculation as per piece.	piece	32.00	x	138.38 €	=	4428
4.06	Purchase and installation of vertical water heater cylinder of 80 l capacity, a wall mounting type, connectors and other accessories for proper operation.						
	Calculation as per piece.	piece	4.00	x	148.63 €	=	595
	TOTAL SANITARY EQUIPMENT						**9377**

SUMMARY OF COSTS

I	REMOVAL WORKS	2065
II	WATER-SUPPLY INDOOR INSTALLATIONS	3192
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	2457
IV	SANITARY EQUIPMENT	9377
	TOTAL PRICE, VAT EXCLUDED	17090
	VAT (19 %)	3247
	TOTAL PRICE, VAT INCLUDED	**20338**

GROUP A5.5.1 **BILL OF QUANTITIES** *of building and trade works for energy efficiency improvement in Secondary School "Bećo Bašić" in Plav*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	Facility:	Secondary School "Bećo Bašić", Plav
	Documentation:	Final Architectural Design
	Date:	30 May 2013

Item	Description of the Item	Unit of measure	Quantity		Unit price (€)		Amount (€)
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Demolition of the RC facade bays (erker) up to the facade level, including appurtenant mortar layers, wood battens and ribbed metal sheet. The unit price includes all works and transportation of debris to the town landfill. Special attention shall be paid not to damage RC floor slabs.						
	Calculation per m2 of the roof base.	m2	50.00	x	18.66 €	=	**933**
1.02.	Dismantling of the existing PVC flashing sills off the windows. The unit price includes all works and transportation of debris to the town landfill.						
	Calculation per m.	m	80.10	x	1.03 €	=	**82**
1.03.	Repair of damaged parts of facade using repairing mortar, with previous chasing of damaged parts and base preparation.						
	Calculation per m2 of plastered item. The unit price includes usage of scaffold.	m2	40.00	x	10.05 €	=	**402**
1.04.	Repair of jamb damages 30 cm wide, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing ETICS façade. The unit price includes all works and materials.						
	Calculation per m2 of treated damaged area.	m	350.00	x	10.05 €	=	**3516**

1.05.	Clean the facade surface from dirt, moss and dust. Undertake the cleaning mechanically or chemically. During cleaning, be careful not to damage the surface. Surface strength and absorption shall be provided. Prior to this, dirty, wet and non-bearing surface shall be remedied. The interior mortar and coating shall set prior to commencing the works. Works to be conducted depending on the surface: *smooth surfaces furrowed, *bubbling brushed with dry brush, *wet surfaces dried and protected, *mildew and algae cleaned by using algae remover, *binding mortar cleaned and coated with flexible and cement free adhesive, *dusty surface brushed, cleaned under high pressure, washed with water and dried, *lime mortar removed and covered with equalization coating, *mortar remains mechanically removed, *joints between bricks filled with cement mortar, filled joints cleaned with foam, paint cleaned with water and dried. Calculation as per m2 of the cleaned surface. The unit price includes usage of scaffolding.						
	Calculation per m2	m2	2174.88	x	2.26 €	=	**4904**
1.06.	Setting up of "Demit" thermal facade.						
	On the external side, thermal insulation of reinforced concrete (hereinafter RC) and brick facade walls will be made of expanded EPS polystyrene having heat transfer coefficient of λmax = 0,037 W/mK, thickness 10 cm, produced in line with the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate. Thermal panels with flammability class (DIN 4102 B1 highly resistant to flammability, non-combustible and self-extinguishing) shall be used.						
	The lower part of the facade walls reaching up to the height of h=1,6 m from ground floor will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=10cm, resistant to mechanical damages, with heat transfer coefficient of λ=0,035-0,04 W/mK. Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the openings. In zones above the opening, width of 50 cm, facade walls shall be insulated with HP mineral wool 10cm flammability class A1.						
	Thermal plates are lap-joint, attached to facade wall with corresponding enriched mineral adhesive, anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which consists of the following elements:						

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	*first layer – enriched plaster based on cement binder, mineral aggregate and additives to improve elasticity and water repellence. Surface for this layer of mortar shall be flat and smooth. Any unevenness at joints of the installed polystyrene plates will be filled with polyurethane foam.						
	Reinforcing mesh with adequate overlapping and extra protection at the openings and corners is laid in a fresh layer of this mortar. In case of need for the additional mechanical anchoring, use impact bolt through the reinforcing mesh 24 hours after applying this layer.						
	* reinforcing mesh,						
	* second layer of mortar, apply same procedure as with the first layer. This mortar is laid to well-settled first layer and polished afterwards,						
	* contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar,						
	*top coat is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour selected by the Employer / Employer's Representative, while the entire procedure will be conducted in line with the design details.						
	Before setting up the thermal plates, the following works will be conducted:						
	* all works on the roofs, including the covering and sheet metal works,						
	* windows and doors replacement,						
	* plastering of inside wall and ceiling surfaces,						
	*concrete pavement,						
	*setting up of all installations on the façade,						
	*covering and protection of all non-treated surfaces – glass, wood, aluminium...						
	*removal of eight brick chimneys. *control and testing of the existing facility surface: Use of impregnation- basic coating at the most critical points of the facility. When the basic coating sets, place the EPS cube of 5x5x5 cm using polystyrene adhesive. Once the adhesive has completely settled, minimum 3 days if working conditions are adequate, try to separate the cube manually.						

	If in the process of separating polystyrene only the adhesive separates and not parts of the basis- the basis is sufficiently strong, solid and stable. If in the process of separating polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong. If in the process of separating polystyrene, part of the adhesive and cradling is separated - it means that the basis is not strong enough and it will withstand a new layer of thermal insulation.						
	Use the reinforcing mesh or corner profiles for the window corners and jambs. To complete the facade along the plinth, use reinforced layer or install U profile of the batten adjusted to thickness of a thermal plate.						
	At heights exceeding 8 meters, plates need additional anchoring with appropriate bolts.						
	During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortars must not be applied in case of strong wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Processing of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be aligned with the appropriate EN standards.						
	External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate. ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	EPS	m2	1653.35	x	19.99 €	=	**33046**
	XPS	m2	232.82	x	25.11 €	=	**5847**
	Pressed mineral wool	m2	127.00	x	23.06 €	=	**2929**

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	NOTE: As the existing windows have been installed without considering a sufficient width of the window frame for receiving ETICS "Demit" thermal açade, proper solutions approved by Employer / Employer's Representative shall be found on the site on case to case basis during the construction period.						
1.07.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with equivalent or better technical characteristics, where the installation of thermal plates has not been planned (reinforced concrete brise-soleil, eaves, ceilings and similar).						
	The facade surface will be sound and dry. Surface will be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	*contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the set reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, in colour determined by the Employer / Employer's Representative, while the entire procedure will be conducted under the design details.						
	The openings shall be protected with PVC foil.						
	Use angle profiles to treat corners and window jambs.						
	The unit price includes purchasing, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.						
	Calculation is per m2 of the installed façade.	m2	60.00	x	12.10 €	=	**726**

1.08.	Setting up of the facade plinth with decorative ready mixed marble based mortar, created on grain ("Kulie") as splash guard (as indicated on the drawings). Partial removal of the existing mortar plinth on the workshop (aprox. 10m2) that is peeling from the substructure shall be done. Surface shall be cleaned, washed and sprinkled with acrylic base with granulate. Render shall be applied on cleaned and dried surface by manufacturer's instruction. The color shall be determined by the Employer / Employer's Representative, according to the color chart of manufacturer. Size of the granulate grain-1.5mm.						
	Calculation per m2	m2	161.70	x	15.58 €	=	**2519**
1.09.	Purchase and installation of OSB boards, 10 mm thick. Boards are placed over substructure of the façade gable wall and circular pillars on the building's entrance, in accordance with the Design and enclosed drawing **detail no. 14**. The unit price includes all works and materials.						
	Calculation per m2.	m2	16.00	x	10.66 €	=	**171**
1.10.	Supply and installation of typical profiled flexible expansion joints in wall-wall contact. The joint width is 5 cm as per manufacturer's technology. Price to be calculated per m of installed expansion joint. The unit price includes all works and materials usage of the scaffolding, purchase and transport, everything in accordance to the enclosed drawing **detail no. 14** and description.						
	Calculation per m.	m	14.00	x	22.14 €	=	**310**
1.11.	Purchase and installation of steel box profiles 40x40x3 mm, as preparation of circular column. The works shall be executed in line with the Design and enclosed drawing **detail D5**. The unit price includes all works and materials according to description.						
	Calculation per m.	m	24.80	x	12.71 €	=	**315**
1.12.	Construction of the RC walls, d=20 cm, over the existing gable walls in the ground floor of the workshop. The RC walls shall be constructed in the required concrete form, in line with the structural analysis and enclosed Design details. The unit price includes preparation, construction, vibration and maintenance of the concrete MB 30 type. Concrete works to be done using smooth concrete form and scaffold as per structural analysis and enclosed Design details. The unit price also includes all tools, materials, maintenance etc. Works to be done in line with the general description for this kind of work.						

	Calculation per m3.	m3	1.00	x	230.63 €	=	**231**
1.13.	Purchase and installation of new, adapted, external shutters for fans of the kitchen / restaurant area, after installation of ETICS thermal façade. External shutters shall be of sturdy quality, sampled and approved by Employer / Employer's Representative.						
	Calculation as per piece.	pc	2.00	x	43.05 €	=	**86**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**51084**
II	**RECONSTRUCTION OF PITCHED ROOFS**						
2.01.	Removal of the existing layers of pitched roofs marked as **R1, R3, R4, up** to the existing wooden or concrete slab. This item includes removal of the following layers: ribbed metal sheet cover, roof paper, battens. The unit price includes all works and transportation of debris to a landfill. Special attention shall be paid not to damage RC floor/ceiling slabs.						
	Calculation per m2 of roof base.	m2	814.10	x	3.59 €	=	**2921**
2.02.	Removal of existing trapezoid metal sheet and flat metal sheet from the pitched roof marked as **R2** and from the gable wall. The unit price includes all works and transportation of debris to a landfill. Pay attention not to damage sub construction-transverse battens, which shall be kept.						
	Calculation per m2 of roof base.	m2	584.41	x	2.46 €	=	**1438**
2.03.	Removal of existing trapezoid metal sheet and flat metal sheet from the pitched roof marked as **R**. The unit price includes all works and transportation of debris to a landfill.						
	Calculation per m2 of roof base.	m2	584.41	x	2.46 €	=	**1438**
2.04.	Removal of existing roofs from the canopies marked as **T** together with trapezoid metal sheet and substructure. The unit price includes all works and transportation of debris to a landfill.						
	Calculation per m2 of roof base.	m2	45.50	x	3.08 €	=	**140**
2.05.	Purchase and covering the roofs **R2, R3, R4 and R5** with the roof polyurethane composite panels, d=10 cm thickness, heat transfer coefficient λmax=0,025 W/mK, of standard modular width 1000 mm. The unit price includes installation of substructure panels, made of cold profiled steel,with cross-section in the shape of the letter C, 60x30x3 mm, together with all related works and materials.						
	Calculation per m2 of roof base.	m2	807.31	x	69.29 €	=	**55939**

2.06.	Purchase and setting of the Al trapezoid metal sheet 40/230/0.7 mm over the existing sub construction of the roof **R1**, in line with the Design and enclosed drawing details. The unit price includes snow guards and all related works and material.						
	Calculation per m2 of roof base.	m2	584.41	x	28.50 €	=	**16653**
2.07.	Purchase of the waterproof membrane as final layer for covering the roof R1a in line with the Design and enclosed drawing detail D7. The unit price includes setting up thermal insulation with inclination of 10-12 cm as well as the PVC foil, placed between thermal insulation and concrete slab. Before installation, waterproof membrane shall be sampled and approved by Employer / Employer's Representative. The unit price also includes all works and materials as described.						
	Calculation per m2.	m2	87.00	x	54.94 €	=	**4780**
2.08.	Purchase and installation of the vapour barrier on the roof marked as **L,** on the floor slab of the attic, as defined in the Design, made of post bituminized aluminium foil lined with glass fibre fleece. The unit price includes all works and material as per description.						
	Calculation per m2.	m2	96.00	x	10.66 €	=	**1023**
2.09.	Purchase and installation of wooden rafters and strutted frame (post), made of 1st class dry fir timber, cross section of 10x14 cm, everything in line with the Design and enclosed drawing **detail 15.** The unit price includes all works and materials as per description.						
	Calculation per m2 of horizontal roof projection.	m2	95.50	x	16.61 €	=	**1586**
	TOTAL FOR RECONSTRUCTION OF PITCHED ROOF						**85916**
III	**REPLACEMENT OF FACADE JOINERY**						
3.01.	Dismantling of façade joinery and all its elements and mechanisms. Transportation to the town landfill or hand-over to the Employer / Employer's Representative (according to the agreement) for storing. Calculation as per piece of dismantled joinery.						
	windows						
	dim.245/75cm	pc	1.00	x	11.50 €	=	**12**
	dim.80/170cm	pc	1.00	x	11.50 €	=	**12**
	dim.130/135cm	pc	1.00	x	11.50 €	=	**12**
	basement window	pc	1.00	x	11.50 €	=	**12**
	glass panel with single-leaf door						
	dim.260/270cm	pc	2.00	x	11.50 €	=	**23**

3.02.	Production and installation of the façade PVC joinery. The unit price includes everything from the description:						
	* production and assembling, * 6-chamber PVC profiles, adequate thickness (3,5 mm) reinforced on the inside with galvanized steel U profiles, no thermal bridge, * non-recycled PVC to be used, *heat transfer coefficient Umax = 1,5 W/m^{2}K, * minimal required solar energy transmittance factor for glazed surfaces is g≤65% , * glass double-glazed 4+16+4 mm low emission with argon or some other inert gas between glass panes, * fittings: required set for hanging and closing, *opening - as shown in the annexed joinery schemes. * internal PVC sill (window bench) of required width, * profile colour: white.						
	Measures to be taken onsite. Calculation per piece of installed joinery fully in line with the description.						
A	Clear opening 245/75cm-window	pc	1.00	x	299.81 €	=	**300**
B	Clear opening 80/170cm-window	pc	1.00	x	185.15 €	=	**185**
C	Clear opening 130/135cm-window	pc	1.00	x	224.25 €	=	**224**
D	Clear opening 235/50cm-window	pc	1.00	x	201.25 €	=	**201**
3.03.	Production and installation of the aluminium windshield joinery. The unit price includes everything from the description: purchase of material, manufacturing, transport and installation of fittings and blind frame, together with aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break, - glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown in the annexed joinery schemes, - profile colour - natural aluminium. - aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						

	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	- building A						
	Clear opening 260/330cm-window	pc	1.00	x	1,299.50 €	=	**1300**
3.04.	Production and installation of the façade aluminium joinery. The unit price includes everything from the description:						
	*production and assembling, *self-closing mechanism, *profiles - aluminium, with thermal break, *infill: double-glass panel 4+16+4 mm, with argon or some other inert gas between the panes, with one glass as low-emission, * heat transfer coefficient Umax = 2.8 W/m¸K, * solar energy transmittance factor g≤65%, * fittings: required set for hanging and closing, * knob - chrome plated - mate, * fit rubber door stoppers on the floor , * opening as shown in the annexed joinery schemes, *profile colour - natural aluminium.						
	Measures to be taken on site. Calculation is per piece of installed joinery, fully in line with the description.						
	Glass panel with single-leaf door						
	Clear opening 260/270cm	pc	2.00	x	1,236.25 €	=	**2473**
	NOTE: Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles. NOTE: Only main entrance and windshield door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.						
	TOTAL FOR REPLACEMENT OF FACADE JOINERY						**4751**
IV	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
4.01.	Dismantling of the canopy made of steel box profiles 10 x 10 cm on the terraces. The unit price includes works and transportation of the debris to the town landfill.						
	Calculation as per lump sum.	pc	2.00	x	46.13 €	=	**92**

4.02.	Dismantling of metal plates, various signs, commercial signs, steel structures, metal stairs, spars, luminaries, cameras, mechanical elements and electrical installations, protective bars, aggregate, canopy above entrance of the technical room and all other equipment which is not included in the list and which is necessary to be dismantled from the facade due installation of the ETICS thermal facade and renovation of the roofs. Dismantled equipment shall be handed over to the Client for storing (with proper handing-over procedure). After completion of the works on installation of the ETICS thermal facade and renovation of the roof, all items shall be re-installed. The unit price includes work and materials, all necessary works for adjustment of these elements to the new conditions. Calculation is per lump sum.						
	Calculated as per lump sum	pc	1.00	x	358.75 €	=	**359**
4.03.	Dismantling and re-installing of the existing roof windows. The unit price includes works and material.						
	Calculated as per piece.	pc	8.00	x	15.00 €	=	**120**
4.04.	Dismantling of metal sheet flashings, drips, horizontal and vertical gutters. Flashings have different developed widths and they are made of galvanized, coloured sheet metal with double interlocking system, d=0,68 mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price includes all works, materials and debris transportation to the town landfill. Calculation as per m of dismantled flashing and its supporters.						
	-attic-wall flashing, **d.w.=65 cm.**	m	152.20	x	1.03 €	=	**156**
	-joints flashings between vertical walls and roofs covered with metal sheet, d.w.=65 cm.	m	206.27	x	1.03 €	=	**211**
	-horizontal gutters, developed width **d.w.=65cm.** **NOTE:** The unit price includes dismantling of the connections between horizontal and vertical gutters.	m	130.00	x	1.03 €	=	**133**
	-vertical gutters, **dim.12x12cm**	m	151.33	x	1.03 €	=	**155**
	-vertical gutters, **dim.8x8cm**	m	15.00	x	1.03 €	=	**15**
	-vertical gutters, **dim.Ø12cm**	m	10.00	x	1.03 €	=	**10**
	-vertical gutters, **dim.Ø10cm**	m	14.00	x	1.03 €	=	**14**

4.05.	Production and installation of the roof cornice flashings- attic, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealings. Works to be executed as per Design and enclosed drawing details D6 and D8. The unit price includes all works and material, fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. Developed width is up to d=0,80 m.						
	Calculation per m' of treated flashing including entire binding and joining material.	m	152.20	x	14.97 €	=	**2278**
4.06.	Production and installation of the roof eaves flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealings, as per Design and enclosed drawing details D6 and D8. The unit price includes all works and materials fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. Developed width is up to d=0,80 m.						
	Calculation is per m' of treated flashing and entire binding and joining material.	m	127.00	x	14.97 €	=	**1901**
4.07.	Production and installation of the roof ridges flashings, roof hip flashings and valley flashings, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, together with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealings. The unit price includes all works and materials fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. Developed width is up to d=50 cm.						
	Calculation per m of treated flashing and entire binding and joining material.	m	80.60	x	14.97 €	=	**1206**

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4.08.	Purchase and installation of OSB boards as roof eave flashing, 10 mm thick, beneath the metal sheet drips, as per enclosed drawing details **D6 and D8**. OSB panels shall be fixed to the roof wooden rafters.						
	Calculation per m2 of treated flashing, including entire binding and joining materials	m2	88.50	x	12.71 €	=	**1125**
4.09.	Production and installation of flashings at the connection point of vertical wall and pitched roof covered with made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm with all necessary joining materials, such as: stainless steel screws, washers and EPDM sealing, d.w.=40 cm. The unit price includes all works and materials fully in line with the description. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative.						
	Calculation per m of treated drip and entire bonding and joining materials, as well as sealing with elastic joint filler.	m	245.00	x	14.97 €	=	**3666**
4.10.	Purchase and installation of drips, made of made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, d.w.= 30 cm. The item includes surface preparation and binding carried out in line with standards. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative.						
	Calculation per m' of treated drip together with entire bonding,joining materials and sealing with elastic joint filler.	m	245.00	x	14.97 €	=	**3666**
4.11.	Installation of horizontal hanging gutters, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, d.w.= 70 cm. Entire process shall be carried out in line with the Design and sample approved, and color selected by the Employer / Employer's Representative. The item includes surface preparation and binding carried out in line with standards.						
	Calculation per m of installed gutters and entire binding and joining material.	m	121.00	x	14.97 €	=	**1811**

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4.12.	Production and installation of vertical gutters, with square cross-section 120/120 mm and 100/100mm, made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour to be selected by the Employer / Employer's Representative. Gutter pipes to be installed with all required anchors, holding clips and also bonding and joining material.						
	Calculation per m of installed gutters, including top-gutter cisterns at the connection points of horizontal and vertical rain water pipes (bonding and joining materials shall be included too).						
	Calculation per m of installed gutters and entire binding and joining material.	m	218.27	x	14.97 €	=	**3266**
4.13.	Production and installation of flashing sills made of ready-made plastic-laminated galvanized steel metal sheets d=0.7mm, colour will be selected by the Employer / Employer's Representative, developed width 60 cm.						
	Calculation per m of installed flashing sill.	m	220.00	x	14.97 €	=	**3292**
4.14.	Production and installation of the canopy made of steel box profiles dimensions 12x12 on the terraces. The unit price includes all necessary work, material, protection and painting.						
	Calculated as per piece.	pc	2.00	x	435.63	=	**871**
4.15.	Installation of the sloped 2% concrete pavement in the area of the basement window. The unit price includes following works: -gravel filling 8-12cm thick, -lean concrete 2% slope, 8cm thick, -installation of waterproofing layer in the window / pavement connection area.						
	Calculated per m2	m2	3.80	x	22.55	=	**86**
4.16.	Partial repair of the external concrete pavement around school building. Concrete works shall include, where necessary: putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm and stair tread with height of 15 cm. New pavement shall have inclination of 1,5% compared to the building. Pavement has to be strained into the fields cca. 1,5m2. Expansion joints shall be filled up with joint filler. The unit price includes all works and materials and demolition of old concrete slabs, transportation to a landfill up to 5 km distance and finishing works.						
	Calculation per m2.	m2	100.00	x	15.79 €	=	**1579**

4.17.	Removal of brick chimneys on the roof and the attic of the building up to the roof slab level. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance. Preparing of surfaces for installation of ETICS thermal facade and construction of the new roof. Special attention shall be paid not to damage the RC slab and walls.						
	Calculation as per piece.	pc	8.00	x	87.13 €	=	**697**
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						**26140**
V	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
5.01.	Removal of existing ceramic floor tiles with screed, up to structure in sanitary facilities. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance.						
	Calculation per m2 of the floor area.	m2	28.73	x	4.92 €	=	**141**
5.02.	Removal of the existing ceramic wall tiles with undercoat layer up to the wall in sanitary facilities. Removal and loading of debris onto a truck and transportation of it to a landfill up to 5 km distance. The unit price includes possible usage of the scaffold.						
	Calculation as per m2 of the floor area.	m2	105.75	x	4.92 €	=	**520**
5.03.	Scraping of the old paint from the ceilings in sanitary facilities on the ground floor. Removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2 of the scraped painted area.	m2	33.22	x	1.23 €	=	**41**
5.04.	Scraping of oil-based paint off the walls in sanitary facilities (technique "spanski" zid), removal and loading of the debris onto a truck and its transportation to a landfill up to 5 km distance. This item include all pre-work for installation of wall ceramic tiles, and usage of scaffold.						
	Calculation per m2 of scraped painted area.	m2	110.00	x	1.85 €	=	**203**
5.05.	Dismantling of the internal, single wing, double layer plywood door. The unit price includes transportation to a landfill up to 5 km distance. Undamaged door shall be registered and given to the Employer / Employer's Representative. Calculation per piece.						
	- dim. 70/205cm	pc	5.00	x	10.25 €	=	**51**
	- dim. 80/205cm	pc	4.00	x	10.25 €	=	**41**
	- dim. 140/205cm	pc	1.00	x	10.25 €	=	**10**

5.06.	Production and installation of internal joinery. The unit price includes everything from the description:						
	Purchase of material and mounting of indoor joinery, produced of hard and high resistant PVC profiles, reinforced by zinc plated steel „U" profiles, strictly according to joinery schemes and details, including high quality of accessories, hinges, opening / closing handles etc. PVC panels shall be used for doors. This item implicates all needed cleanings and transportation of waste materials to the waste depot, as well as all necessary works for joinery mounting (proper fitting, needed wall chase cutting, plastering, painting and use of jamb sills). Calculation is per completely finished item. The profiles are white. Prior to manufacture of joinery , the Contractor is obliged to take „on site" measures.						
	1- dim. 140/205cm	pc	1.00	x	538.13 €	=	**538**
	2- dim. 80/205cm	pc	4.00	x	395.65 €	=	**1583**
	3- dim. 70/205cm	pc	5.00	x	362.85 €	=	**1814**
5.06.	Making of the scrimmed cement screed for a sloping layer in the toilets. The unit price includes installation of the mesh (1kg/m2) with and overlap 5cm (1,08 m2/m2). Floated coat is used as finishing layer. Screed thickness is d = 4 cm.						
	Calculation per m2 of the treated surface, including all work and material.	m2	28.73	x	10.05 €	=	**289**
5.07.	Setting up of horizontal waterproofing in the toilets, on ground floor, in the following layers (from the bottom up):						
	- bitulith + polyasbestos + glass mesh,						
	- polyasbestos + glass mesh,						
	- polyasbestos,						
	Put the waterproofing at least 10 cm up the wall. Calculation is based on a m2 of the basis (section pulled up the walls is included in the unit price). The unit price includes all works and materials, in line with the description, including the cleaning and surface preparation for a quality installation of a new waterproofing.						
	NOTE: Entire waterproofing overlapping and putting the waterproofing up the walls to be included in the price of works.	m2	28.73	x	19.99 €	=	**574**
5.08.	Plastering of internal toilet walls with cement mortar 1:3 in two layers with the previous spraying of cement slurry to prepare the wall for ceramic tiles. The unit price includes all necessary works, materials with battens, transportation and scaffolding.						
	Calculation is based on a m2 of the plastered wall, without the openings.	m2	105.75	x	8.00 €	=	**845**

5.09.	Tiling the toilet walls with the class I ceramic tiles, while the size and color and tone of the tiles will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in layer of adhesive, placing them in joint bonding manner, by pointing the joints using pointing plaster.						
	Ceramic tiles to be placed up to the height of 190 cm.						
	Coating of the jambs and niches is included in the item price and it won't be calculated separately.						
	Calculation per m2 of the treated surface.	m2	105.75	x	23.06 €	=	**2439**
5.10.	Tiling floor in the toilet with the class I anti-slip tiles. The size, colour and tone of the tiles will be will be sampled and approved by the Employer / Employer's Representative.						
	Line the tiles in the waterproof adhesive layer in joint bonding manner, by using pointing plaster.						
	In the toilets where there is a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2 of the treated surface.	m2	28.73	x	23.06 €	=	**663**
5.11.	Polishing and painting of the internal walls in toilet. The Employer / Employer's Representative will select the tone of semi dispersed distemper. Repeat the polishing until a completely flat surface is achieved, and apply layers of paint until reaching an even tone. This item includes scraping, plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done twice.						
	Calculation per m2, including all material, work and required scaffolding.	m2	110.00	x	4.00 €	=	**440**
5.12.	Polishing and painting of the ceilings in sanitary facilities. The tone of semi dispersed distemper will be selected by the Employer / Employer's Representative. This item includes scraping, plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer.						
	Calculation as per m2, including all material, work and required scaffolding.	m2	33.22	x	4.00 €	=	**133**

5.13.	Works on the sanation of the moisture from the toilet which is visible on the façade wall. Works include breaking and removal of the existing wall tiles in order to reach water tube and determine the position of crack which makes leakages and all necessary works for bringing wall in the previous condition.The unit price includes all necessary works to perform these leakage repair in the full professional manner.						
	Calculation as per lump sum	lump sum	1.00	x	189.63 €	=	190
5.14.	Painting the walls with oil-based paint in the areas of the radiators which will be replaced. Unit price shall include loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation as per m2	m2	15.00	x	3.33 €	=	50
5.15.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers and painting of hydrant and switch boxes in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculated per lump sum.	lump sum	1.00	x	189.63 €	=	190
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						10754
VI	**LIST OF SPARE PARTS**						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3.00	x	11.50 €	=	35
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1.00	x	11.50 €	=	12
6.03.	Purchase and delivery of wall/floor mounted door rubber stopper.						
	Calculated as per piece	pc	2.00	x	11.50 €	=	23
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2.00	x	28.75 €	=	58
6.05.	Purchase and delivery of spare I class ceramic tiles. Calculated as per m2.						

	wall	m^2	1.00	x	11.50 €	=	12
	floor	m^2	1.00	x	11.50 €	=	12
	TOTAL FOR SPARE PARTS						**150**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing handing over document.						

SUMMARY OF COSTS

I	THERMAL INSULATION OF FACADE WALLS	51084
II	RECONSTRUCTION OF PITCHED ROOF	85916
III	REPLACEMENT OF FAÇADE JOINERY	4751
IV	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	26140
V	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	10754
VI	SPARE PARTS	150
	TOTAL PRICE, VAT EXCLUDED:	178795
	VAT (19 %):	33971
	TOTAL PRICE, VAT INCLUDED:	**212766**

GROUP A5.5.2 **BILL OF QUANTITIES** *of thermal-technical (heating) services for energy efficiency improvement in Secondary School "Beco Basic" in Plav*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Beco Basic" Plav
	Doc. origin:	Final Heating Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: "Siemens" or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 15 m^3/h						
	Connection size DN50						
		pc	1	x	1,319.05 €	=	1,319.05 €
2	Purchase, supply and installation of electronic flow gauge for light fuel oil.						
	Manufacturer: "Aqua metro" or equivalent						
	Type: "VZO 4 RE"						
	Nominal flow: 50 l/h						
	Minimum flow: 1 l/h						
		pc	2	x	511.75 €	=	1,023.50 €
3	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: "Siemens" or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	2,472.50 €	=	2,472.50 €
4	Software development and staff training.						
		pc	1	x	690.00 €	=	690.00 €
	TOTAL A - Energy management						**5,505.05 €**

B - INSTALLATION OF NEW HEATING EQUIPMENT							
1	Purchase, delivery and fitting of cast steel ribbed radiators, total 13 units, axial connection distance h=500mm, depth d=110mm, rib width s=60mm thermal effectiveness at branching 90/70°C 99W (the item includes fitting of new sets for brackets mounting with spacers). Item as per number of ribs.						
		pc	188	x	11.33 €	=	2,129.57 €
2	Purchase, delivery and fitting of cast steel ribbed radiators, total 5 units, axial connection distance h=500mm, depth d=160mm, rib width s=60mm thermal effectiveness at branching 90/70°C 139.1W (the item includes fitting of new sets for brackets mounting with spacers). Item as per number of ribs.						
		pc	80	x	13.23 €	=	1,058.00 €
3	Purchase, delivery and fitting of cast steel ribbed radiators, total 2 units, axial connection distance h=800mm, depth d=160mm, rib width s=60mm thermal effectiveness at branching 90/70°C 191.9W (the item includes fitting of new sets for brackets mounting with spacers). Item as per number of ribs.						
		pc	36	x	19.90 €	=	716.22 €
4	Purchase, delivery and installation of thermostatic radiator valve 1/2" (angle and flat).						
		pc	20	x	13.94 €	=	278.76 €
5	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many users, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without having to remove protective cap. The thermostat has liquid sensor.						
	Temperature range from 8 °C to 26 °C						
	Closing time 24 min.						
		pc	20	x	15.67 €	=	313.49 €
6	Purchase, delivery and installation of radiator angle bolts, connection size 1/2"						
		pc	20	x	12.49 €	=	249.78 €
7	Purchase, delivery and assemblage of air-release vessels complete with overflow pipe DN 15, made of black seamless pipe DN100 length 200 mm.						
		pc	2	x	32.20 €	=	64.40 €

8	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	4	x	4.83 €	=	19.32 €
9	Purchase, delivery and fitting of radiator cap, size 5/4" .						
		pc	32	x	1.38 €	=	44.16 €
10	Purchase, delivery and fitting of connection elements for reduction from 5/4" to 1/2" pipe diameter .						
		pc	10	x	1.38 €	=	13.80 €
11	Purchase, delivery and fitting of manual air release whisker for radiator, size 1/2".						
		pc	6	x	1.73 €	=	10.35 €
12	Purchase of material and installation of pipeline made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø33,7x2,6						
		m	90	x	8.34 €	=	750.38 €
	Ø26,9x2,3						
		m	130	x	7.06 €	=	917.93 €
	Ø21,3x2,0						
		m	280	x	6.44 €	=	1,803.20 €
	Ø17,2x1,8						
		m	40	x	5.52 €	=	220.80 €
13	Joining, tightening material and brackets, elbows, branches and such are calculated as 50% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 50% of the previous item.		0.5	x	3,692.31 €	=	1,846.15 €
14	Purchase, delivery and installation of oblique flow control valves, for flow reduction, threaded, dimensions and properties:						
	DN25 PN6						
		pc	2	x	20.70 €	=	41.40 €
15	Purchase, delivery and installation of threaded ball valves, connection size:						
	DN25 PN6						
		pc	2	x	13.23 €	=	26.45 €
16	Purchase of material and fitting of pipe insulation consisting of plate prefabricated insulation on the base of expanded rubber with closed cell structure. Insulation to be 25 mm thick for temperatures up to 105°C, for insulation of part of the pipeline to be added in the boiler room. Calculated as per m^2 of insulation measured from the external side of the pipe.						

220

		m^2	3	x	23.00 €	=	69.00 €
17	Preparation of the construction site for execution of works on heating and cooling installations. On-site state analysis. Erection of containers. Transportation of man power, goods and material.						
		lump sum	1	x	460.00 €	=	460.00 €
18	Putting into operation and trial testing of the entire heating system, as well as testing of proper operating of all fitted radiator valves. Balancing and setting heating system network.						
		lump sum	1	x	460.00 €	=	460.00 €
19	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operating newly installed equipment and introduction with drill for hazardous and emergency situations. Issuance of certificates for entire installed material and equipment. Preparation of as-built design.						
		lump sum	1	x	460.00 €	=	460.00 €
20	Drilling holes in walls for installations of the new heating system. The item includes mending works at penetration points for bringing walls and ceilings in proper condition.(10 penetration points on the walls and 4 on the ceilings)						
		lump sum	1	x	575.00 €	=	575.00 €
21	Cleaning of the existing burners (2pcs), chimneys (2pcs) and boilers (2pcs).						
		lump-sum	1	x	920.00 €	=	920.00 €
	TOTAL B - Installation of new heating equipment						**13,448.16 €**

SUMMARY OF COSTS:

A	ENERGY MANAGEMENT	5,505.05 €
B	INSTALLATION OF NEW HEATING EQUIPMENT	13,448.16 €
	TOTAL PRICE, VAT EXCLUDED	18,953.21 €
	VAT (19 %)	3,601.11 €
	TOTAL PRICE, VAT INCLUDED	22,554.32 €

GROUP A5.5.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Secondary School "Beco Basic" in Plav*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica
	School:	S.S. "Beco Basic" Plav
	Doc. origin:	Final Electrical Design
	Date:	30 May 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION**						
1.1.	Dismantling of existing lightning protection system.	lump sum	1	x	230.0	=	230.00 €
1.2.	Delivery and installation of lightning descending system and lightning reception system, made of round conductor which is made of Al/Mg with diameter of 8mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	680.00	x	2.30	=	1,564.00 €
1.3.	Delivery and installation of lightning conductor brackets. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	475.00	x	5.75	=	2,731.25 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	150.00	x	5.75	=	862.50 €
	Lightning conductor holder for wall installation:	pc	38.00	x	5.75	=	218.50 €
	Holders for vertical mechanical protection of lightning conductors:	pc	30.00	x	5.75	=	172.50 €
1.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	15.00	x	5.75	=	86.25 €
	linking clamp strip-wire	pc	15.00	x	5.75	=	86.25 €
	linking clamp wire-wire	pc	56.00	x	5.75	=	322.00 €
	groove clamp (for crossing over horizontal gutters)	pc	29.00	x	5.75	=	166.75 €
1.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	15.00	x	28.75	=	431.25 €
1.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	19.00	x	11.50	=	218.50 €
1.7.	Delivery and mounting of wet-preventing clamp. Works and material to be calculated per unit:	pc	15.00	x	11.50	=	172.50 €

1.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	lump sum	1.00	x	747.50	=	747.50 €
1.9.	Delivery and mounting of prefabricated tape junction elements for gutters with radius of 120mm according to JUS and IEC standards and technical report. Works and material to be calculated per unit:	pc	17.00	x	9.20	=	156.40 €
1.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 for grounding of gutters. Tape should be connected to nearest connection point to foundation grounding system, through ground trench or beneath new pavements. Works shall be done according in line with standards and technical recommendations. Total for works and material:	m	160.00	x	2.30	=	368.00 €
1.11.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	70.00	x	5.75	=	402.50 €
	Total for lighting, grounding installation and potential equalization installation						**8,936.65 €**
2	**TESTING**						
2.1	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1.00	x	345.00 €	=	345.00 €
	Total for testing:						**345.00 €**
3	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1.00	x	**115.00 €**	=	**115.00 €**

SUMMARY OF COSTS:

1	LIGHTING, GROUNDING INSTALLATION AND POTENTIAL EQUALIZATION INSTALLATION	8,936.65 €
2	TESTING	345.00 €
3	PREPARATION OF MAINTENANCE DESIGN	115.00 €
	TOTAL PRICE, VAT EXCLUDED	9,396.65 €
	VAT (19%)	1,785.36 €
	TOTAL PRICE, VAT INCLUDED	**11,182.01 €**

GROUP A5.5.4 **BILL OF QUANTITIES** *on Indoor Water Supply and Sewerage Services in Secondary School "Bećo Bašić" in Plav*	*Client:*	Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Local Designer:	KOPRING PMC, Podgorica, Montenegro
	Facility:	Secondary School "Bećo Bašić", Plav
	Documentation:	Final Design of Interior Water Supply and Sewerage Services
	Date:	May, 2013

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1.01	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	4.00	x	10.25 €	=	41
1.02	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	piece	5.00	x	10.25 €	=	51
1.03	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per m'	m'	23.88	x	7.18 €	=	171
1.04.	Removal of existing floor gullies. Carrying, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	piece	2.00	x	15.38 €	=	31
	TOTAL REMOVAL WORKS						294

II	WATER-SUPPLY INDOOR INSTALLATIONS						
2.01	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dØ20mm(DN15)	piece	9.59	x	3.59 €	=	34
	dØ25mm(DN20)	piece	14.29	x	4.61 €	=	66
2.02	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dØ20mm(DN15)	piece	5.00	x	12.30 €	=	62
	dØ25mm(DN20)	piece	4.00	x	14.35 €	=	57
2.03	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	piece	5.00	x	12.30 €	=	62
2.04	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	23.88	x	2.05 €	=	49
2.05	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the price. Disinfection works shall be done by certified organization.						

	Calculation as per m of disinfected pipeline	m	23.88	x	3.59 €	=	86
2.06	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations.	lump sum	1.00	x	256.25 €	=	256
2.07	Repair of failure on water-supply installations on the first floor, which causes external damages on the façade.	lump sum	1.00	x	666.25 €	=	666
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**1338**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
3.01	After detection of existing installations, in case when a certain local part of installation is out of order or in poor condition, it shall be replaced. Where deemed necessary pipes shall be painted.	lump sum	1.00	x	512.50 €	=	513
3.02.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or equivalent. Calculation as per piece.						
	Floor drain, type: "HL310NPr"	pc	2.00	x	30.75 €	=	62
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**574**
IV	**SANITARY EQUIPMENT**						
4.01	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network shall be connected by siphon trap of Ø100. Water tank shall be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette shall be ordered as per Employer / Employer's Representative decision.						
	Calculation as per piece.	piece	5.00	x	123.00 €	=	615
4.02	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation. Calculation as per piece.						
		piece	6.00	x	138.38 €	=	830

4.03	Purchase and delivery of first class ceramic wall toilette urinal. The toilette urinal shall be fixed by means of rubber spacers, suitable wall plugs and brass screws. To install chrome plated stop valve and siphon trap. The siphon trap shall be ordered as per Employer / Employer's Representative decision. Calculation as per piece.						
	toilette urinal	piece	1.00	x	138.38 €	=	138
	TOTAL SANITARY EQUIPMENT						**1584**

SUMMARY OF COSTS

I	REMOVAL WORKS	294
II	WATER-SUPPLY INDOOR INSTALLATIONS	1338
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	574
IV	SANITARY EQUIPMENT	1584
	TOTAL PRICE, VAT EXCLUDED	3790
	VAT (19 %)	720
	TOTAL PRICE, VAT INCLUDED	**4510**

2.2 Price Schedule - Grand Summary		
No.	**Description**	**Total Price per Building [EUR]**
	Educational Building 1	
A.5.1	"Secondary Vocational School", Pljevlja	1,095,514.94
	Educational Building 2	
A.5.2	Primary School "Ristan Pavlović", Pljevlja	605,941.98
	Educational Building 3	
A.5.3	Secondary School "Miloje Dobrašinović", Bijelo polje	631,783.61
A.5.4	**Educational Building 4**	
	Primary School "Mustafa Pećanin", Rožaje	654,344.14
A.5.5	**Educational Building 5**	
	Secondary School "Beco Bašić", Plav	251,012.12
	Grand Total for All Schools (Total Contract Price)	**3,238,596.79**

2.3 Price Schedule - Group Prices

No.	Description	Total Price per Works [EUR]
A.5.1	**Educational Building 1: "Secondary Vocational School", Pljevlja**	**1,095,514.94**
A.5.1.1	Building and trade works	720,996.16
A.5.1.2	Thermo-technical (heating) services	247,861.89
A.5.1.3	Electrical services	110,774.05
A.5.1.4	Sanitary (Water Supply and Sewage) services	15,882.84
A.5.2	**Educational Building 2: Primary School "Ristan Pavlović", Pljevlja**	**605,941.98**
A.5.2.1	Building and trade works	328,188.36
A.5.2.2	Thermo-technical (heating) services	212,220.94
A.5.2.3	Electrical services	65,532.68
A.5.3	**Educational Building 3: Secondary School "Miloje Dobrašinović", Bijelo polje**	**631,783.61**
A.5.3.1	Building and trade works	485,538.25
A.5.3.2	Thermo-technical (heating) services	70,902.86
A.5.3.3	Electrical services	70,295.63
A.5.3.4	Sanitary (Water Supply and Sewage) services	5,046.87
A.5.4	**Educational Building 4: Primary School "Mustafa Pećanin", Rožaje**	**654,344.14**
A.5.3.1	Building and trade works	524,059.86
A.5.3.2	Thermo-technical (heating) services	36,340.86
A.5.3.3	Electrical services	73,605.81
A.5.3.4	Sanitary (Water Supply and Sewage) services	20,337.61
A.5.5	**Educational Building 5:Secondary School "Bećo Bašić", Plav**	**251,012.12**
A.5.4.1	Building and trade works	212,765.92
A.5.4.2	Thermo-technical (heating) services	22,554.32
A.5.4.3	Electrical services	11,182.01
A.5.4.4	Sanitary (Water Supply and Sewage) services	4,509.87

2.4 Options

No.	Description	Unit	Qty	Total Cost [EUR]
		1	2	3=1 x 2
	Total Alternative Items			

2.5 Price Schedule - Extra Works

No.	Description	Unit	Quantity	Rate [EUR]
			1	2
I	**Labor**			
1.	**Supervisor unit rates**			
1.01	Leading Contractor Engineer	hour	1	6.5
1.02	Site engineer (architectural works, civil works, thermal-technical (heating), electrical, water supply and sewage services)	hour	1	4.5
1.03	Design engineer	hour	1	4.5
1.04	Foreman	hour	1	6.7
2.	**Labor unit rates**			
2.01	Unskilled laborer	hour	1	.
2.02	Sheet metal worker	hour	1	3.8
2.03	Bricklaying worker	hour	1	3.5
2.04	Bar bender	hour	1	4
2.05	Plastering worker	hour	1	4.2
2.06	Waterproofing worker	hour	1	3.8
2.07	Carpenter	hour	1	4
2.08	Ironmongery worker	hour	1	4.2
2.09	Joinery assembler	hour	1	3.8
2.10	Floor (parquet) worker	hour	1	4
2.11	Ceramic worker	hour	1	3.8
2.12	Painter	hour	1	3
2.13	Electrician	hour	1	4
2.14	Heating services assembler	hour	1	4.5
2.15	Plumber	hour	1	4.2

II Material

The Bidder shall state the percentage on-cost which would be added to the net cost of any sub-contracted extra supply or works not covered by the Contract/unit rates.
This percentage must include handling charges and all other costs involved in providing extra equipment or work at site in accordance with the General Conditions of Contract and the requirements of the Technical Requirements

5%

III Plant and equipment

The Bidder shall add to the list all other items of plant which he expects to have on site



Montenegro
Ministry of Economy,
Directorate for Energy Efficiency

Energy Efficiency Program in Public Buildings (EEPPB)

Cluster IV

Contract Documents

April 2015

Energy Efficiency Program in Public Buildings (EEPPB)

Cluster IV - Contract documents

A.Contract agreement

Contract Agreement

Contract Agreement No. .....

This Contract Agreement made on ...../...../ 2015
between

Ministry of Economy
Directorate for Energy Efficiency
Rimski Trg 46
81000 Podgorica
Montenegro

(hereinafter referred to as "the Employer")

OF THE FIRST PART

and

JV Fidija (IGP Fidija doo Podgorica and Bombeton doo Cetinje), represented by IGP Fidija doo Podgorica

a corporation organized and doing business under the Law of Montenegro, with its registered business office at

IGP Fidija doo
Stara varoš, blok 7
81000 Podgorica
Montenegro

(hereinafter referred to as "the Contractor")

OF THE SECOND PART

Witnessed that the parties covenant, promise and agree each with the other as follows:

1. The Contractor agrees:

To do all specified works for the “Energy Efficiency Project in Public Buildings - Cluster IV” as “Turn Key Project” in accordance with the terms, conditions and requirements of the Bid documents and papers set forth below, which are included in, attached to, and form part of this agreement, and which have been signed in duplicate for identification by both parties.

Contract Documents entitled “Energy Efficiency Project in Public Buildings – cluster IV” dated ...../...../2015 shall be deemed to include:

a) Contract Agreement
b) Minutes of the Contract Negotiations
c) Clarification to Bidding Documents
d) Particular Conditions of Contract
e) General Conditions of Contract
f) Project Description and Procedures, with Technical Requirements
g) Contractor's Bid
h) Drawings

Document precedence from Contract Documents is according to above stated sequence.

The said Contract Agreement is intended to cover and provide for first class completed work in all respects; and everything necessary to carry out this intent which may be reasonably implied from the Contract Agreement shall be done by the Contractor, even if not particularly referred to in the Contract Agreement.

2. The Employer agrees:

To make to the Contractor the Payments as set forth in Clause 14 of "Particular Conditions" of the Contract Agreement.

3. It is mutually agreed:

(a) That the Work as herein before set forth shall be performed and completed in full compliance with the terms and conditions of the Contract Agreement.

(b) That the Contract comes into force at the Commencement Date. Commencement date will be when the conditions from "Particular Conditions" of the Contract Agreement, Sub-clause 1.6 are fulfilled”.

(c) That this Contract Agreement shall extend to, the binding upon, and ensure to the benefits of the successors and assigns of the parties hereto.

(d) A last-dated document in this contract shall always have precedence over any other document of an earlier date.

(e) That the Contract Price is:

(in figures) **EUR 2,042,200.67**

(in words) (Two million forty two thousand two hundred Euro and sixty seven Eurocents).

This amount is broken down in "Revised Price Schedules" which are the integral part of this Contract Agreement.

In witness whereof the Contractor and the Employer have respectively affixed the hands of their proper officers on the day and year first above written.

For and on behalf of
Ministry of Economy

……...	……...
Mr. Vladimir Kavarić	Mrs. Dragica Sekulić
Minister of Economy	Director General of the Directorate for Energy Efficiency

For and on behalf of
IGP Fidija doo Podgorica

……...	……...
Mr. Joko Blagojević	Mrs. Marija Blagojević
Director	Legal representative

Ugovor - prevod

Ugovor br. .....

Ovaj ugovor je potpisan dana ...../...../ 2015
između

Ministarstva ekonomije
Direktorat za energetsku efikasnost
Rimski Trg 46
81000 Podgorica
Crna Gora

(u daljem tekstu; "Investitor")

sa jedne strane

i

JV Fidija (IGP Fidija doo Podgorica i Bombeton doo Cetinje, koji predstavlja IGP Fidija doo Podgorica)

preduzeća koje je organizovano i posluje u skladu sa zakonima Crne Gore, i ima sjedište na sledećoj adresi:

IGP Fidija doo
Stara Varoš, blok 7
81000 Podgorica
Crna Gora

(u daljem tekstu; "Izvođač")

Sa druge strane

Potvrđujemo da ugovorne se strane obavezuju i slažu u vezi sledećeg:

1. Izvođač je saglasan da:

Izvede sve navedene radove u okviru “Program energetske efikasnosti u javnim zgradama- klaster IV” po sistemu “ključ u ruke” u skladu sa uslovima i zahtjevima tenderskog dokumenta, kao i ostalih dolje navedenih dokumenata, koji su uključeni, priloženi i sastavni su dio ove ponude, a koji su potpisani kao duplikat od obje strane.

Ugovor pod nazivom “Program energetske efiksanosti u javnim zgradama– klaster IV ” od ...../...../ 2015 obuhvata sledeće:

i) Ugovor
j) Zapisnik sa sastanka o pregovorima
k) Pojašnjenje tenderske dokumentacije
l) Posebne uslove ugovora
m) Opšte uslove ugovora
n) Opis projekta i procedure, sa tehničkim zahtjevima
o) Ponudu ponuđača
p) Crteže

Prioritet dokumenata je u skladu sa gore navedenim redoslijedom.

Navedenim ugovorom se namjerava obuhvatiti i obezbjediti prvoklasno izvođenje radova, u svakom pogledu i sve ostale neophodne radnje prouzrokovane ugovorom, moraju biti izvedene od strane Izvođeča, čak iako nisu posebno navedene u ugovoru.

2. Investitor je saglasan:

Da izvrši plaćanje u skladu sa klauzulom 14, Posebnih uslova ugovora

3. Investitor i Izvođač su saglasni:

(a) Da će radovi biti izvedeni i završeni, u skladu sa odredbama i uslovima ovog ugovora.

(b) Da ugovor stupa na snagu na dan početka radova.
Dan početka radova je dan kada se ispune uslovi iz podklauzule 1.6, Posebnih uslova ugovora.

(c) Da se ovaj ugovor primjenjuje i da je obavezujući za strane potpisnice

(d) Poslednji usvojeni dokument u okviru ovog ugovora će uvijek imati prioritet u odnosu na, ranije usvojene, dokumente.

(e) Ugovorena vrijednost radova je:

(brojevima) **EURA 2,042,200.67**

(slovima) (dva miliona četrdeset dvije hiljade i dvijesta eura i šezdeset sedam centi).

Ovaj iznos je dat u jediničnim cijenama u okviru finansijske ponude, koja je sastavni dio ovog ugovora.

Mi, dolje potpisani smo svjedoci da su se izvođač i investitor saglasili dana, koji je gore naveden.

U ime Ministarstva ekonomije

……...	……...
G-din Vladmir Kavarić	G-đa Dragica Sekulić
Ministar ekonomije	Generalna direktorica
	Direktorata za energetsku efikasnost

U ime
IGP Fidija doo Podgorica

……...	……...
G-din Joko Blagojević	G-đa Marija Blagojević
Direktor	Pravni zastupnik

B. Contract negotiations report



Montenegro
Ministry of Economy,
Directorate for Energy Efficiency

Energy Efficiency Program in Public Buildings (EEPPB)

Bid Report
Contract Recommendation

Cluster IV

Project financed by:

KfW Development Bank

Project implemented by:

Fichtner GmbH & Co. KG
Germany

South East Europe Consultants (S.E.E.C.) Ltd.
Serbia

EXERGIA S.A.
Greece

March 2015

Issue and Revision Record

No.	Date	Originator	Checker	Description
A	23/03/2015	S. Sipcic/U. Becker	P. Stojcic	-

Fichtner GmbH & Co.KG

Head Office:		Project Office: c.o. KOPRING PMC d.o.o.	
Sarweystrasse 3		Jovana Tomaševića 9 / 2-11	
70191 Stuttgart, Germany		20000 Podgorica, Montenegro	
Phone:	+49-711-8995-520	Phone:	+382-20-203-265
Fax:	+49-711-8995-530	Fax:	+382-20-203-266
Mobile:	+382-69-892-955	Contact:	Nebojsa Zizic
E-mail:	ubecker@fibaucon.de	E-mail	n.zizic@kopringpmc.com

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Preamble

This report was prepared by Fichtner and approved by the MoE Evaluation committee.
It is approved by the Client and the Bidder JV Fidija

On behalf of MoE evaluation committee	On behalf of Fichtner evaluation team	On behalf of JV Fidija
Dragica Sekulić	Udo Becker	Joko Blagojević
Žana Radulović		
Sandra Šipčić		

4/59

0. Summary and Recommendation

This evaluation report covers the contractual recommendation of the Bid of JV Fidija, for the **Cluster IV** of the project “MNE EEPPB”**.**

For details on the previous procedure, please refer to the following approved documents:

- **Qualification evaluation** - “Report on the Evaluation of the Qualification Documents”;
- **Bid opening** - “Protocol on opening of the Bids”;
- **Technical evaluation** - “Technical evaluation report”:
- **Commercial evaluation** - “Commercial evaluation report”.

As result of these contract negotiations, it is **recommended to sign the contract with JV Fidija**.

1. Introduction

1.1 General

The Project Executing Authority/Employer, Ministry of Economy, uses funds provided by KfW Development Bank within the scope of German Financial Co-operation towards financing the implementation of the Project “MNE EEPPB - Energy Efficiency Program in Public Buildings in Montenegro”.

The project comprises the execution, on a turnkey basis, of the below supplies and services.

Cluster IV
In a group of two schools in Podgorica and one in Danilovgrad, energy efficiency measures shall be implemented, comprising the following works: Thermal insulation of external walls and the roof; installation of new windows, doors and façade elements; renovation of an existing or installation of a new heating system, renovation of the sanitary facilities, and installation of an energy management system.

After a separate pre-qualification process the bidding procedure comprises two envelopes with the financial and technical part. Bidders should submit one bid containing the two envelopes.

1.2 Basic Data Sheet

The key information of the tendering process is compiled in the ***Basic Data Sheet*** below.

Project Title:	Energy Efficiency Program in Public Buildings EEPPB
Reference No. (BMZ ID):	202080554
Invitation for Bids issued:	13/06/2014
Site visit & pre-bid meeting:	09/07/2014;10/07/2014
Time extension issued on:	No extension
Bid Closing date and time:	01/09/2014, 12:00 p.m.
Number of Bids received:	3
Bid validity:	180 days
Clarifications to the Tender Documents:	Clarification no. 1 dated 23/07/2014
Clarification to Bids	Clarification no. 1 dated 15/08/2014

2. Contract negotiations

2.1 General

As a result of the technical and commercial evaluation of the Bids, the Bidder JV Fidija was invited to the contract negotiations on 04/03/2015. The contract negotiation was held on 09/03/2015.

At the meetings were present

- for the Client: Dragica Sekulic, Sandra Sipcic
- for the PC: Udo Becker
- for the Bidder: Joko Blagojević, Senka Perović, Nebojša Vujović, Goran Mrkela

2.2 Contract negotiation procedure

With the invitation to the contract negotiations, the Bidder received a clarification list, containing open topics were additional information and confirmations were listed.

In the meeting on 09/03/2015 the following topics were addressed:

1. Technical data for doors and windows,
2. Technical data for thermal insulation,
3. Clarification for luminaries,
4. Payment procedures (question raised by JV Fidija during the meeting),
5. Clarification of details concerning the application of FIDIC General Conditions of Contract “Silver Book” (question raised by JV Fidija during the meeting),
6. Start of works (question raised by JV Fidija during the meeting).

For details refer to Annex1 – “Invitation to contract negotiations”.

JV Fidija submitted the requested clarifications (Annexes 2-5) and a new Tender Guarantee.

3. Clarifications by the Bidder

3.1 Technical data for thermal insulation

The Bidder provided a statement on principal technical data for thermal insulation (Annex 2).

3.2 Technical data for doors and windows

The Bidder provided a statement on principal technical data for doors and windows (Annex 3).

3.3 Technical data for luminaries

The Bidder provided a statement on principal technical data for luminaries during the meeting (Annex 4). On 17/03/2015 the Bidder was asked to submit data sheets for each luminary which is offered, as a supporting document to that statement, which were received on 20/03/2015 (Annex 5).

The type of luminary offered for the illumination of the blackboard (items 1.9 BoQ for all schools) does not meet the requirements of the tender documents. The Bidder will propose replacement at the kick-off meeting. The same comment applies to the luminaries for emergency lighting (items 1.17 BoQ for "B. Bozovic" and "Oktoih" and 1.18 BoQ for "V. Jovovic").

It was determined that a measurement of the illumination level will be performed in situ, after the installation of the luminaries. In the case that the luminance and other requirements of the tender documents (e.g. electronic ballast) have not been reached, the Bidder will replace the installed luminaries or install additional ones, without any additional payment.

3.4 General and Particular Conditions of the Contract

The Bidder asked for adaptation of the sub-clause 14.4.1 (Schedule of Payments) of the Particular Conditions of the Contract, where it is specified that 75% of the contracted value will be paid in bi-monthly installments and asked for monthly payments. It was explained that the payment interval of two months has been determined by the financing agency KfW Development Bank.

3.5 Other topics

(1) JV Fidija raised the question, why FIDIC “Silver Book” (lump sum/turnkey) conditions of contract are used, and not “Red Book” (measurement based). The Client explained, to the satisfaction of JV Fidija, all relevant procedures and possible adjustment by Variation Orders.

(2) The start of works is presently scheduled for beginning of May 2015. A Kick-off meeting of the PC’s supervising teams with the Contractor’s Project Manager and Site Managers,

as well as of the Client’s project team will be organized prior to the commencement of the works on the sites.

(3) JV Fidija was asked to submit an extended tender guarantee with validity until 30/04/2015. The new guarantee was received on 16/03/2015 (Annex 5).

4. Conclusion

As a result of the contract negotiations, **it is recommended to invite JV Fidija for contract signature**.

5. Annexes

Annex 1 – Invitation for contract negotiation

Annex 2 – Technical data for thermal insulation

Annex 3 – Technical data for doors and windows

Annex 4 – Technical data for luminaries - A

Annex 5 – Technical data for luminaries - B

Annex 6 – Extended tender guarantee

Annex 1 – Invitation for contract negotiation

Crna Gora
Ministarstvo ekonomije

Ref No: 0601-2413
Podgorica, 04/03/2015

IGH Fidija doo
Attention: Mr. Joko Blagojević
Stara Varoš blok 7
81000 Podgorica
Montenegro

Energy Efficiency Program in Public Buildings
Tender for energy efficient reconstruction and modernisation of three educational buildings of cluster IV

Invitation for contract negotiation

Dear Mr. Blagojević,

Herewith we inform you that according to the evaluation of the Bids, for reconstruction of three educational buildings of cluster IV, under the EEPPB project, the Bid of JV Fidija is considered as first ranged. Therefore we invite you to the contract negotiations, which will be held in the premises of the Ministry of Economy (Rimski Trg 46, fourth floor, Podgorica) on 09/03/2015, starting at 12:30.

At the contract negotiations the Bidder shall be requested to clarify the following:

1.The Bidder has to provide a statement on principal technical data for doors and windows.

2. The Bidder has to provide a statement on principal technical data for thermal insulation.

3.The Bidder has to specify which offered luminary is related to which item of the BoQ. Photometric calculation for one classrooms in every school has to be submitted too.

Rimski trg 46, 81000 Podgorica
Tel: (+382) 20 482 238; 482 446 Fax: (+382) 20 234 081
Web: www.minekon.vlada.cg.yu

The Bidder is required to prepare comments, if any, to the General and Particular conditions of the Contract which are part of the tender documents (Tender documents, part A2 and A3).

The Bidder JV Roaming shall confirm, by Friday 06/03/2015, by 11:00 a.m, if time and date proposed for the contract negotiations are acceptable for him. Information about the persons present at the contract negotiations shall be provided by the same date.

Tender evaluation committee

Dragica Sekulić,
Chairperson

Annex 2 – Technical data for thermal insulation

IGP ΦΙΔΙΙΑ
PREDUZEĆE ZA INŽENJERING, GRAĐENJE I PROJEKTOVANJE
Stara Varoš, blok 7, Podgorca 81000, Crna Gora
tel: +382 20 621 140 . +382 20 623 120 . tel/fax: +382 20 621 144
žiro-račun: 505-513-84 . PIB: 02111616 . PDV: 30/31-02514-0
www.fidija.co.me e-mail:fidija@t-com.me

No:159-15
Date:09.03.2015.

Statement
on principal technical data for thermal insulation

We hereby declare that thermal insulation for reconstruction of three educational buildings of Cluster IV shall be incorporated all in accordance with the attests submitted in Tender documents...Catalogues and certificates No 1, No 2, No 3 and No 4 on pages 191-425:

Certificate No 1:
Rock stone mineral wool for contact facade, type: FKD-S, the thickness of 100 mm, the manufacturer Knauf Insulation doo Belgrade;
Coefficient of thermal conductivity at average standard temperature for application in construction ..... tsr=10°C..... $\lambda_{10,L}$=0,036 W/(mK);
This rock stone mineral wool is nonflammable.

Certificate No 2:
Extruded polystyrene with a chase, type: "XPS 50", thickness of 50 mm, the manufacturer Austrotherm Valjevo, Serbia;
Coefficient of thermal conductivity at average standard temperature for application in construction .....tsr=10°C..... $\lambda_{10,L}$=0,032 W/(mK).

Certificate No3:
Expanded polystyrene, type "Austrotherm EPS AF", thickness of 50 mm, the manufacturer Austrotherm Valjevo, Serbia;
It belongs to the class B1 of hardly flammable materials;
Coefficient of thermal conductivity at average standard temperature for application in construction .....tsr=10°C..... $\lambda_{10,L}$=0,036 W/(mK).

Certificate No 4:
ETA certificate refers to the external facade.

Sincerely,
Joko Blagojević

Annex 3 – Technical data for doors and windows

IGP
ΦΙΔΙΙΑ
PREDUZEĆE ZA INŽENJERING, GRAĐENJE I PROJEKTOVANJE
Stara Varoš, blok 7, Podgorca 81000, Crna Gora
tel: +382 20 621 140 . +382 20 623 120 . tel/fax: +382 20 621 144
žiro-račun: 505-513-84 . PIB: 02111616 . PDV: 30/31-02514-0
www.fidija.co.me e-mail:fidija@t-com.me

No.:160-15
Date:09.03.2015.

Statement
on principal technical data for doors and windows

We hereby declare that doors and windows for reconstruction of three educational buildings of Cluster IV shall be incorporated all in accordance with attests submitted in Tender documents…Catalogues and certificates No 17, No 18, and No 19 on pages 507-825:

PVC profiles: Manufacturer: Trocal Germany, Type: Trocal 88+, six-chamber, sound protection up to class 5; the heat transfer coefficient Uf = 1,0W / (m²K); they have attest to the wind effect; resistance to the water effect, attest to air permeability, Fittings: Winkhaus, series: Active Pilot; thermo-insulation glass 4+16+4, argon-filled, low emission inside, float glass outside.
Al profiles: Manufacturer: FEAL doo, Bosnia and Herzegovina; type: Thermo 65; profiles from the series are additionally filled with thermo-insulation material; material is thermo block λ=0,035W/Mk, **Heat transfer coefficient Uf=2**.15-2.4W/m²K
Fittings: Winkhaus, Germany,
Glass: Guardian Luxemburg, thermo-insulation

Sincerely,
Jokó Blagojević

Popis ključne opreme

A1.10 - Popis ključnih opreme i materijala				
No	Oprema i materijali	Stavka u opisu artikla	vrsta	proizvođač
I PS "Branko Božović" Podgorica				
34	Električni svjetiljka	I.7 u A.5.1.3	233243 P3M 272x28W T16	PETRIDIS - GR
		I.8 u A.5.1.3	312243 LP2S 322x28W T16	PETRIDIS - GR
		I.9 u A.5.1.3	SLOT WW 221/80	PETRIDIS - GR
		I.10 u A.5.1.3	SLOT 222/28	PETRIDIS - GR
		I.11 u A.5.1.3	PRISMA P2M 261X28 221233; F.28W/840 T5	PETRIDIS - GR
		I.12 u A.5.1.3	PRISMA PSPO 261X28 IP54 595233,	PETRIDIS - GR
		I.13 u A.5.1.3	PRISMA PSPO 262X18 TC-L 230023	PETRIDIS - GR
		I.14 u A.5.1.3	PRISMA PSPO 262X18 TC-L IP54 59542	PETRIDIS - GR
		I.15 u A.5.1.3	LINDA 2X35W 511263; T5 35W/840	PETRIDIS - GR
		I.16 u A.5.1.3	P3M 224/80	PETRIDIS - GR
		I.17 u A.5.1.3	OVA38357	SCHNEIDER
		I.18 u A.5.1.3	OVA38357	SCHNEIDER
		I.19 u A.5.1.3	OVA38357	SCHNEIDER
		I.20 u A.5.1.3	RILUX OVA37067E	SCHNEIDER

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1.7.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	
	PETRIDIS 233243 P3M 272x28W T16		106
1.8.	Delivery and mounting of recessed luminaries for installation in suspended ceilings 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	
	PETRIDIS 312243 LP2S 322x28W T16		27
1.9.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries has to be mounted at 2.7 m height from floor level and 0.9 m from wall with board mounted on it. Works and material to be calculated per unit:	pc	
	SLOT WW 221/80		74
1.10.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	
	SLOT 222/28		6
1.11.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	
	PRISMA P2M 261X28 221233; F.28W/840 T5		23
1.12.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	
	PRISMA PSPO 261X28 IP54 595233,		2

1.13.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit: PRISMA PSPO 262X18 TC-L 230023	pc	33
1.14.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit: PRISMA PSPO 262X18 TC-L IP54 59542	pc	15
1.15.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit: LINDA 2X35W 511263; T5 35W/840	pc	15
1.16.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit: P3M 224/80	pc	17
1.17.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit: OVA38357	pc	8
1.18.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit: OVA38357	pc	1
1.19.	Delivery and mounting of wall mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit: OVA38357	pc	6
1.20.	Delivery and mounting of fluorescent antipanic luminaries 8W, 1h with IP40 protection completely equipped with mounting gear and light source according to project of electrical installation. Works and material to be calculated per unit: RILUX OVA37067E	pc	

Popis ključne opreme

A1.10 - Popis ključnih opreme i materijala				
No	Oprema i materijali	Stavka u opisu artikla	vrsta	proizvođač
II PS "Oktoih" Podgorica				
26	Električni svjetiljka	I.7 u A.5.2.3	233243 P3M 272x28W T16	PETRIDIS - GR
		I.8 u A.5.2.3	312243 LP2S 322x28W T16	PETRIDIS - GR
		I.9 u A.5.2.3	SLOT WW 221/80	PETRIDIS - GR
		I.10 u A.5.2.3	SLOT 222/28	PETRIDIS - GR
		I.11 u A.5.2.3	PRISMA P2M 261X28 221233; F.28W/840 T5	PETRIDIS - GR
		I.12 u A.5.2.3	PRISMA PSPO 261X28 IP54 595233,	PETRIDIS - GR
		I.13 u A.5.2.3	PRISMA PSPO 262X18 TC-L 230023	PETRIDIS - GR
		I.14 u A.5.2.3	PRISMA PSPO 262X18 TC-L IP54 59542	PETRIDIS - GR
		I.15 u A.5.2.3	LINDA 2X35W 511263; T5 35W/840	PETRIDIS - GR
		I.16 u A.5.2.3	P3M 224/80	PETRIDIS - GR
		I.17 u A.5.2.3	OVA38357	SCHNEIDER
		I.18 u A.5.2.3	OVA38357	SCHNEIDER
		I.19 u A.5.2.3	OVA38357	SCHNEIDER
		I.20 u A.5.2.3	RILUX OVA37067E	SCHNEIDER



1.7.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	116
	PETRIDIS 233243 P3M 272x28W T16	
1.8.	Delivery and mounting of recessed luminaries for installation in suspended ceilings 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	106
	PETRIDIS 312243 LP2S 322x28W T16	
1.9.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted at 2.7 m height from floor level and 0.9 m from wall with board mounted on it. Works and material to be calculated per unit:	26
	SLOT WW 221/80	
1.10.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	68
	SLOT 222/28	
1.11.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	12
	PRISMA P2M 261X28 221233; F.28W/840 T5	

1.12.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit: PRISMA PSPO 261X28 IP54 595233,	20
1.13.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit: PRISMA PSPO 262X18 TC-L 230023	5
1.14.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit: PRISMA PSPO 262X18 TC-L IP54 59542	32
1.15.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit: LINDA 2X35W 511263; T5 35W/840	16
1.16.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit: P3M 224/80	15
1.17.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit: OVA38357	16
1.18.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit: OVA38357	7
1.19.	Delivery and mounting of wall mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	1

1.20.	OVA38357 Delivery and mounting of fluorescent antipanic luminaries 8W, 1h with IP40 protection completely equipped with mounting gear and light source according to project of electrical installation. Works and material to be calculated per unit: RILUX OVA37067E	6

Popis ključnih opreme

A1.10 - Popis ključnih opreme i materijala				
No	Oprema i materijali	Stavka u opisu artikla	vrsta	proizvođač
III PS "Vuko Jovović" Danilovgrad				
15	Električni svjetiljka	I.7 u A.5.3.3	SLOT LOUVRE 222/35	PETRIDIS - GR
		I.8 u A.5.3.3	PETRIDIS 233243 P3M 272x28W T16	PETRIDIS - GR
		I.9 u A.5.3.3	SLOT WW 221/80	PETRIDIS - GR
		I.10 u A.5.3.3	SLOT 222/28	PETRIDIS - GR
		I.11 u A.5.3.3	SLOT 222/35	PETRIDIS - GR
		I.12 u A.5.3.3	PRISMA PSPO 262X18 TC-L IP54 59542	PETRIDIS - GR
		I.13 u A.5.3.3	PRISMA PSPO 262X18 TC-L 230023	PETRIDIS - GR
		I.14 u A.5.3.3	PRISMA PSPO 261X28 IP54 595233,	PETRIDIS - GR
		I.15 u A.5.3.3	LINDA 2X35W 511263; T5 35W/840	PETRIDIS - GR
		I.16 u A.5.3.3	P3M 224/80	PETRIDIS - GR
		I.17 u A.5.3.3	OVA38357	SCHNEIDER
		I.18 u A.5.3.3	OVA38357	SCHNEIDER
		I.19 u A.5.3.3	OVA38357	SCHNEIDER
		I.19 u A.5.3.3	RILUX OVA37067E	SCHNEIDER
		I.19 u A.5.3.3	710532 Mach 1 symetrical 1x250W IP65	SCHNEIDER

1.7.	Delivery and mounting of ceiling mounted luminaries 2/35WT16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	7
	SLOT LOUVRE 222/35		
1.8.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	124
	PETRIDIS 233243 P3M 272x28W T16		
1.9.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from wall with board mounted on it. Works and material to be calculated per unit:	pc	18
	SLOT WW 221/80		
1.10.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	74
	SLOT 222/28		
1.11.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	2
	SLOT 222/35		
1.12.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	19
	PRISMA PSPO 262X18 TC-L IP54 59542		



1.13.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit: PRISMA PSPO 262X18 TC-L 230023	pc	3
1.14.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit: PRISMA PSPO 261X28 IP54 595233,	pc	21
1.15.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit: LINDA 2X35W 511263; T5 35W/840	pc	2
1.16.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit: P3M 224/80	pc	6
1.17.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit: OVA38357	pc	15
1.18.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit: OVA38357	pc	6
1.19.	Delivery and mounting of wall mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit: OVA38357	pc	1
1.20.	Delivery and mounting of fluorescent antipanic luminaries 8W, 1h with IP40 protection completely equipped with mounting gear and light source according to project of electrical installation. Works and material to be calculated per unit: RILUX OVA37067E	pc	4

1.21.	Delivery and installation of MH reflector 250W, IP65, mounted on the facade. Reflector to be equipped with mounting gear and light source. Works and material to be calculated per unit:		
	710532 Mach 1 symetrical 1x250W IP65	pc	3



OŠ Branko Božović - Podgorica

Partner for Contact:
Order No.:
Company:
Customer No.:

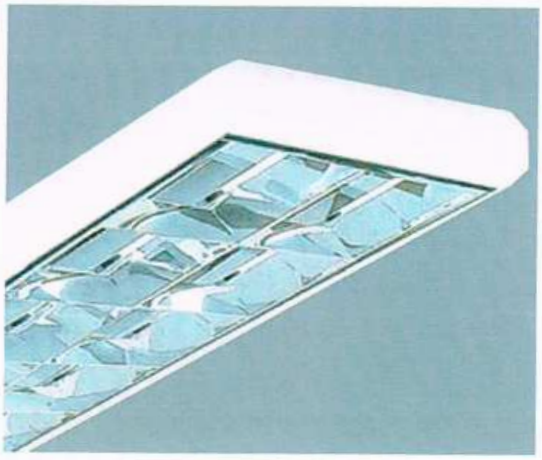
Date: 06.03.2015
Operator: mirko



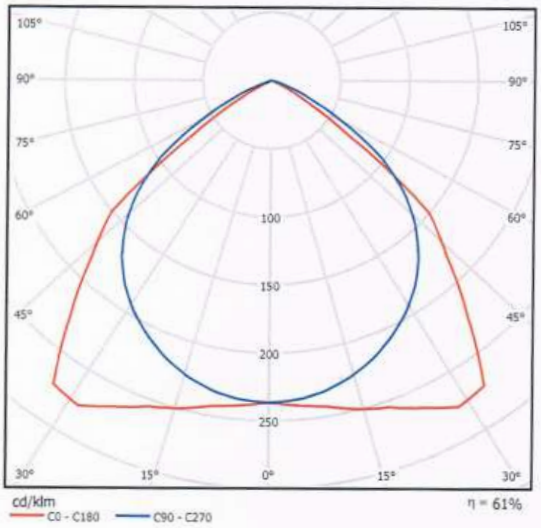
Bombeton doo - Cetinje
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Admirala Zmajevića 37

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PETRIDIS 233243 P3M 272x28W T16 / Luminaire Data Sheet



Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 61 96 100 100 60

P3M 272x28W T16
Technical Description
Luminaires for fluorescent T16 & T26.
• Body made of steel formed into a single form, electrostatically painted in white color.
• Parabolic louvre 3M with square cell section from anodized non iridescent specular aluminium
• Provide lighting symmetrical distribution
• Wiring for operation on 230V-50Hz with conventional ballast and power factor correction capacitor (lamp T26).
• Connection to operate the electronic 230V-50/60Hz ballast(lamps T16, T26)
• Wiring for use with electronic ballast dimmable (Fluorescent T16, T26).
• Wiring for emergency lighting (lamps T16, T26).
Upon request:
• Body and accessories in various colors (RAL).

Luminous emittance 1:

Glare Evaluation According to UGR

ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room Size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	13.8	14.9	14.0	15.1	15.3	18.1	19.2	18.4	19.4	19.6
	3H	13.6	14.6	13.9	14.9	15.1	18.2	19.2	18.5	19.4	19.7
	4H	13.6	14.5	13.9	14.7	15.0	18.1	19.1	18.5	19.3	19.6
	6H	13.5	14.3	13.8	14.6	14.9	18.1	18.9	18.4	19.2	19.5
	8H	13.4	14.2	13.8	14.5	14.9	18.0	18.8	18.4	19.1	19.4
	12H	13.4	14.2	13.8	14.5	14.8	18.0	18.8	18.4	19.1	19.4
4H	2H	13.9	14.9	14.3	15.1	15.4	18.0	18.9	18.3	19.2	19.4
	3H	13.8	14.6	14.2	14.9	15.2	18.1	18.9	18.5	19.2	19.5
	4H	13.7	14.4	14.1	14.7	15.1	18.1	18.7	18.5	19.1	19.4
	6H	13.7	14.2	14.1	14.6	15.0	18.0	18.6	18.4	18.9	19.3
	8H	13.6	14.2	14.1	14.5	15.0	18.0	18.5	18.4	18.9	19.3
	12H	13.6	14.1	14.0	14.5	14.9	17.9	18.4	18.4	18.8	19.2
8H	4H	13.7	14.2	14.1	14.6	15.0	18.0	18.5	18.4	18.9	19.3
	6H	13.6	14.0	14.0	14.4	14.9	17.9	18.3	18.3	18.7	19.2
	8H	13.5	13.9	14.0	14.3	14.8	17.8	18.2	18.3	18.6	19.1
	12H	13.5	13.8	14.0	14.3	14.8	17.8	18.1	18.3	18.6	19.1
12H	4H	13.6	14.1	14.1	14.5	14.9	17.9	18.4	18.4	18.8	19.2
	6H	13.5	13.9	14.0	14.3	14.8	17.8	18.2	18.3	18.6	19.1
	8H	13.5	13.8	14.0	14.3	14.8	17.8	18.1	18.3	18.6	19.1

Variation of the observer position for the luminaire distances S

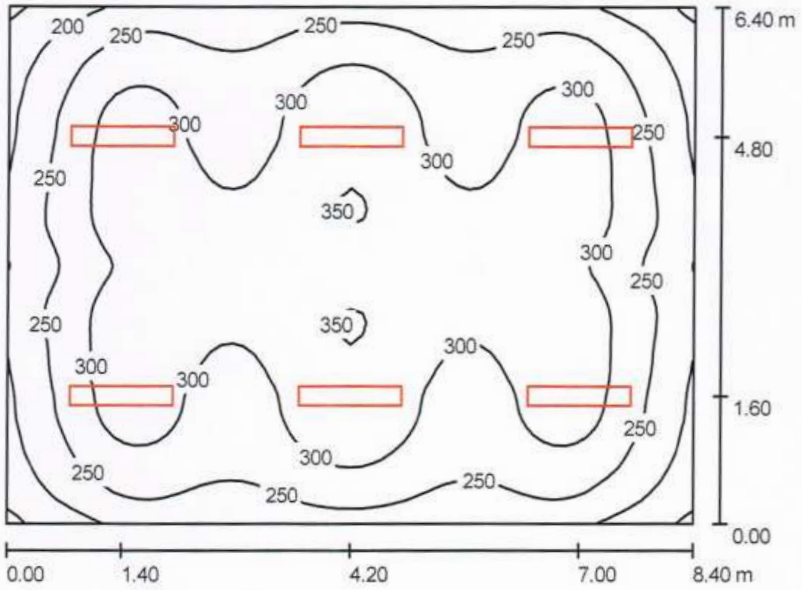
S = 1.0H	+0.9 / -1.9	+0.7 / -0.8
S = 1.5H	+2.3 / -10.1	+1.9 / -3.4
S = 2.0H	+3.8 / -19.5	+2.5 / -6.7
Standard table	BK00	BK01
Correction Summand	-8.6	-6.9

Corrected Glare Indices referring to 5200lm Total Luminous Flux

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Učionica 8.4 x 6.4 / Summary



Height of Room: 2.800 m, Mounting Height: 2.800 m, Maintenance factor: 0.80

Values in Lux, Scale 1:83

Surface	ρ [%]	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0
Workplane	/	280	140	354	0.499
Floor	20	251	159	347	0.633
Ceiling	80	56	41	62	0.733
Walls (4)	60	111	43	186	/

Workplane:
Height: 0.750 m
Grid: 64 x 64 Points
Boundary Zone: 0.000 m

UGR (to luminaire axis)

	Lengthways-	Across
Left Wall	14	18
Lower Wall	14	18

(CIE, SHR = 1.00.)

Illuminance Quotient (according to LG7): Walls / Working Plane: 0.360, Ceiling / Working Plane: 0.200.

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ [lm]	P [W]
1	6	PETRIDIS 233243 P3M 272x28W T16 (1.000)	5200	62.0
		Total:	31200	372.0

Specific connected load: 6.92 W/m² = 2.47 W/m²/100 lx (Ground area: 53.76 m²)

Bombeton doo - Cetinje
PC Podgorica
Admirala Zmajevića 37

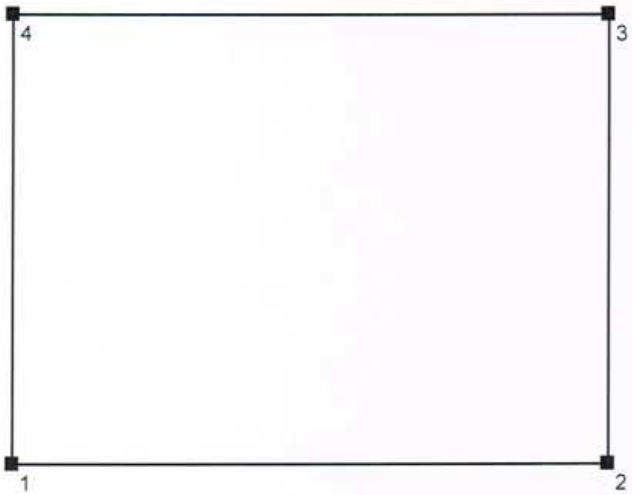
Operator mirko
Telephone 020 605 305
Fax 020 605 306
e-Mail bombeton@t.com.me

Učionica 8.4 x 6.4 / Input Protocol

Height of working plane: 0.750 m
Boundary Zone: 0.000 m

Maintenance factor: 0.80

Height of Room: 2.800 m
Ground area: 53.76 m²



Surface	Rho [%]	from ([m] | [m])	towards ([m] | [m])	Length [m]
Floor	20	/	/	/
Ceiling	80	/	/	/
Wall 1	60	(0.000 | 0.000)	(8.400 | 0.000)	8.400
Wall 2	60	(8.400 | 0.000)	(8.400 | 6.400)	6.400
Wall 3	60	(8.400 | 6.400)	(0.000 | 6.400)	8.400
Wall 4	60	(0.000 | 6.400)	(0.000 | 0.000)	6.400

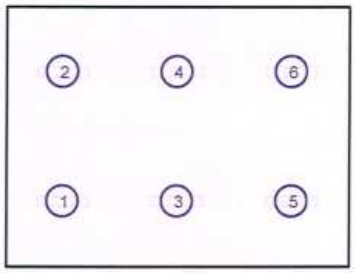
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Učionica 8.4 x 6.4 / Luminaires (coordinates list)

PETRIDIS 233243 P3M 272x28W T16

5200 lm, 62.0 W, 1 x 2 x T16 28W/840 (Correction Factor 1.000).



No.	Position [m]			Rotation [°]		
	X	Y	Z	X	Y	Z
1	1.400	1.600	2.800	0.0	0.0	90.0
2	1.400	4.800	2.800	0.0	0.0	90.0
3	4.200	1.600	2.800	0.0	0.0	90.0
4	4.200	4.800	2.800	0.0	0.0	90.0
5	7.000	1.600	2.800	0.0	0.0	90.0
6	7.000	4.800	2.800	0.0	0.0	90.0

OŠ Vuko Jovović - Danilovgrad

Partner for Contact:
Order No.:
Company:
Customer No.:

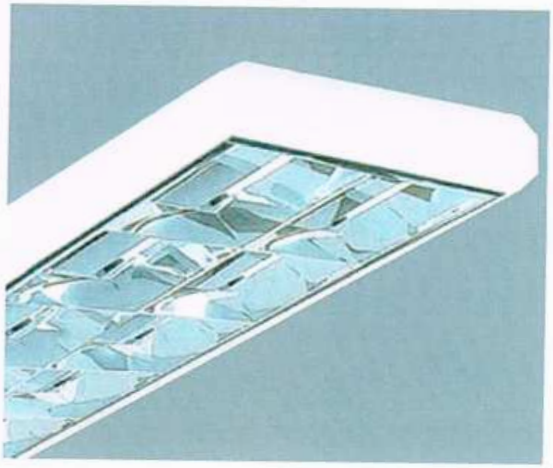
Date: 06.03.2015
Operator: mirko



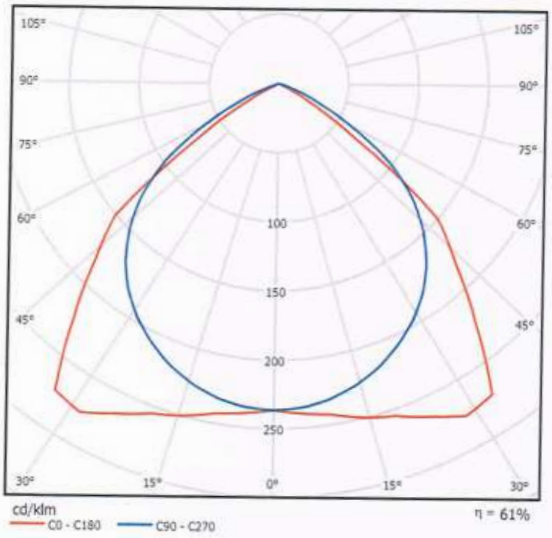
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PETRIDIS 233243 P3M 272x28W T16 / Luminaire Data Sheet



Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 61 96 100 100 60

P3M 272x28W T16
Technical Description
Luminaires for fluorescent T16 & T26.
• Body made of steel formed into a single form, electrostatically painted in white color.
• Parabolic louvre 3M with square cell section from anodized non iridescent specular aluminium
• Provide lighting symmetrical distribution
• Wiring for operation on 230V-50Hz with conventional ballast and power factor correction capacitor (lamp T26).
• Connection to operate the electronic 230V-50/60Hz ballast(lamps T16, T26)
• Wiring for use with electronic ballast dimmable (Fluorescent T16, T26).
• Wiring for emergency lighting (lamps T16, T26).
Upon request:
• Body and accessories in various colors (RAL).

Luminous emittance 1:

Glare Evaluation According to UGR

ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room Size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	13.8	14.9	14.0	15.1	15.3	18.1	19.2	18.4	19.4	19.6
	3H	13.6	14.6	13.9	14.9	15.1	18.2	19.2	18.5	19.4	19.7
	4H	13.6	14.5	13.9	14.7	15.0	18.1	19.1	18.5	19.3	19.6
	6H	13.5	14.3	13.8	14.6	14.9	18.1	18.9	18.4	19.2	19.5
	8H	13.4	14.2	13.8	14.5	14.9	18.0	18.8	18.4	19.1	19.4
	12H	13.4	14.2	13.8	14.5	14.8	18.0	18.8	18.4	19.1	19.4
4H	2H	13.9	14.9	14.3	15.1	15.4	18.0	18.9	18.3	19.2	19.4
	3H	13.8	14.6	14.2	14.9	15.2	18.1	18.9	18.5	19.2	19.5
	4H	13.7	14.4	14.1	14.7	15.1	18.1	18.7	18.5	19.1	19.4
	6H	13.7	14.2	14.1	14.6	15.0	18.0	18.6	18.4	18.9	19.3
	8H	13.6	14.2	14.1	14.5	15.0	18.0	18.5	18.4	18.9	19.3
	12H	13.6	14.1	14.0	14.5	14.9	17.9	18.4	18.4	18.8	19.2
8H	4H	13.7	14.2	14.1	14.6	15.0	18.0	18.5	18.4	18.9	19.3
	6H	13.6	14.0	14.0	14.4	14.9	17.9	18.3	18.3	18.7	19.2
	8H	13.5	13.9	14.0	14.3	14.8	17.8	18.2	18.3	18.6	19.1
	12H	13.5	13.8	14.0	14.3	14.8	17.8	18.1	18.3	18.6	19.1
12H	4H	13.6	14.1	14.1	14.5	14.9	17.9	18.4	18.4	18.8	19.2
	6H	13.5	13.9	14.0	14.3	14.8	17.8	18.2	18.3	18.6	19.1
	8H	13.5	13.8	14.0	14.3	14.8	17.8	18.1	18.3	18.6	19.1

Variation of the observer position for the luminaire distances S

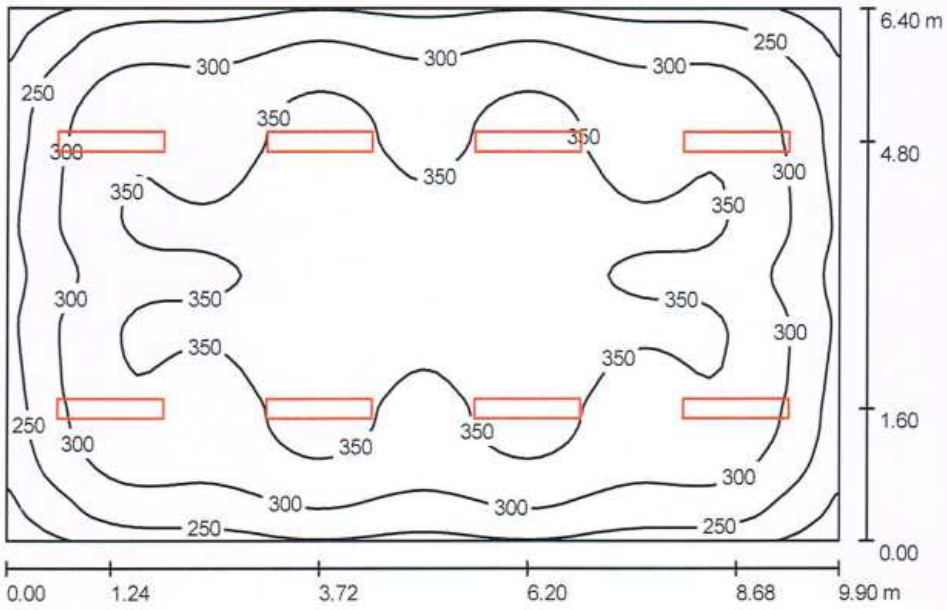
S = 1.0H	+0.9 / -1.9	+0.7 / -0.8
S = 1.5H	+2.3 / -10.1	+1.9 / -3.4
S = 2.0H	+3.8 / -19.5	+2.5 / -6.7
Standard table	BK00	BK01
Correction Summand	-8.6	-6.9

Corrected Glare Indices referring to 3200lm Total Luminous Flux

Bombeton doo - Cetinje
PC Podgorica
Admirala Zmajevića 37

Operator mirko
Telephone 020 605 305
Fax 020 605 306
e-Mail bombeton@t.com.me

Učionica 9.9 x 6.4 / Summary



Height of Room: 2.800 m, Mounting Height: 2.800 m, Maintenance factor: 0.80

Values in Lux, Scale 1:83

Surface	ρ [%]	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u0
Workplane	/	320	166	389	0.519
Floor	20	288	180	393	0.626
Ceiling	80	64	47	72	0.730
Walls (4)	60	127	50	241	/

Workplane:

		UGR	Lengthways-	Across	to luminaire axis
Height:	0.750 m	Left Wall	14	18	
Grid:	64 x 64 Points	Lower Wall	14	18	
Boundary Zone:	0.000 m	(CIE, SHR = 1.00.)			

Illuminance Quotient (according to LG7): Walls / Working Plane: 0.362, Ceiling / Working Plane: 0.201.

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ [lm]	P [W]
1	8	PETRIDIS 233243 P3M 272x28W T16 (1.000)	5200	62.0
			Total: 41600	496.0

Specific connected load: 7.83 W/m² = 2.45 W/m²/100 lx (Ground area: 63.36 m²)

Bombeton doo - Cetinje
PC Podgorica
Admirala Zmajevića 37

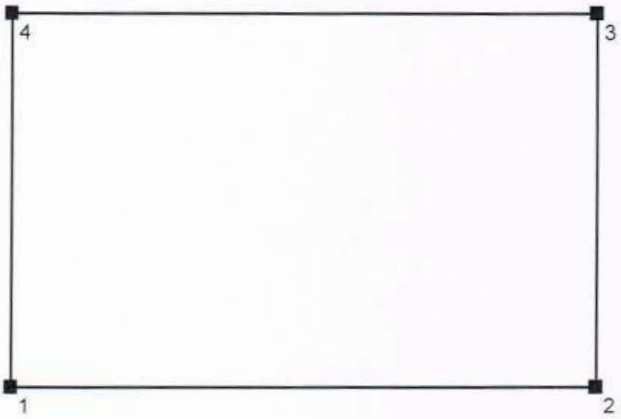
Operator mirko
Telephone 020 605 305
Fax 020 605 306
e-Mail bombeton@t.com.me

Učionica 9.9 x 6.4 / Input Protocol

Height of working plane: 0.750 m
Boundary Zone: 0.000 m

Maintenance factor: 0.80

Height of Room: 2.800 m
Ground area: 63.36 m²



Surface	Rho [%]	from ([m] | [m])	towards ([m] | [m])	Length [m]
Floor	20	/	/	/
Ceiling	80	/	/	/
Wall 1	60	(0.000 | 0.000)	(9.900 | 0.000)	9.900
Wall 2	60	(9.900 | 0.000)	(9.900 | 6.400)	6.400
Wall 3	60	(9.900 | 6.400)	(0.000 | 6.400)	9.900
Wall 4	60	(0.000 | 6.400)	(0.000 | 0.000)	6.400

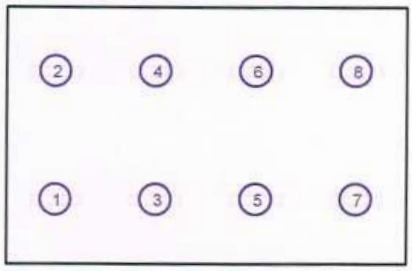
Bombeton doo - Cetinje
PC Podgorica
Admirala Zmajevića 37

Operator mirko
Telephone 020 605 305
Fax 020 605 306
e-Mail bombeton@t.com.me

Učionica 9.9 x 6.4 / Luminaires (coordinates list)

PETRIDIS 233243 P3M 272x28W T16

5200 lm, 62.0 W, 1 x 2 x T16 28W/840 (Correction Factor 1.000).



No.	Position [m]			Rotation [°]		
	X	Y	Z	X	Y	Z
1	1.240	1.600	2.800	0.0	0.0	90.0
2	1.240	4.800	2.800	0.0	0.0	90.0
3	3.720	1.600	2.800	0.0	0.0	90.0
4	3.720	4.800	2.800	0.0	0.0	90.0
5	6.200	1.600	2.800	0.0	0.0	90.0
6	6.200	4.800	2.800	0.0	0.0	90.0
7	8.680	1.600	2.800	0.0	0.0	90.0
8	8.680	4.800	2.800	0.0	0.0	90.0



Annex 5 – Technical data for luminaries - B

IGP
ФИДИЈА
PREDUZEĆE ZA INŽENJERING, GRAĐENJE I PROJEKTOVANJE
Stara Varoš, blok 7, Podgorica 81000, Crna Gora
tel: +382 20 621 140 . +382 20 623 120 . tel/fax: +382 20 621 144
žiro-račun: 505-513-84 . PIB: 02111616 . PDV: 30/31-02514-0
www.fidija.co.me e-mail:fidija@t-com.me

Црна Гора
МИНИСТАРСТВО ЕКОНОМИЈЕ
ПОДГОРИЦА
Примљено: 19-03-2015
Орг. јед. | Број | Прилог | Вриједност

Podgorica: 19th March 2015
No: 203-15

Ministry of Economy, Directorate
for Energy Efficiency
For Sandra Šipčić

Subject: EEPPB in Montenegro, BMZ Nr. 20208055, 4 Cluster IV

As You asked in your e-mail, dated 18th March 2015, we submit the:

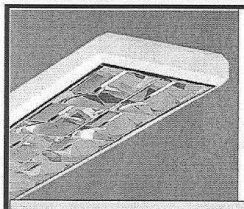
1. Data sheets for each luminary which is offered, as a supporting document to the clarification we provided for the contract negotiation.

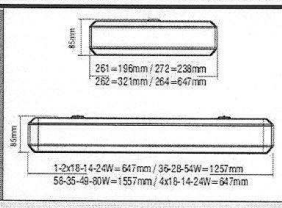
With respect,

Executive director
Joko Blagojević

Branko Božović
Hem 1.7.

„ Oktoih" Hem 1.7.
„ Vuko Jovović 1.8.





OSRAM: T8
PHILIPS: TL-D

OSRAM: T5
PHILIPS: TL5

TC-S
OSRAM: DULUX S
PHILIPS: PL-S

TC-L
OSRAM: DULUX L
PHILIPS: PL-L

TC-SEL
OSRAM: DULUX S/E
PHILIPS: PL-S/4P

Parabolic louvre 3M with square cell section from anodized non iridescent **specular** aluminium

PRISMA P3M
(SURFACE MOUNTED AND PENDANT LUMINAIRES)

CE IP 20

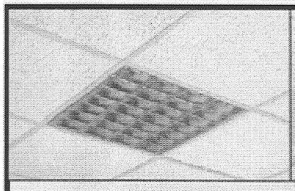
PRICE LIST

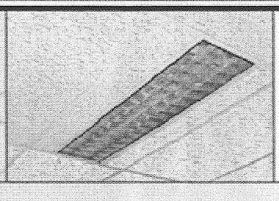
DESCRIPTION	DIMENSIONS	COLOUR	Conventional ballast and capacitor		Electronic ballast	
			CODE	PRICE	CODE	PRICE
P3M 261x18W T26	196x 647x 85	White	223012		223013	
P3M 261x36W T26	196x1257x85	White	223112		223113	
P3M 261x58W T26	196x1557x85	White	223152		223153	
P3M 262x18W T26	321x 647x85	White	243022		243023	
P3M 262x36W T26	321x1257x85	White	243122		243123	
P3M 262x58W T26	321x1557x85	White	243162		243163	
P3M 264x18W T26	647x 647x 85	White	243042		243043	
P3M 272x18W T26	238x 647x 85	White	233022		233023	
P3M 272x36W T26	238x1257x85	White	233122		233123	
P3M 272x58W T26	238x1557x85	White	233162		233163	
P3M 261x14W T16	196x 647x 85	White			223173	
P3M 261x24W T16	196x 647x 85	White			223273	
P3M 261x28W T16	196x1257x85	White			223233	
P3M 261x54W T16	196x1257x85	White			223353	
P3M 261x35W T16	196x1557x85	White			223253	
P3M 261x49W T16	196x1557x85	White			223333	
P3M 261x80W T16	196x1557x85	White			223393	
P3M 262x14W T16	321x 647x85	White			243183	
P3M 262x24W T16	321x 647x85	White			243283	
P3M 262x28W T16	321x1257x85	White			243243	
P3M 262x54W T16	321x1257x85	White			243363	
P3M 262x35W T16	321x1557x85	White			243263	
P3M 262x49W T16	321x1557x85	White			243343	
P3M 262x80W T16	321x1557x85	White			243403	
P3M 264x14W T16	647x 647x 85	White			243203	
P3M 264x24W T16	647x 647x 85	White			243303	
P3M 272x14W T16	238x 647x 85	White			233183	
P3M 272x24W T16	238x 647x 85	White			233283	
P3M 272x28W T16	238x1257x85	White			233243	
P3M 272x54W T16	238x1257x85	White			233363	
P3M 272x35W T16	238x1557x85	White			233263	
P3M 272x49W T16	238x1557x85	White			233343	
P3M 262x11W TC-S / TC-SEL	321x321x85	White	243782			
P3M 262x18W TC-L	321x321x85	White	243422		243423	
P3M 262x36W TC-L	321x518x85	White	243462		243463	

Note: The preceding luminaires are also available in **TITAN** colour with **10%** extra charge on the price list.

Branka Božović 1.8.
Ortoili 1.8.
Vuko Jovović 1.9.

Lighting PETRIDIS





OSRAM: T8
PHILIPS: TL-D

OSRAM: T5
PHILIPS: TL5

OSRAM: DULUX L
PHILIPS: PL-L

Parabolic **louvre 2S** from anodized non iridescent **semi-glossy** aluminium.

LP2S 320 T26 or T16

IP 20

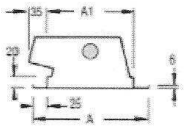
PRICE LIST

DESCRIPTION	For panels with structure mm	DIMENSIONS mm						COLOUR	Conventional ballast and capacitor		Electronic ballast	
		A	L	H	A1	L1	L2		CODE	PRICE	CODE	PRICE
LP2S 321x18W T26	200 x 600	196	596	95	148	587	40	White	312012		312013	
LP2S 322x18W T26	300 x 600	296	596	95	273	573	40	White	312022		312023	
LP2S 323x18W T26	600 x 600	596	596	92	573	626		White	312032		312033	
LP2S 324x18W T26	600 x 600	596	596	92	573	626		White	312042		312043	
LP2S 321x36W T26	200 x 1200	196	1196	95	148	1187	50	White	312112		312113	
LP2S 322x36W T26	300 x 1200	296	1196	95	273	1173	50	White	312122		312123	
LP2S 323x36W T26	600 x 1200	596	1196	95	573	1173	50	White	312132		312133	
LP2S 324x36W T26	600 x 1200	596	1196	95	573	1173	50	White	312142		312143	
LP2S 321x14W T16	200 x 600	196	596	95	148	587		White			312173	
LP2S 321x24W T16	200 x 600	196	596	95	148	587		White			312293	
LP2S 322x14W T16	300 x 600	296	596	95	273	573		White			312183	
LP2S 322x24W T16	300 x 600	296	596	95	273	573		White			312303	
LP2S 323x14W T16	600 x 600	596	596	95	573	573		White			312193	
LP2S 323x24W T16	600 x 600	596	596	95	573	573		White			312313	
LP2S 324x14W T16	600 x 600	596	596	95	573	573		White			312203	
LP2S 324x24W T16	600 x 600	596	596	95	573	573		White			312323	
LP2S 321x28W T16	200 x 1200	196	1196	95	148	1187		White			312233	
LP2S 321x54W T16	200 x 1200	196	1196	95	148	1187		White			312373	
LP2S 322x28W T16	300 x 1200	296	1196	95	273	1173		White			312243	
LP2S 322x54W T16	300 x 1200	296	1196	95	273	1173		White			312383	
LP2S 323x28W T16	600 x 1200	596	1196	95	573	1173		White			312253	
LP2S 323x54W T16	600 x 1200	596	1196	95	573	1173		White			312393	
LP2S 324x28W T16	600 x 1200	596	1196	95	573	1173		White			312263	
LP2S 324x54W T16	600 x 1200	596	1196	95	573	1173		White			312403	
LP2S 324x36W TC-L	600 x 600	596	596	95	573	626		White	312492		312493	
LP2S 324x55W TC-L	600 x 600	596	596	95	573	626		White			312553	

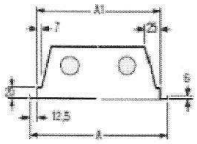
Note: The preceding luminaires are also available in **TITAN** colour with **10%** extra charge on the price list.

Dimensions

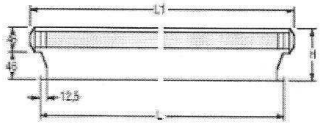
T26 & T16
L 321



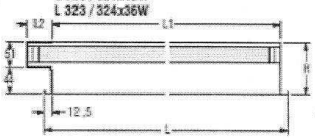
T26 & T16
L 322 - L 323 - L 324



L 323x18W
L 324x18W



L 321x18 / 36W
L 322x18 / 36W
L 323 / 324x18W
L 323 / 324x36W



T16



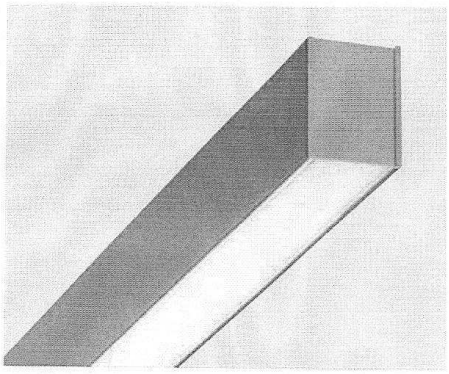
„Branko Božović" Hem 1.09.

„Oktoih" Hem. 1.09.

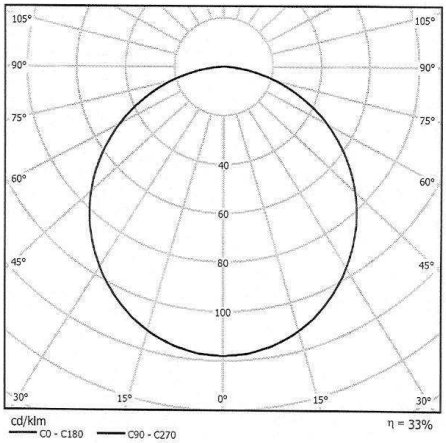
„Vuko Jovović" 1.10.

Operator
Telephone
Fax
e-Mail

PETRIDIS 90149_ SLOTLIGHT 2x35W T16 / Luminaire Data Sheet



Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 47 79 96 100 33

SLOTLIGHT 2x35W T16
Technical Description
Luminaire for fluorescent lamps T16, surface mounted or suspended.
Maximum profile length: 6m.
Housing in aluminium profile electrostatic painted white,titan (or other colour selected by RAL) or anodised.
Removable plastic heads white or titan to create a continuous channel by selecting the desired length.
TETRIS lamp delivery system in continuous channels for uniform illumination across the length of the luminaire.
Flow recuperator in white aluminium.
Diffuser in opal PMMA.

Luminous emittance 1:

Glare Evaluation According to UGR

ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room Size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	18.7	20.0	18.9	20.2	20.4	18.7	20.0	19.0	20.3	20.5
	3H	20.4	21.6	20.7	21.9	22.1	20.5	21.7	20.8	21.9	22.2
	4H	21.0	22.2	21.4	22.4	22.7	21.1	22.3	21.5	22.5	22.8
	6H	21.5	22.5	21.8	22.8	23.1	21.6	22.6	22.0	23.0	23.3
	8H	21.6	22.6	22.0	22.9	23.2	21.7	22.8	22.1	23.1	23.4
	12H	21.7	22.6	22.0	23.0	23.3	21.8	22.8	22.2	23.1	23.5
4H	2H	19.2	20.4	19.6	20.6	20.9	19.3	20.4	19.6	20.7	21.0
	3H	21.2	22.2	21.6	22.5	22.8	21.3	22.2	21.7	22.6	22.9
	4H	22.0	22.8	22.4	23.2	23.5	22.1	22.9	22.5	23.3	23.6
	6H	22.5	23.3	23.0	23.7	24.1	22.7	23.4	23.1	23.8	24.2
	8H	22.7	23.4	23.2	23.8	24.2	22.9	23.6	23.3	24.0	24.4
	12H	22.8	23.4	23.3	23.9	24.3	23.0	23.7	23.5	24.1	24.5
8H	4H	22.3	23.0	22.7	23.4	23.8	22.4	23.1	22.8	23.4	23.9
	6H	23.0	23.5	23.4	24.0	24.4	23.1	23.7	23.6	24.1	24.6
	8H	23.2	23.7	23.7	24.2	24.6	23.4	23.9	23.9	24.3	24.8
	12H	23.4	23.8	23.9	24.3	24.8	23.6	24.0	24.1	24.5	25.0
12H	4H	22.3	22.9	22.8	23.3	23.8	22.4	23.0	22.8	23.4	23.9
	6H	23.0	23.5	23.5	24.0	24.5	23.2	23.7	23.7	24.1	24.6
	8H	23.3	23.8	23.8	24.2	24.7	23.5	23.9	24.0	24.4	24.9

Variation of the observer position for the luminaire distances S

S = 1.0H	+0.1 / -0.1	+0.1 / -0.1
S = 1.5H	+0.2 / -0.4	+0.2 / -0.4
S = 2.0H	+0.4 / -0.7	+0.4 / -0.7
Standard table	BK06	BK06
Correction Summand	-4.2	-4.1

Corrected Glare Indices referring to 6600lm Total Luminous Flux

„ Branko Božović " Hem 1.10

DIALux

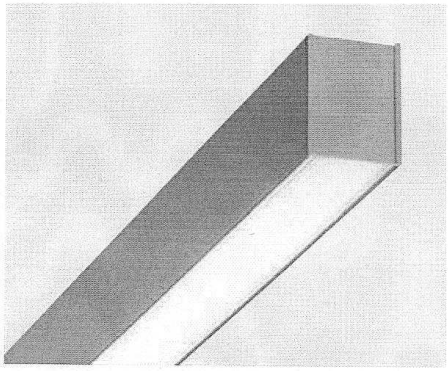
19.03.2015

„ Oktoih " Hem 1.10.

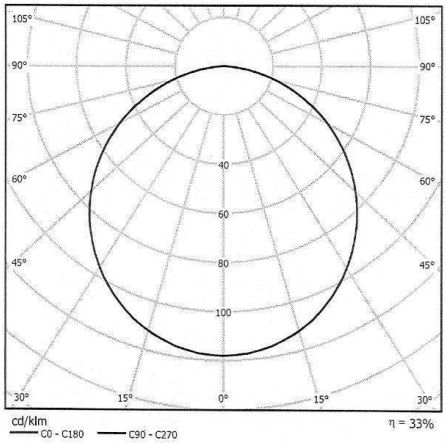
Operator
Telephone
Fax
e-Mail

„ Vuko Jovović " 1.11.

PETRIDIS 90145_ SLOTLIGHT 2x28W T16 / Luminaire Data Sheet



Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 47 79 96 100 33

SLOTLIGHT 2x28W T16
Technical Description
Luminaire for fluorescent lamps T16, surface mounted or suspended.
Maximum profile length: 6m.
Housing in aluminium profile electrostatic painted white,titan (or other colour selected by RAL) or anodised.
Removable plastic heads white or titan to create a continuous channel by selecting the desired length.
TETRIS lamp delivery system in continuous channels for uniform illumination across the length of the luminaire.
Flow recuperator in white aluminium.
Diffuser in opal PMMA.

Luminous emittance 1:

Glare Evaluation According to UGR

ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room Size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	18.6	19.9	18.9	20.2	20.4	18.7	20.0	19.0	20.2	20.5
	3H	20.4	21.6	20.7	21.8	22.1	20.5	21.7	20.8	21.9	22.2
	4H	21.0	22.1	21.3	22.4	22.7	21.1	22.2	21.4	22.5	22.8
	6H	21.4	22.5	21.8	22.8	23.1	21.6	22.6	21.9	22.9	23.2
	8H	21.6	22.6	21.9	22.9	23.2	21.7	22.7	22.1	23.0	23.4
	12H	21.6	22.6	22.0	22.9	23.3	21.8	22.8	22.2	23.1	23.4
4H	2H	19.2	20.3	19.5	20.6	20.9	19.3	20.4	19.6	20.7	21.0
	3H	21.2	22.1	21.5	22.5	22.8	21.2	22.2	21.6	22.5	22.9
	4H	21.9	22.8	22.3	23.1	23.5	22.0	22.9	22.4	23.3	23.6
	6H	22.5	23.3	22.9	23.6	24.0	22.6	23.4	23.1	23.8	24.2
	8H	22.7	23.4	23.1	23.8	24.2	22.9	23.5	23.3	23.9	24.4
	12H	22.8	23.4	23.2	23.8	24.3	23.0	23.6	23.5	24.0	24.5
8H	4H	22.2	22.9	22.7	23.3	23.7	22.3	23.0	22.8	23.4	23.8
	6H	22.9	23.5	23.4	23.9	24.4	23.1	23.6	23.5	24.1	24.5
	8H	23.2	23.7	23.7	24.1	24.6	23.4	23.9	23.9	24.3	24.8
	12H	23.4	23.8	23.9	24.3	24.8	23.6	24.0	24.1	24.5	25.0
12H	4H	22.3	22.9	22.7	23.3	23.7	22.4	23.0	22.8	23.4	23.8
	6H	23.0	23.5	23.5	24.0	24.4	23.1	23.6	23.6	24.1	24.6
	8H	23.3	23.7	23.8	24.2	24.7	23.5	23.9	24.0	24.4	24.9

Variation of the observer position for the luminaire distances S

S = 1.0H	+0.1 / -0.1	+0.1 / -0.1
S = 1.5H	+0.2 / -0.4	+0.2 / -0.4
S = 2.0H	+0.4 / -0.7	+0.4 / -0.7
Standard table	BK06	BK06
Correction Summand	-3.4	-3.3

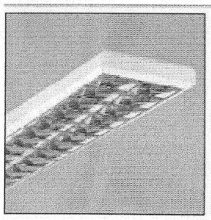
Corrected Glare Indices referring to 52000lm Total Luminous Flux

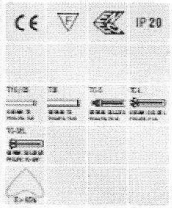
„Branka Božović" 1.11.
„Oktoih" 1.11.

SURFACE MOUNTED & PENDANT - PROFESSIONAL | **SURFACE or PENDANT**

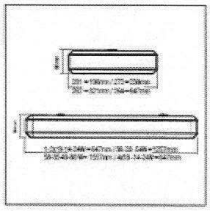
PRISMA

PRISMA P2M





- Screen 2M with parabolic transverse louvers and double parabolic longitudinal components (reflectors) from anodized non iridescent specular aluminium. 2M louvres have illuminance <200cd/m² for radial angles >65° at the luminaires PRISMA 261 & 262 , while at the luminaires PRISMA 272 they have illuminance <1000cd/m² for radial angles >65°.
- At the luminaires PRISMA 272, the screens do not have longitudinal central elements V.



Description	Dimensions	Conventional Ballast and capacitor Code	Electronic Ballast Code
P2M 261x18W T26	196x 647x 85	221012	221013
P2M 261x36W T26	196x1257x85	221112	221113
P2M 261x58W T26	196x1557x85	221152	221153
P2M 262x18W T26	321x 647x85	241022	241023
P2M 262x36W T26	321x1257x85	241122	241123
P2M 262x58W T26	321x1557x85	241162	241163
P2M 264x18W T26	647x 647x 85	241042	241043
P2M 272x18W T26	238x 647x 85	231022	231023
P2M 272x36W T26	238x1257x85	231122	231123
P2M 272x58W T26	238x1557x85	231162	231163
P2M 261x13/14W T16	196x 647x 85		221173
P2M 261x20/24W T16	196x 647x 85		221273
P2M 261x25/28W T16	196x1257x85		221233
P2M 261x50/54W T16	196x1257x85		221353
P2M 261x32/35W T16	196x1557x85		221253
P2M 261x45/49W T16	196x1557x85		221333
P2M 261x73/80W T16	196x1557x85		221393
P2M 262x13/14W T16	321x 647x85		241183
P2M 262x20/24W T16	321x 647x85		241283
P2M 262x25/28W T16	321x1257x85		241243
P2M 262x50/54W T16	321x1257x85		241363
P2M 262x32/35W T16	321x1557x85		241263
P2M 262x45/49W T16	321x1557x85		241343
P2M 262x73/80W T16	321x1557x85		241403
P2M 264x13/14W T16	647x 647x 85		241203
P2M 264x20/24W T16	647x 647x 85		241303
P2M 272x13/14W T16	238x 647x 85		231183
P2M 272x20/24W T16	238x 647x 85		231283
P2M 272x25/28W T16	238x1257x85		231243
P2M 272x50/54W T16	238x1257x85		231363
P2M 272x32/35W T16	238x1557x85		231263
P2M 272x45/49W T16	238x1557x85		231343
P2M 262x11W TC-S/ TC-SEL	321x321x85	241782	
P2M 262x18W TC-L	321x321x85	241422	241423
P2M 262x36W TC-L	321x518x85	241462	241463

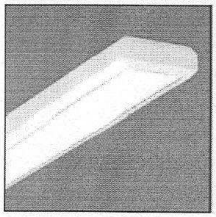
Number of the luminaire's lamps: the third digit of the first number (at the description) corresponds to the number of lamps eg 261x18W = 1x18W.

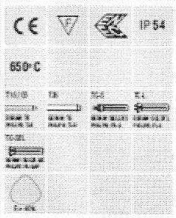
„Branko Božović" Hem 1.12.
„Oktoih" Hem 1.12.
„Vuko

SURFACE MOUNTED & PENDANT - PROFESSIONAL | SURFACE or PENDANT

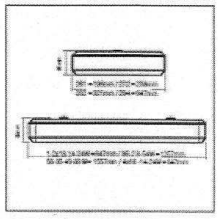
PRISMA

PRISMA PSPO IP54





- Flat diffuser from opal methacrylate.
- Frame made of white painted steel, with sealing gasket and steel springs for adjusting the cover to the body of the luminaire.



Description	Dimensions	Conventional Ballast and capacitor Code	Electronic Ballast Code
PSPO 261x18W T26 IP54	196x 647x 85	595012	595013
PSPO 261x36W T26 IP54	196x1257x85	595112	595113
PSPO 261x58W T26 IP54	196x1557x85	595152	595153
PSPO 262x18W T26 IP54	321x 647x85	595022	595023
PSPO 262x36W T26 IP54	321x1257x85	595122	595123
PSPO 262x58W T26 IP54	321x1557x85	595162	595163
PSPO 264x18W T26 IP54	647x 647x 85	595042	595043
PSPO 272x18W T26 IP54	238x 647x 85	594022	594023
PSPO 272x36W T26 IP54	238x1257x85	594122	594123
PSPO 272x58W T26 IP54	238x1557x85	594162	594163
PSPO 261x13/14W T16 IP54	196x 647x 85		595173
PSPO 261x20/24W T16 IP54	196x 647x 85		595273
PSPO 261x25/28W T16 IP54	196x1257x85		595233
PSPO 261x50/54W T16 IP54	196x1257x85		595353
PSPO 261x32/35W T16 IP54	196x1557x85		595253
PSPO 261x45/49W T16 IP54	196x1557x85		595333
PSPO 261x73/80W T16 IP54	196x1557x85		595393
PSPO 262x13/14W T16 IP54	321x 647x85		595183
PSPO 262x20/24W T16 IP54	321x 647x85		595283
PSPO 262x25/28W T16 IP54	321x1257x85		595243
PSPO 262x50/54W T16 IP54	321x1257x85		595363
PSPO 262x32/35W T16 IP54	321x1557x85		595263
PSPO 262x45/49W T16 IP54	321x1557x85		595343
PSPO 262x73/80W T16 IP54	321x1557x85		595403
PSPO 264x13/14W T16 IP54	647x 647x 85		595203
PSPO 264x20/24W T16 IP54	647x 647x 85		595303
PSPO 272x13/14W T16 IP54	238x 647x 85		594183
PSPO 272x20/24W T16 IP54	238x 647x 85		594283
PSPO 272x25/28W T16 IP54	238x1257x85		594243
PSPO 272x50/54W T16 IP54	238x1257x85		594363
PSPO 272x32/35W T16 IP54	238x1557x85		594263
PSPO 272x45/49W T16 IP54	238x1557x85		594343
PSPO 262x11W TC-S / TC-SEL IP54	321x321x85	595782	
PSPO 262x18W TC-L IP54	321x321x85	595422	595423
PSPO 262x36W TC-L IP54	321x518x85	595462	595463

Number of the luminaire's lamps: the third digit of the first number (at the description) corresponds to the number of lamps eg 261x18W = 1x18W.

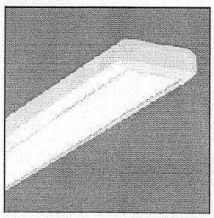
Vuko Jovović Hem 1.12.

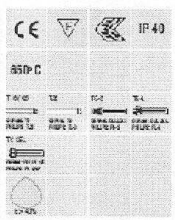
ЈП ПУ ЦИЈА

„Branko Božović" Item 1.13.
„Oktoih" Item 1.13.
Oktoih Item 1.13.

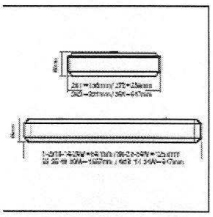
PRISMA

PRISMA PSPO





- Flat diffuser from opal methacrylate.
- Frame made of white painted steel, with steel springs for adjusting the cover to the body of the luminaire.



Description	Dimensions	Conventional Ballast and capacitor Code	Electronic Ballast Code
PSPO 261x18W T26	196x 647x 85	220012	220013
PSPO 261x36W T26	196x1257x85	220112	220113
PSPO 261x58W T26	196x1557x85	220152	220153
PSPO 262x18W T26	321x 647x85	240022	240023
PSPO 262x36W T26	321x1257x85	240122	240123
PSPO 262x58W T26	321x1557x85	240162	240163
PSPO 264x18W T26	647x 647x 85	240042	240043
PSPO 272x18W T26	236x 647x 85	230022	230023
PSPO 272x36W T26	236x1257x85	230122	230123
PSPO 272x58W T26	236x1557x85	230162	230163
PSPO 261x13/14W T16	196x 647x 85		220173
PSPO 261x20/24W T16	196x 647x 85		220273
PSPO 261x25/28W T16	196x1257x85		220283
PSPO 261x50/54W T16	196x1257x85		220353
PSPO 261x32/35W T16	196x1557x85		220253
PSPO 261x45/49W T16	196x1557x85		220353
PSPO 261x73/80W T16	196x1557x85		220393
PSPO 262x13/14W T16	321x 647x85		240183
PSPO 262x20/24W T16	321x 647x85		240283
PSPO 262x25/28W T16	321x1257x85		240243
PSPO 262x50/54W T16	321x1257x85		240363
PSPO 262x32/35W T16	321x1557x85		240263
PSPO 262x45/49W T16	321x1557x85		240343
PSPO 262x73/80W T16	321x1557x85		240403
PSPO 264x13/14W T16	647x 647x 85		240203
PSPO 264x20/24W T16	647x 647x 85		240303
PSPO 272x13/14W T16	236x 647x 85		230183
PSPO 272x20/24W T16	236x 647x 85		230283
PSPO 272x25/28W T16	236x1257x85		230243
PSPO 272x50/54W T16	236x1257x85		230363
PSPO 272x32/35W T16	236x1557x85		230263
PSPO 272x45/49W T16	236x1557x85		230343
PSPO 262x1 W TC-S / TC-SEL	321x321x85	240782	
PSPO 262x18W TC-L	321x321x85	240422	240423
PSPO 262x36W TC-L	321x518x85	240462	240463

Number of the luminaire's lamps: the third digit of the first number (at the description) corresponds to the number of lamps eg 261x18W = 1x18W.

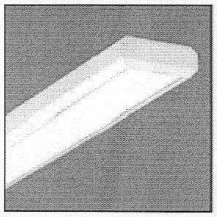
ОДАЈА

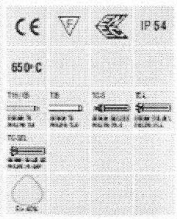
„Branko Božović" Hem: 1.14.
„ostalo" 1.14.

SURFACE MOUNTED & PENDANT - PROFESSIONAL | **SURFACE or PENDANT**

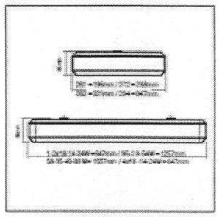
PRISMA

PRISMA PSPO IP54





- Flat diffuser from opal methacrylate.
- Frame made of white painted steel, with sealing gasket and steel springs for adjusting the cover to the body of the luminaire.



Description	Dimensions	Conventional Ballast and capacitor Code	Electronic Ballast Code
PSPO 261x18W T26 IP54	196x 647x 85	595012	595013
PSPO 261x36W T26 IP54	196x1257x85	595112	595113
PSPO 261x58W T26 IP54	196x1557x85	595152	595153
PSPO 262x18W T26 IP54	321x 647x85	595022	595023
PSPO 262x36W T26 IP54	321x1257x85	595122	595123
PSPO 262x58W T26 IP54	321x1557x85	595162	595163
PSPO 264x18W T26 IP54	647x 647x 85	595042	595043
PSPO 272x18W T26 IP54	238x 647x 85	594022	594023
PSPO 272x36W T26 IP54	238x1257x85	594122	594123
PSPO 272x58W T26 IP54	238x1557x85	594162	594163
PSPO 261x13/14W T16 IP54	196x 647x 85		595173
PSPO 261x20/24W T16 IP54	196x 647x 85		595273
PSPO 261x25/28W T16 IP54	196x1257x85		595233
PSPO 261x50/54W T16 IP54	196x1257x85		595353
PSPO 261x32/35W T16 IP54	196x1557x85		595253
PSPO 261x45/49W T16 IP54	196x1557x85		595333
PSPO 261x73/80W T16 IP54	196x1557x85		595393
PSPO 262x13/14W T16 IP54	321x 647x85		595183
PSPO 262x20/24W T16 IP54	321x 647x85		595283
PSPO 262x25/28W T16 IP54	321x1257x85		595243
PSPO 262x50/54W T16 IP54	321x1257x85		595363
PSPO 262x32/35W T16 IP54	321x1557x85		595263
PSPO 262x45/49W T16 IP54	321x1557x85		595343
PSPO 262x73/80W T16 IP54	321x1557x85		595403
PSPO 264x13/14W T16 IP54	647x 647x 85		595203
PSPO 264x20/24W T16 IP54	647x 647x 85		595303
PSPO 272x13/14W T16 IP54	238x 647x 85		594183
PSPO 272x20/24W T16 IP54	238x 647x 85		594283
PSPO 272x25/28W T16 IP54	238x1257x85		594243
PSPO 272x50/54W T16 IP54	238x1257x85		594363
PSPO 272x32/35W T16 IP54	238x1557x85		594263
PSPO 272x45/49W T16 IP54	238x1557x85		594343
PSPO 262x11W TC-S / TC-SEL IP54	321x321x85	595782	
PSPO 262x18W TC-L IP54	321x321x85	595422	595423
PSPO 262x36W TC-L IP54	321x518x85	595462	595463

„Vuko Jovović" ← Hem 1.14.

Number of the luminaire's lamps: the third digit of the first number (at the description) corresponds to the number of lamps eg 261x18W = 1x18W.

Project 1

DIALux

25.08.2014

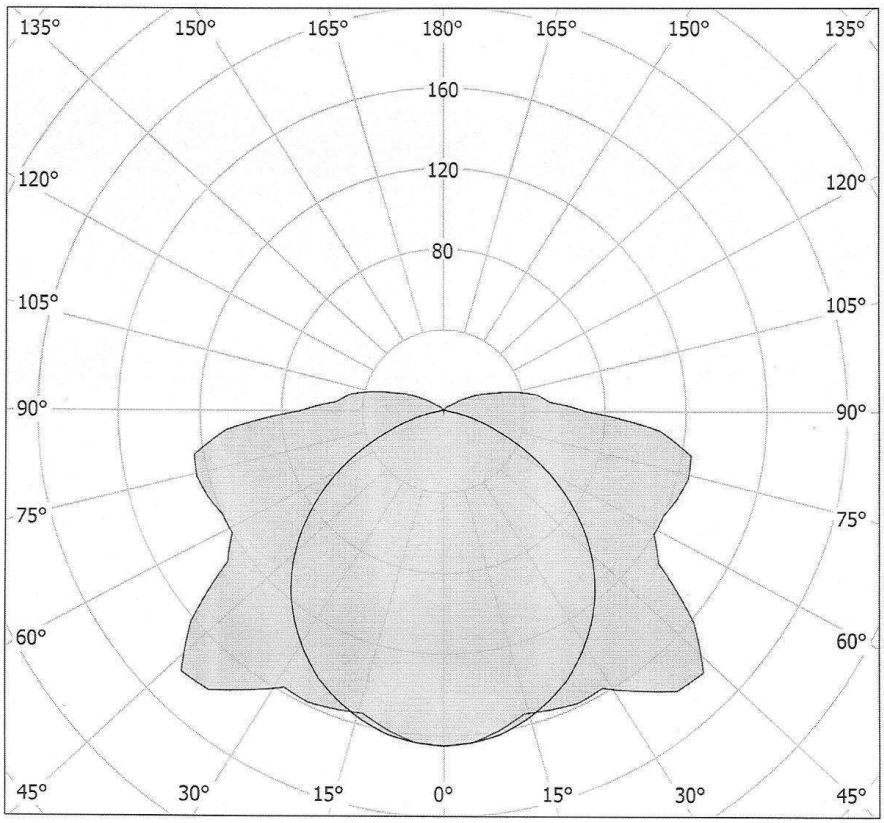
ΠΕΤΡΙΔΗΣ ΑΒΕΕ

ΑΔΡΙΑΝΟΥΠΟΛΕΩΣ 6, ΚΑΛΑΜΑΡΙΑ
ΘΕΣΣΑΛΟΝΙΚΗ

Operator ΜΙΣΣΑ ΒΑΣΙΛΙΚΗ
Telephone 2310 408700
Fax 2310 407016
e-Mail missa@petridis-lighting.gr

Petridis 511263 3FLinda 2x35W T16 / LDC (Polar)

Luminaire: Petridis 511263 3FLinda 2x35W T16
Lamps: 2 x T16 35W/840

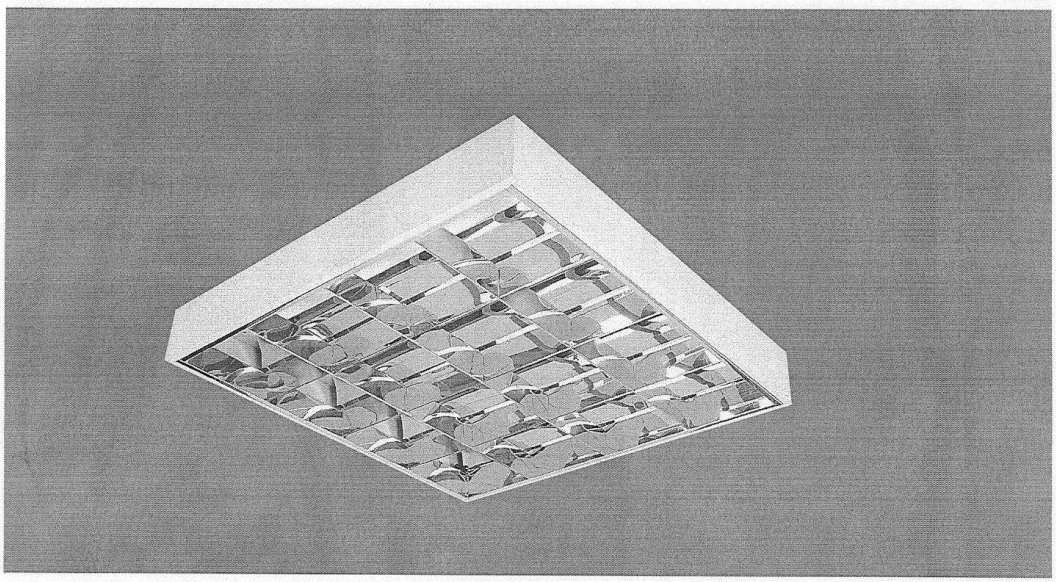


cd/klm

η = 73%

C0 - C180 C90 - C270

Borauko Brozović Hem 1.16. Ordolj Hem 1.16. Vuko Jovović Hem 1.17.



Technical Features

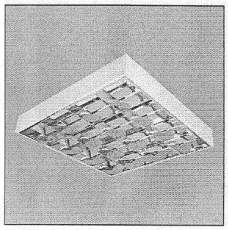
- Luminaires for fluorescent lamps T16, T26.
- Steel body, electrostatically painted in white colour.

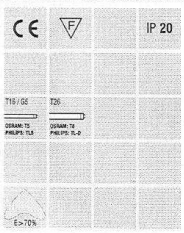
- Connection for operation on 230V-50/60Hz with conventional ballast and power factor correction capacitor (lamps T26).
- Connection for operation on 230V-50/60Hz with electronic ballast (lamps T26, T16).
- Connection for operation with electronic ballast dimmable (lamps T26, T16).
- Connection for emergency lighting system (lamps T26, T16).

Upon request:
- Body and accessories in various colours (RAL).

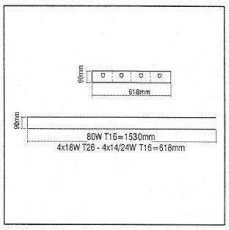
224

224 P3M





- Screen 3M with square cell section, with parabolic transverse louvers and double parabolic longitudinal components (reflectors), from anodized non iridescent specular aluminium.



Description	Conventional Ballast and capacitor Code	Electronic Ballast Code	
P3M 224x18W T26	273042		273043
P3M 224x14W T16			273203
P3M 224x24W T16			273303
P3M 224x80W T16			273423

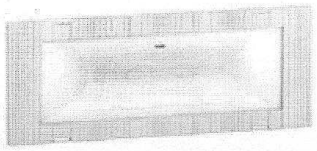
Number of the luminaire's lamps: the third digit of the first number (at the description) corresponds to the number of lamps eg 224x18W = 4x18W.

Branko Božović
Item 1.17. and 1.18. and 1.19.
Ostali Item 1.17, 1.18 and 1.19.

Product data sheet
Characteristics

OVA38357
Exiway Easyled - LED - Standard version - 1 h - 240 lm - non maintained - IP42

Vuko Đonović 1.18., 1.19. ~~1.20~~



Main

Range of product	Exiway
Aesthetic name	Exiway Easyled
Product or component type	Emergency light fitting
Device presentation	Standard version
Supply	Non-maintained
Wiring device additional information	Supply with pictogram stickers Can be inhibited with rest mode via Teleur range of remote controls
Number of batteries	1 x 4.8 V 1.6 AH Ni-Cd
Light source	LED integral LED 4 x 1 W

Complementary

Wiring device mounting	Ceiling False ceiling Flush Wall Recessed
Type of glass	Serigraphed transparent glass
[Ue] rated operational voltage	230 V 50 Hz
Power consumption	3.9 VA
Power consumption	1 W
Autonomy	1 h
Charging time	12 h
Luminous flux	240 lm
Height	116 mm
Width	292 mm
Depth	37 mm
Product weight	0.57 kg

Environment

Fire resistance	850 °C
Product certifications	Aenor ENEC
Standards	EN 1838 IEC EN 60598-2-22 ISO 3864 EN/IEC 60598-1 EN 62471
Electrical insulation class	Class II
Ambient air temperature for operation	5...30 °C
IK degree of protection	IK07
IP degree of protection	IP42

Offer Sustainability

Sustainable offer status	Not Green Premium product
RoHS	Compliant - since 1231 - Schneider Electric declaration of conformity
Product environmental profile	Available Download Product Environmental
Product end of life instructions	Available Download End Of Life Manual

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein.
This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications.
It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof.
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ИЛИЈА 1

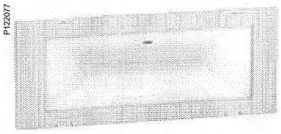
Contractual warranty

Period	18 months

Schneider Electric

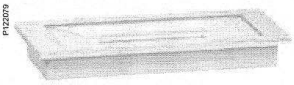
Emergency light fittings

Exiway Easyled



Technical specifications

- Available for maintained and non-maintained operation: the maintained product can be used in non-maintained mode. The selection is made on the connector
- Installation: quick fixing plate-body
- Compliant with IEC EN 60598-2-22 standard
- ENEC certification (Italy and RoW- Reset of the World)
- AENOR certification (Spain)
- NF (France)
- Standard version:
  - can be inhibited with rest mode via Teleur range of remote controls
  - cat. no. OVA39121: can be inhibited via a switch (Italy)
- Self-diagnosis version (SATI): can be inhibited with rest mode via TBS range of remote controls (France)
- Protection rating: IP42, 65 / IK07
- Insulation class: II
- Installation even on flammable surfaces
- Fire behaviour (IEC 60695-2-10), incandescent wire: 850°C
- Case of self-extinguishing polycarbonate 94V-2 (UL 94)
- Light source: long-lasting LED light source (Over 10 years of expected service life (no relamping))
- Power supply: 220/230 V, 50 Hz
- Complete recharge:
  - in 12 h for model with 1 and 2 h autonomy
  - in 24 h for model with 3, 5 and 6 h autonomy.



Product catalogue numbers

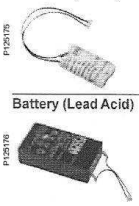
Exiway Easyled	Protection rating IP	Autonomy (h)	Average flux (lm) in		Consumption N.M/M		Battery			Control	Cat. no.	
			emergency condition	maintained mode	(VA)	(W)	Type	(V)	(Ah)		IP 42	IP65
Standard	**Non-maintained**											
	IP42,65 / IK07	1	45	-	2.4	1.6	Ni-Cd	3.6	0.8	Teleur	**OVA38350**	
			70	-	2.4	1.6	Ni-Cd	3.6	0.8	Teleur	**OVA38351**	**OVA38359**
			120	-	2.5	1.6	Ni-Cd	4.8	0.8	Teleur	**OVA38352**	**OVA38360**
			170	-	2.5	1.6	Ni-Cd	4.8	0.8	Teleur	**OVA38355**	**OVA38362**
			240	-	3.9	1.0	Ni-Cd	4.8	1.6	Teleur	**OVA38357**	**OVA38364**
			300	-	3.9	1.0	Ni-Cd	4.8	1.6	Teleur	**OVA38358**	
		2	140	-	3.9	1.0	Ni-Cd	4.8	1.6	Teleur	**OVA38354**	**OVA38361**
		3	120	-	3.9	1.0	Ni-Cd	4.8	1.6	Teleur	**OVA38353**	
		6	120	-	2.4	0.9	Lead Acid	6	3.8	Switch	**OVA39121**	
	Maintained											
		1	170	170	3.8/5.9	0.8/2.6	Ni-Cd	3.6	1.6	Teleur	**OVA38356**	**OVA38363**
SATI	**Non-maintained**											
	IP42,65 / IK07	1	45	-	3.5	0.6	Ni-Cd	2.4	0.8	TBS50/100	**OVA58000***	**OVA58001***
		5	8	-	3.5	0.6	Ni-Cd	2.4	0.8	TBS50/100	**OVA58015**	**OVA58016**



Note: The maintained product can be used in Non-maintained mode. The selection is made on the connector.
(*): Cat. no. OVA58000 is provided with the 3 pictogram stickers (mandatory to be sticked on)

Spare parts catalogue numbers

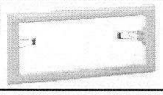
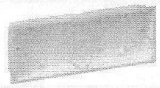
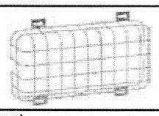
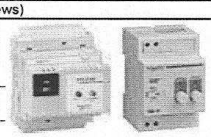
	Description	Compatibility	Cat. no.
Batteries (Ni-Cd)	2.4 V, 0.8 Ah	OVA58000, OVA58015	**OVA51014**
	3.6 V, 0.8 Ah	OVA38350, OVA38351	**OVA51105**
	3.6 V, 1.6 Ah	OVA38356	**OVA51108**
	4.8 V, 0.8 Ah	OVA38352, OVA38355	**OVA51106**
	4.8 V, 1.6 Ah	OVA38353, OVA38354, OVA38357, OVA38358	**OVA51107**
Battery (Lead Acid)	6.0 V, 3.8 Ah	OVA39121	**OVA51109**



OIZIJA

Schneider Electric

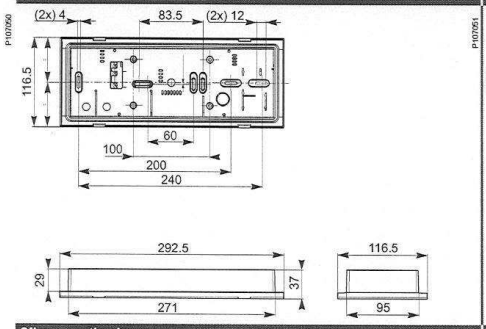
Accessories catalogue numbers

		Compatibility	Dimensions (mm) height x width x depth	Cat. no.
Pictogram stickers ISO (1 set of 3) Left/Right/Down Visibility: 20 m		All	278 x 100	**OVA53129**
False ceiling kit* White		All	342 x 157 x 39.5	**OVA53120**
Flush mounting box White **without screew**		All	292.5 x 116.5 x 39	**OVA53119**
Flush mounting box White **provided with screew**		All	292.5 x 116.5 x 39	**OVA53130**
Protective grid		All	191 x 347 x 93	**OVA53098**
Screws and fixing (3 sets of 4 screws)		All	–	**OVA53131**
Teleur remote control		All models (for 100 luminaires)	102 x 77 x 81 4.5 mod. of 18 mm	**OVA50325E**
		All models (for 500 luminaires)	90 x 71 x 60 4 mod. of 18 mm	**OVA50326E**
TBS50		For french products OVA58000, OVA58015	81 x 66 x 54 3 mod. of 18 mm	**15855**
TBS100		For french products OVA58000, OVA58015	81 x 66 x 54 3 mod. of 18 mm	**15856**

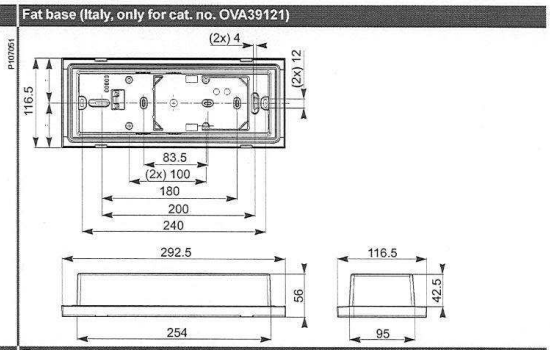
(*) Use this accessory only on sturdy material, like wood, metal or plaster plates (no glass wool plates).

Mounting dimensions

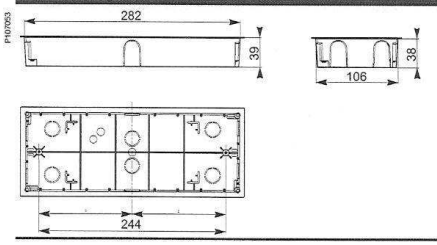
Slim base



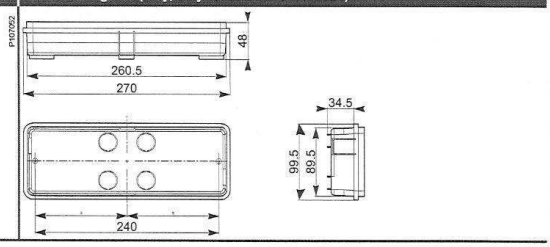
Fat base (Italy, only for cat. no. OVA39121)



Slim mounting box



Fat mounting box (Italy, only for cat. no. OVA39121)



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As standards, specification and designs change from time to time, please ask for confirmation of the information given in this publication

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Photos: Patrick Avavian

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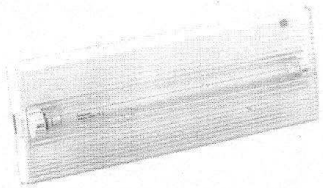
Branko Božović Hem 1.20.

Oktobar Hem 1.20.

Vuko Jovović Hem 1.20.

Rilux
IP 40 standard

Protivpanična rasveta



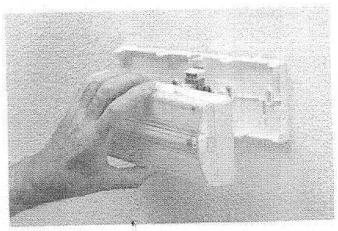
Rilux

Tehnička specifikacija

- Upotrebljiv za operacije u privremenom ili trajnom spoju
- Instalacija: brzo montiranje na plafone i zidove
- U skladu sa IEC EN 60598-2-22 standardom
- Mogućnost "odmor" režima rada preko Teleur daljinske kontrole
- Nivo zaštite: IP 40
- Klasa II
- Radna temperatura: 0...40 °C
- Ponašanje u slučaju vatre (IEC 695-2-1/CEI 50-11), užaren provodnik: 850 °C
- Svetlosni izvor: fluorescentna lampa
- Napajanje: 230V, 50 Hz
- Potpuno punjenje za 24 sata

Opis proizvoda

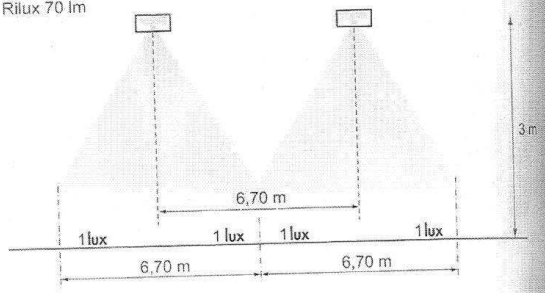
Svetiljka (W)	Autonomija (h)	Prosečan fluks (lm) panični uslovi	Prosečan fluks (lm) normalni uslovi	Potrošnja (VA)	Baterija	Grlo svetiljke	Težina (kg)	Referenca
Standardna, privremeni spoj								
6	1	70	-	2.3	2.4 V 1.5 Ah Ni-Cd	G5	0.550	OVA37066E
8	1	90	-	2.3	2.4 V 1.5 Ah Ni-Cd	G5	0.630	OVA37067E
	3	90	-	3.2	6.0 V 1.5 Ah Ni-Cd	G5	0.800	OVA37068E
11	1	180	-	2.9	4.8 V 1.5 Ah Ni-Cd	2G7	0.750	OVA37069E
18	1	250	-	3.2	7.2 V 1.5 Ah Ni-Cd	2G11	0.850	OVA37070E
Standardna, trajni spoj								
8	1	75	90	8.2	6.0 V 0.6 Ah Ni-Cd	G5	0.650	OVA37071E
	3	75	90	8.2	6.0 V 1.5 Ah Ni-Cd	G5	0.800	OVA37072E



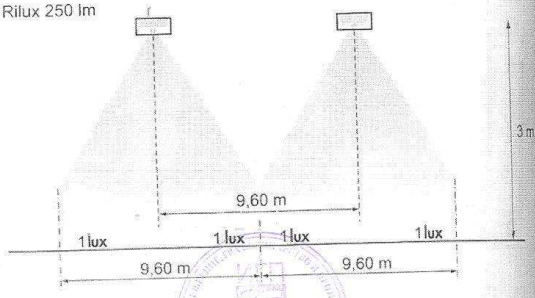
Brzo montiranje

Način instalacije

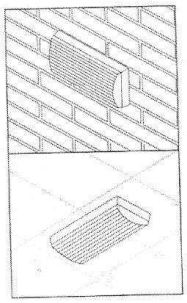
Rilux 70 lm



Rilux 250 lm



Modeli instalacije



Zid
(instalacija bez dodatne opreme)

Plafon
(instalacija bez dodatne opreme)

CIANA

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Import - Export BO 011503
Casella Postale n. 6
Società con unico socio

Dichiarazione di conformità CE

(CE DECLARATION OF CONFORMITY)

La / Messrs: **OVA G. Bargellini S.p.A – Via Govoni 17 – 40066 Pieve di Cento (BO)**

Dichiara sotto la propria responsabilità che il prodotto:
Declares on its own responsability that the product: **RILUX 8/3 NC GSE**
(**Descrizione** / Description)

Codice / Code: **OVA37068E**

al quale questa dichiarazione si riferisce è conforme alle seguenti norme / altri documenti normativi / specifiche:
that concerns this declaration is in conformity with the following norms / documents / specifications:

EN 60598-1 / EN 60598-2-22 / EN 55015 / EN 61547 / EN 61000-3-2

(Titolo e/o numero della norma e/o di altri documenti normativi / specifiche)
(Title and/or number of norms and/or of other documents / specifications)

Report prova n° / Test report n°: **Emilab n° 421**
(**Report di prova - D.A.T. - N.T.R.**
Test report - D.A.T. - N.T.R.)

e quindi rispondenti ai requisiti essenziali delle direttive:
and, therefore, it meets the essential requirements of the specifications: **89/336/CEE, 73/23/CEE, 93/68/CEE**

Pieve di Cento - 07 Dicembre 06
(**Luogo e data** / Place and date)

(**Firma** / Signature)

06
(**Ultime due cifre dell'anno della marcatura**)
(The last two figures of the year of the marking)

Sandro Cavicchi
(**Nome e Cognome** / Name and Surname)

DIREZIONE QUALITA'- Quality Manager
(Funzione / Title)

Revisione - Review: **00**

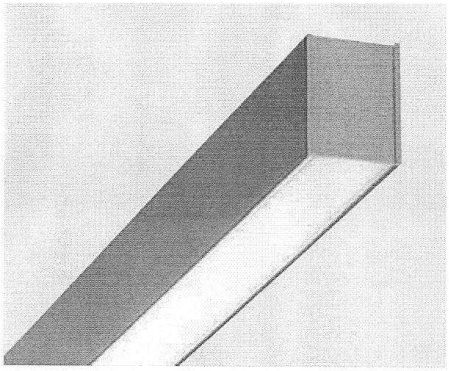
M038SGQ Rev. 1-06.07

OVA G. BARGELLINI S.p.A.

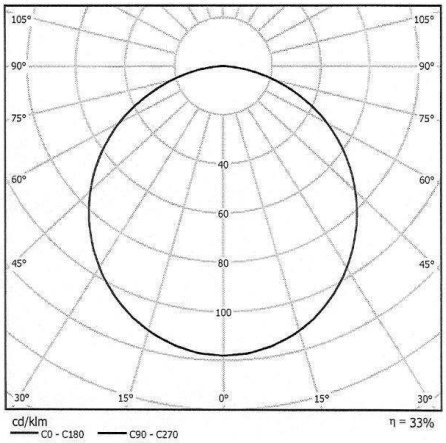
„Vuko Jovanić" Hetej 17.

Operator
Telephone
Fax
e-Mail

PETRIDIS 90149_ SLOTLIGHT 2x35W T16 / Luminaire Data Sheet



Luminous emittance 1:



Luminaire classification according to CIE: 100
CIE flux code: 47 79 96 100 33

SLOTLIGHT 2x35W T16
Technical Description
Luminaire for fluorescent lamps T16, surface mounted or suspended.
Maximum profile length: 6m.
Housing in aluminium profile electrostatic painted white,titan (or other colour selected by RAL) or anodised.
Removable plastic heads white or titan to create a continuous channel by selecting the desired length.
TETRIS lamp delivery system in continuous channels for uniform illumination across the length of the luminaire.
Flow recuperator in white aluminium.
Diffuser in opal PMMA.

Luminous emittance 1:

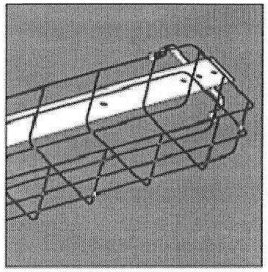
Glare Evaluation According to UGR

ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room Size X	Y	Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	18.7	20.0	18.9	20.2	20.4	18.7	20.0	19.0	20.3	20.5
	3H	20.4	21.6	20.7	21.9	22.1	20.5	21.7	20.8	21.9	22.2
	4H	21.0	22.2	21.4	22.4	22.7	21.1	22.3	21.5	22.5	22.8
	6H	21.5	22.5	21.8	22.8	23.1	21.6	22.6	22.0	23.0	23.3
	8H	21.6	22.6	22.0	22.9	23.2	21.7	22.8	22.1	23.1	23.4
	12H	21.7	22.6	22.0	23.0	23.3	21.8	22.8	22.2	23.1	23.5
4H	2H	19.2	20.4	19.6	20.6	20.9	19.3	20.4	19.6	20.7	21.0
	3H	21.2	22.2	21.6	22.5	22.8	21.3	22.2	21.7	22.6	22.9
	4H	22.0	22.8	22.4	23.2	23.5	22.1	22.9	22.5	23.3	23.6
	6H	22.5	23.3	23.0	23.7	24.1	22.7	23.4	23.1	23.8	24.2
	8H	22.7	23.4	23.2	23.8	24.2	22.9	23.6	23.3	24.0	24.4
	12H	22.8	23.4	23.3	23.9	24.3	23.0	23.7	23.5	24.1	24.5
8H	4H	22.3	23.0	22.7	23.4	23.8	22.4	23.1	22.8	23.4	23.9
	6H	23.0	23.5	23.4	24.0	24.4	23.1	23.7	23.6	24.1	24.6
	8H	23.2	23.7	23.7	24.2	24.6	23.4	23.9	23.9	24.3	24.8
	12H	23.4	23.8	23.9	24.3	24.8	23.6	24.0	24.1	24.5	25.0
12H	4H	22.3	22.9	22.8	23.3	23.8	22.4	23.0	22.8	23.4	23.9
	6H	23.0	23.5	23.5	24.0	24.5	23.2	23.7	23.7	24.1	24.6
	8H	23.3	23.8	23.8	24.2	24.7	23.5	23.9	24.0	24.4	24.9

Variation of the observer position for the luminaire distances S		
S = 1.0H	+0.1 / -0.1	+0.1 / -0.1
S = 1.5H	+0.2 / -0.4	+0.2 / -0.4
S = 2.0H	+0.4 / -0.7	+0.4 / -0.7
Standard table	BK06	BK06
Correction Summand	-4.2	-4.1

Corrected Glare Indices referring to 6600lm Total Luminous Flux

ACCESSORY FOR SURFACE MOUNTED LUMINAIRES



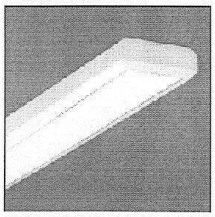
- Wire-guard for applications in dry environments, againts shocks coming from anuy directions, in galvanized steel rod ∅5mm.

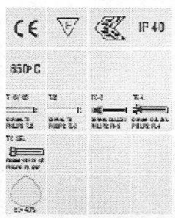
Code	Description		Dimensions
201302	**12 AZ**	(for lum. 36W T26, 28/54W T16)	180 x 1320 x 130
201301	**12 BX**	(for lum. 36W T26, 28/54W T16)	280 x 1330 x 130
201303	**12 IA**	(for lum. 58W T26, 35/49/80W T16)	180 x 1630 x 130
201304	**12 LB**	(for lum. 58W T26, 35/49/80W T16)	280 x 1630 x 130

ΕΛΑΤΑ

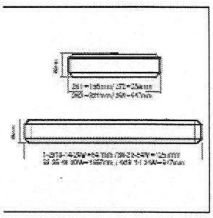
PRISMA

PRISMA PSPO





- Flat diffuser from opal methacrylate.
- Frame made of white painted steel, with steel springs for adjusting the cover to the body of the luminaire.



Description	Dimensions	Conventional Ballast and capacitor Code	Electronic ballast Code
PSPO 261x18W T26	196x 647x 85	220012	220013
PSPO 261x36W T26	196x1257x85	220112	220113
PSPO 261x58W T26	196x1557x85	220152	220153
PSPO 262x18W T26	321x 647x85	240022	240023
PSPO 262x36W T26	321x1257x85	240122	240123
PSPO 262x58W T26	321x1557x85	240162	240163
PSPO 264x18W T26	647x 647x 85	240042	240043
PSPO 272x18W T26	236x 647x 85	230022	230023
PSPO 272x36W T26	236x1257x85	230122	230123
PSPO 272x58W T26	236x1557x85	230162	230163
PSPO 261x13/14W T16	196x 647x 85		220173
PSPO 261x20/24W T16	196x 647x 85		220273
PSPO 261x25/28W T16	196x1257x85		220283
PSPO 261x50/54W T16	196x1257x85		220353
PSPO 261x32/35W T16	196x1557x85		220253
PSPO 261x45/49W T16	196x1557x85		220353
PSPO 261x73/80W T16	196x1557x85		220393
PSPO 262x13/14W T16	321x 647x85		240183
PSPO 262x20/24W T16	321x 647x85		240263
PSPO 262x25/28W T16	321x1257x85		240243
PSPO 262x50/54W T16	321x1257x85		240363
PSPO 262x32/35W T16	321x1557x85		240263
PSPO 262x45/49W T16	321x1557x85		240343
PSPO 262x73/80W T16	321x1557x85		240403
PSPO 264x13/14W T16	647x 647x 85		240303
PSPO 264x20/24W T16	647x 647x 85		240303
PSPO 272x13/14W T16	236x 647x 85		230183
PSPO 272x20/24W T16	236x 647x 85		230263
PSPO 272x25/28W T16	236x1257x85		230243
PSPO 272x50/54W T16	236x1257x85		230363
PSPO 272x32/35W T16	236x1557x85		230263
PSPO 272x45/49W T16	236x1557x85		230343
PSPO 262x1 1W TC-S / TC-SEL	321x321x35	240782	
PSPO 262x13W TC-L	321x321x35	240422	240423
PSPO 262x36W TC-L	321x518x35	240462	240463

Number of the luminaire's lamps: the third digit of the first number (at the description) corresponds to the number of lamps eg 261x18W = 1x18W.

Annex 6 – Extended tender guarantee

ATLASBANKA

Bid Security No 2079/14-3

ATLAS BANKA AD PODGORICA
Vaka Đurovića bb
81000 Podgorica
telefon: +382 20 407 209
fax: +382 20 665 451
e-mail: office@atlasbanka.com
web site: www.atlasbanka.com
S.W.I.F.T.: ATLMMEP2
Žiro račun: 907-50501-34

Guarantor: Atlas Banka AD Podgorica,
Street Vaka Djurovica bb, Podgorica

To Employer:
Ministry of Economy, Directorate for Energy Efficiency
Rimski Trg 46
81000 Podgorica
Montenegro

Phone: +382 (20) 482 238
Fax: +382 (20) 234 081
E-mail: sandra.sipcic@ee-me.org
Attention: Mrs. Sandra Sipcic

We, the undersigned **Atlas Banka AD Podgorica** (Guarantor), in order to enable **IGP Fidija DOO Podgorica** to bid for **execution Energy Efficiency Program in Public Buildings (EEPPB) in Montenegro, BMZ Nr. 202080554, Educational buildings of Cluster IV**, for energy efficent reconstruction and modernization of three (3) educational buildings listed below, which are under jurisdiction of Ministry of Education: Educational Building 1 - Primary School "Branko Božović", Podgorica, Educational Building 2 - Primary School "Oktoih", Podgorica, Educational Building 3 - Primary School "Vuko Jovović", Danilovgrad, that cover civil-construction works, thermal-technical services, electrical services, sanitary (water supply and sewage) services and shall include, but not be limited to the following: dismantling of existing equipment and its temporary site storage (disposal), procurement of materials and equipment, packing transporting and storage to the site, insurance of the Works, installation of the equipment, commissioning, trial operation and obligations during defect notification period (for equipment for which applicable) and preparation of as-build design, hereby irrevocably and independently guarantee to pay to you an amount up to a total of **40.000,00 € (forty thousand euro)** waiving all objections and defenses.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws his Bid during the period of Bid validity specified by the Bidder in the Bid Form, or

2. If the Bidder, having been notified of the acceptance of its Bid by the Employer during the period of Bid validity:

   (a) fails or refuses to sign the Form of Contract Agreement when required, or

   (b) fails or refuses to issue the performance security in accordance with the Bid documents,

WE shall effect payments under this guarantee on your first written demand, without the Employer having to substantiate his demand, provided that in his demand, the Employer will note that the amount claimed by him is due, owing to the occurrence of one or both of the two above-named CONDITIONS, and specifying the occurred condition or conditions.

This guarantee will remain in full force from **April 3rd 2015** up to and including **April 30th 2015** *(the date 30 days after the period of Bid validity).*

By this date we must have received any claims for payment by letter or encoded telecommunication. It is understood that you will return this guarantee to us on expiry or after payment of the total amount to be claimed hereunder.

This guarantee is governed by the laws of Republic of Montenegro.

Podgorica,11.03.2015.

Guarantor

C1. Minutes of the pre-bid meeting

EEPPB:Tender for Cluster III and IV
Minutes of the Pre-Bid meeting

Country:	**Montenegro**
Employer:	**Ministry of Economy**
Project Name:	**Energy Efficiency Program in Public Buildings**
Closing Date:	**01/09/2014**
Ref. No.:	**BMZ Nr. 202080554**
Funding Source:	**German Financial Cooperation Funds via KfW-Development Bank**
Date:	**Thursday, 10/07/2014.**
Place:	**Ministry of Economy, Podgorica, Montenegro**

Present:

Ministry of Economy:
Dragica Sekulić
Sandra Šipčić
Toma Siništaj

Program Consultant:
Udo Becker
Viktor Marković
NebojšaŽižić
Igor Strugar
Slobodan Marković

Bidders:
JV Bitemo MNG Podgorica
JV Roaming Nikšić
JV Fidija, Podgorica
JV Kroling, Podgorica,
JV Normal, Podgorica

Recipients: present at the meeting

Item	Subject	Responsible/ Remarks
1.	**Brief presentation of the project**	D. Sekulić
	The Bidders have been briefly informed about the tender documents, bidding procedures and the deadline.	
	The requests for clarification of the tender documents shall be submitted to the Client before 08/08/2014, answers will be provided by 15/08/2014.	
2.	**Questions of the Bidders - General**	
	Question 1: When will be the start of the works?	Bitermo
	Answer 1: The time schedule shall be prepared with the starting date of 1st April 2015, both for cluster III and IV.	

	Q2: Please clarify the meaning of "handing over",clause 1.1.3/A1-Instructions to Bidders?	Bitermo
	A 2:A1 Instructions to Bidders/1.1.3*: If the necessity is given, parts of the above works, might be handed over separately, on a school for school bases...* –meaning that if the works on one school are finished before the deadline or before finishing of the works on other schools from the same cluster, the handing over of the works can be organized separately.	
	Q 3: Is it possible to visit one of the schools which is reconstructed within the same project?	Bitermo
	A 3: The visit to the school "Njegos" Spuz will be organized for all interested Bidders after the pre-bid meeting.	
	Q 4: In the BoQ it was mentioned that the colours shall be chosen by the Client, please clarify.	Bitermo
	A 4: Colours of the finishing layer for external walls and of the painting for internal walls and visible pipes will be chosen from the standard catalogue of colours, provided by the Contractor at the site, before the start of the certain phase of works.	
	Q 5: In the BoQ some works are described as a percentage (for example 20% of the roof tiles to be replaced etc.). Who will define exact amount of the works to be done and how?	Bitermo
	A 5: When certain works are foreseen to be done partially, the Employer´s Representative will determine exact quantity and location of works at the site.	
	Q 6: If in the school "Vuko Jovović" in Danilovgrad, it is foreseen to reconstruct electrical installation (power), why the reconstruction of telecommunication installation, fire detection, public address and other similar systems is not included?	Bitermo
	A 6: Funds from this program are supposed to be used only for application of EE measures, besides that certain part of the funds can be used for comfort measures. In some schools it was necessary to perform certain works such as reconstruction of the roof construction, replacement of electrical installations and similar issues, in order to enable the application of EE measures. There are not sufficient funds available to finance any other sort of works.	
	Q 7: Are reports on periodical testing of electrical installations available for all schools? Has the quality of the existing grounding conductors been checked prior preparation of the designs?	Bitermo
	A 7: The reports on testing of electrical installations in all buildings of Clusters III and IV will be submitted to the Contractor at the kick-off meeting.	
	Q 8: Drawings for sewage and water installations are missing for the schools "Vuko Jovović" Danilovgard and "Branko Božović" Podgorica.	Bitermo
	A8: Please refer to the Technical descriptions of works A4/ pg A4-18 and A 4-52: *Since the exact position of sewerage installation is not known, nor it's condition in the walls and beneath the floors and the As-built. Design does not exist, drawings of the new sewerage installation have not been prepared. The contractor shall*	

	provide the routes and drawings of new sewerage installation, after revealing existing installation in walls and floors of the sanitary facilities planned for reconstruction. Before the commencement of the works, the Contractor will submit the necessary drawings to the Employer / Employer's Representative for approval. The Estimated Bill of Quantities was prepared on the basis of previous experience and similar scope of reconstruction works of sanitary rooms in other schools within this project.	
	Q 9: Is it possible to receive drawings in dwg format?	Roaming
	A 9: All drawings in dwg form attached to this document in Annex 2.	
	Q 10: Who is responsible for the removal of the furniture in the school before commencement of the works?	Bitermo
	A 10: School authorities will have to remove all furniture and the school equipment.	
	Q 11: Are the tender documents available in native form?	Fidija
	A 11: Only BoQ and forms; forms are enclosed in Annex 3 of this document. The BoQ in native form was provided with the tender documents.	
	Q 12: The native form of BoQ which is enclosed to the tender documents is protected**.**	Normal
	A 12: Only text and quantities are protected.	
	Q 13: Since all works which are offered have to be described in the *Conformity of the site* in details, is the Bidder allowed to change the description in the Bill of quantities?	Kroling
	A 13: The offered price shall be based on the BoQ provided in the section A5 Price schedule. The descriptions from the BoQ must not be changed. As a part of the technical offer, the Bidder has to provide in the section "Conformity of the Site"a detailed description of the equipment and components, with its technical characteristics and a detailed description on how the Bidder intends to organize the execution of the works on the site. Please see A1 Instructions to Bidders/3/3.2/3.2.1.1/15/Pg A1-12 as well.	

Annex 1 – attendance lists
Annex 2- drawings in dwg form (CD)
Annex 3- forms A 1-1 to A1-8

Annex 1

Country:	Montenegro
Employer:	Ministry of Economy
Project Name:	Energy Efficiency Program in Public Buildings, Cluster III
Invitation for bids announced:	13/06/2014
Submission of the bids:	01/09/2014 until 12:00
Ref. No.:	BMZ Nr. 202080554
Funding Source:	German Financial Cooperation Funds via KfW-Development Bank

MNE EEPPB Tender for Cluster III and IV, Pre – bid meeting

Attendance List

No.	Company	Name of the representative	Signature	Telephone number
1	BITERMO MNG Podgorica	SILVANA VOVK		00386 41 259 714
2	BITERMO MNG	ALEKSIĆ MIRKO		067/604-341
3	BITERMO MNG	VALTER FURHANIĆ		067 263 869
4	BITERMO MNG	PETER FILIPIČ		00386 51 623 760
5	BITERMO MNG	ANDREJ FILIPIČ		00386 41 687 450
6	KROLING	ĐORĐO IRIĆ		067/549-567
7	JV „FIDIJA" DOO – „BOMBETON" DOO	MRKELA GORAN		069 192 414
8	JV IGP „FIDIJA" DOO – „BOMBETON" DO	BOJKLA TADIĆ		067-236-135
9	NORMAL COMPANY PODGORICA	PETAR JOVANOVIĆ		067-207-897
10	ROAMING MONTENEGRO doo	ILIJA NIKOLIĆ		069 688 338
11	ROAMING MONTENEGRO doo	AYIJAH JAHIĆ		068 840 701
12	ROAMING MONTENEGRO doo	Katarina Bjelović		069 353 292

13	Rosatom Montenegro doo	Dalibor Milović		069 353 290
14	SIEMENSYS DOO	SLOBODAN MARKOVIĆ		067 215 922
15	SIENERSYS d.o.o.	STRUGAR IGOR		067 223 233
16	„KOPRING PMC"	VIKTOR MARKOVIĆ		
17	FICHTNER GmbH & Co. KG	UDO BECKER		
18	MINISTARSTVO EKONOMIJE	DRAGICA SEKULIĆ		020 482 274
19	MINISTARSTVO EKONOMIJE	TOMA SINIŠTAJ		067 9044 555
20	MINISTARSTVO EKONOMIJE	SAŠKA ŠIPČIĆ		020 482 288
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

C2. List of the bidders questions with answers – Cluster IV

List of the bidders questions with answers- Cluster IV

Country: **Montenegro**
Employer: **Ministry of Economy**
Project Name: **Energy Efficiency Program in Public Buildings**
Tender : **Tender for energy efficiency reconstruction and modernisation of the buildings of Cluster IV**
Closing Date: **01/09/2014**
Ref. No.: **BMZ Nr. 202080554**
Funding Source: **German Financial Cooperation Funds via KfW-Development Bank**

CLUSTER IV – Vol. 02

Item	Subject	Responsible/ Remarks
Q1	Do engineers licenses need to be translated by certified court translators?	
A1	It is not required to submit licences translated by the certified court translator. Please see A1 Instructions to Bidders/3.Preparation of Bids /3.1.Laguage of Bid: *The Bid and all documents and correspondence relating to the Bid shall be in the ENGLISH language. Any printed literature, documents or certificates furnished by the Bidder may be written in another language as long as such literature is accompanied by an **accurate translation** of its pertinent passages in the language of the Bid, in which case, for purposes of interpretation of the Bid, the translation shall govern.*	
Q2	Do four inner envelopes (original and 4 copies) should contain wording: Do not open before (required date)?	
A2	The Inner envelopes shall indicate the name and address of the Bidder and shall be marked as Technical or Financial envelope. It is not required to mark the inner envelopes with "DO NOT OPEN BEFORE [BID OPENING DATE]. Please see A1Instructions to Bidders/4.Submission of Bids/4.1Sealing and marking of Bids/4.1.1: *...Each outer envelope shall contain the Cover letter and two inner envelopes clearly marked:* • *Technical Envelope* • *Commercial Envelope...* and A1Instructions to Bidders/4.Submission of Bids/4.1Sealing and marking of Bids/4.1.3 *The inner envelopes shall also indicate the name and address of the Bidder ...*	
Q3	Does cover letter need to be packed in one envelope (technical and commercial) or separately without packing, just in outer envelope?	
A3	The cover letter has to be packed in the outer envelope. Please see A1Instructions to Bidders/4.Submission of Bids /4.1Sealing and marking of Bids/4.1.1: *...Each outer envelope shall contain the Cover letter and two inner envelopes clearly marked:*	

	• *Technical Envelope* • *Commercial Envelope...*	
Q4	Could you tell us what would be approximate date of commencement of works for each school within Cluster IV?	
A4	The time table should be prepared with the starting date of the 1st April 2015. The duration of the works shall be 5 months. The bidder has to propose in the time schedule starting of the works for each school within the cluster.	
Q5	Regarding provision of Consortium Agreement, do you mean Consortium Agreement submitted within Prequalification tender, and if so, can we submit copy, or are we required to submit original?	
A5	The Bidder is allowed to submit the original or certified copy of the Consortia/ JV agreement, which confirm that there are no changes comparing to the documents submitted in the PQ.	
Q6	Are we required to submit new power of attorney for Bid signatory, or can we submit one we submitted in prequalification tender?	
A6	The Bidder has to submit new Power of attorney indicating the name of the person authorized to sign the bid for each cluster.	
Q7	Are we required to put numbers on each page submitted with the bid? Can we put facsimile of the authorized person instead of his/her signature?	
A7	Please see A1 Instructions to Bidders/3.Preparation of Bids /3.7.Format and signing of Bid/3.7.2: *...All pages of the Bid, except for un-amended printed literature, shall be initialed and numbered by the person or persons signing the Bid.* The Bidder is allowed use the facsimle of the person authorised to sign the Bid.	
Q8	Is it sufficient to put a stamp of the Consortium Leader only on the authorization for presence at Bid opening or is each Consortium member required to put a respective stamp on this authorization?	
A8	All documents related to this tender shall be signed by the person authorized to sign the bid and stamped by the JV/Consortia leader.	
Q9	Within the form A1-8 could you specify the wording “Name of the Contract” and “Loan/Credit No”?	
A9	Name of the Contract: Energy Efficiency Programme in Public Buildings, Tender for educational buildings of Cluster IV Loan: German Financial Cooperation Funds via KfW- Development bank KfW No: BMZ Nr 202080554	
Q10	Are bidders required to submit forms A1-9 (Form of Advance Payment Guarantee); A1-10 (Performance Security) and A1-11 (Form of Contract) or they shall be submitted at the later stage by selected Contractor only?	
A10	Bidders are not required to submit forms A1-9, A1-10 and A1-11 with the Bid.	
Q11	May we use facsimile to stamp the documentation?	
A11	It is allowed to use the facsimile of the person authorized to sign the bid.	

Q12	Would it be satisfactory if we enclose the copy of Consortium agreement?	
A12	Please see answer A 5.	

D. Particular conditions of contract

A3

Particular Conditions of Contract – Cluster IV

Issue and Revision Record

No.	Date	Originator	Checker	Description
A	24/04/2014	U. Becker	P. Stojcic	-

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General

The Conditions of Contract comprise the “General Conditions”, which form part of the “Conditions of Contract for EPC/Turnkey Project” First Edition 1999 published by the FédérationInternationale des Ingénieurs-Conseils (FIDIC), and the following “Particular Conditions”, which include amendments and additions to such General Conditions.

Where reference is made to any Clause or Sub-Clause, this shall mean, unless specifically stated otherwise, a Clause or Sub-Clause in the General Conditions of Contract, but with the amendments or additions given in these Particular Conditions.

In case of any difference between the General Conditions of Contract and the Particular Conditions, the Particular Conditions shall govern.

Sub-Clause 1.1 – Definitions

Add to Clause 1.1:

1.1.3.3 **"Time for Completion"** shall be
5 months for the cluster of three educational buildings

1.1.3.7 **"Defects Notification Period"** shall be 12 months starting after issue of the taking over certificate

1.1.3.10 “**Operation License**” means a document issued by the competent authority of Montenegro after receipt of the Technical Assurance Committee Protocol.

1.1.4.4 **Foreign currency** means “Euro”

1.1.6.2 **Country** refers to the country of Montenegro.

1.1.6.9 The “**Inspection for construction works**” is an authority in charge of inspection during construction works

1.1.6.10 "Turnkey Basis or Functional Specification" means the entire coverage of all Works for design, manufacture, testing, transport, construction, installation, commissioning, trial operation, etc. of all mechanical and electrical equipment and civil part of the buildings under the Contract and will include all such items of the buildings and equipment or Works whether mentioned in the Bidding Documents or not which are required to make the building operationally complete to fulfill the contracted scope of work, performance and purpose of the works.

Sub-Clause 1.3 – Communications

Add to Sub-Clause 1.3:

Details of communication during project implementation e.g. addresses, system of electronic communication are stated in the Bidding documents.

Sub-Clause 1.4 – Law and Language

Amend Sub-Clause 1.4 – Law and Language as follows:

a) The law which applies to the Contract is the law in force in Montenegro.
b) The language of the Contract is the English language. All correspondence, documentation, Operation and Maintenance Manuals etc. shall be in the English language, except the “As-built Design” and “Operation and maintenance manuals and similar documents” that shall be submitted additionally in the Montenegrin language. Furthermore labels for spare parts as well as labels, nameplates, instruction and warning plates necessary for the identification and safe operation of the plant, and all inscriptions shall be in the language of the Country.
c) All documents necessary to obtain permits from the local authorities shall be additionally provided in the language of the Country.

Sub-Clause 1.5 – Priority of Documents

Delete the entire Sub-Clause 1.5 and replace by:

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purpose of interpretation, the priority of the documents shall be in accordance with the stipulations of the Contract Agreement.

Sub-Clause 1.6 – Contract Agreement

The first sentence shall be replaced by:

The Contract shall come into full force, which will be considered as contract effective date, after the following conditions have been fulfilled:

1. No objection issued by the KfWEntwicklungsbank to the agreed and initialed Contract Agreement
2. Signing of the Contract Agreement
3. The Contractor has submitted to the Employer the Performance Security and the Advance Payment Guarantee
4. The Employer has paid the Contractor the advance payment.
5. The Employer has returned the Bid Security to the Contractor.

Sub-Clause 1.13 – Compliance with laws

Add as new item c):

The Contractor shall comply with the local laws and regulations of the Country.

The most important laws/regulations from Montenegro are:

- Law on spatial development and construction of structures (»Official Gazette of the Republic of Montenegro«, No 51/2008) with Amendments (»Official Gazette of the Republic of Montenegro«, No 34/11)
- The Rule book on the Content and Manner of Preparing Technical Documentation (»Official Gazette of the Republic of Montenegro«,
  No 22/2002)
- The Rule book on the Content and Manner of Preparing Civil Engineering Record, Civil Engineering Book and Control Book (»Official Gazette of the Republic of Montenegro«, No 54/2001)
- The Rule book on the Content and Manner of Execution of Technical Control for Main Projects (»Official Gazette of the Republic of Montenegro«, No 54/2001)
- The Rule book on the Content and Manner of Execution of Supervision during construction works (»Official Gazette of the Republic of Montenegro«, No 54/2001)
- The Rulebook on Conditions and Manner of verification and annulment of verification of the licenses for foreign citizens (»Official Gazette of the Republic of Montenegro«, No 68/2008)
- Law on protection at work (»Official Gazette of the Republic of Montenegro«, No 79/2004), with Amendments

- Law on Inspection Control (»Official Gazette of the Republic of Montenegro«, No 39/2003), with Amendments

Add as new item d):
The Contractor shall prepare a Report on Safety on Site, in particular with respect to safety during construction work of the pupils and teaching staff, in line with the regulations of the Country, and submit it to the Employer for approval.

Insert at the end of sub-clause 1.13:

The Contractor shall also obtain all consents including permits-to-work and approvals required for the Works. All required documents/information to obtain these permits must be provided by the Employer. The Contractor has to inform himself in advance, which documents are necessary to obtain the permits.

Sub-Clause 3.1 – The Employer's Representative

The Employer's Representative is:

FICHTNER GmbH & Co. KG
JovanaTomasevica 9/2 - 11
81000 Podgorica
Montenegro

The Employer appointed the Employer's Representative for full assistance, to continuously inform the Employer related to the Project and to act with his consent in particular for design, documentation approval, inspection and supervision of equipment manufacturing, testing, supervision of erection and construction works, etc. for the Delivery and Works during the Contract implementation.

Furthermore, the Employer's Representative requires the consent of the Employer before exercising the following duties:

- issuance of orders which might cause modification of the Contract.
- releasing the Contractor of any responsibility with respect to the Contract.

Sub-Clause 4.1 – Contractor's General Obligations

The first paragraph shall be replaced by:
"The Contractor shall execute and perform the works in accordance with the Contract and the Design prepared by the Employer, and

shall remedy any defects in the Works. When completed, the works shall be fit for the purposes for which the works are intended as defined in the contract…"

In the second paragraph:
"design" should be excluded

Sub-Clause 4.19 – Electricity, Water and Gas

The following should be added:
Supplies on site will be responsibility of the Contractor.
Supplies on the Site are: Electricity and Water

a) Electricity: 400/230 V 3 phase 4 wire 50 Hz
b) Water: From water network.

Contractor should take into account those costs during preparation of the Bid.

Sub-Clause 4.2 – Performance Security

The second paragraph shall be replaced by:

The amount of the Performance Security shall be ten (10) percent of the Contract Price stated in the Contract Agreement, and shall be expressed in the currencies and proportions in which the Contract Price is payable.

The Contractor shall deliver the Performance Security, in the form of a bank guarantee, to the Employer within 14 days after all parties have initialed the Contract Agreement, but prior to commencement date. The Performance Security shall be issued from a reputable first class international bank (acceptable to the Employer and KfW in the form annexed to the Bid documents or in another form approved by the Employer and shall be valid at least until issue of the Performance Certificate.

The successful Bidder shall provide information about the intended bank for the performance security during contract negotiations for approval.

Sub-Clause 4.21 – Progress Reports

Further details are stated in Part A5 "Project Descriptions and Procedures".

Change title of Sub-Clause 4.21 into:
Progress Reports and Progress Meetings

Add as sub-point (i):

detailed cash flow estimate, of all payments to which the Contractor will be entitled under the Contract;

Add at the end of the Sub-Clause the following:

Coordination and design meetings
During execution of the Contract the Employer may call for coordination and design meetings, either at the Employer's head office, the office of the Employer's Representative, the site, or the office of the Contractor, as deemed necessary.

The object of these meetings is to coordinate the progress of work and its control, discuss approval procedures and technical details and to discuss all other matters pertinent to the Contract in order to achieve smooth and undisturbed progress of work as well as expeditious supply delivery. The Contractor's Representative as well as other responsible personnel and senior Representatives of each Sub-Contractor shall be present at this meeting.

Progress meetings on site
During construction on Site and tests of completion, daily or weekly and monthly progress meetings shall be conducted at the Site as directed by the Employer or the Employer's Representative. These meetings are to discuss and review in detail the up-to-date progress of Works at the Site.

In order to assist the Employer or the Employer's Representative in his review during the progress meeting of the work done, the Contractor shall provide; the Employer or the Employer's Representative with a detailed schedule of specific items of works that had been performed, with a comparison of the actual and planned schedule at least one (1) day in advance to each meeting.

If any work or part of work is delayed, the reasons for the delay shall be explained and the proposals how to expedite the delayed part of Works shall be submitted (see also Clause 8 [Commencement, Delays and Suspension])

At all such progress meetings, the Contractor shall provide at least one responsible authorized member of his organization, compulsory having adequate knowledge of the language for communications (defined in Sub-clause 1.4 [Law and Language]), to commit the Contractor to any agreement reached during said meetings.

Sub-Clause 4.4 – Subcontractors

Insert at the end of paragraph (a) the following:

No deviations from, or substitutions of the list of Subcontractors and suppliers submitted with the Bid shall be allowed without the written permission of the Employer.

Add to Sub-Clause 4.4 the following paragraphs:

The Employer will not recognize the existence of any subcontractor or supplier in any matter concerning the administration of the Contract. All correspondence from any subcontractor shall be submitted only through the Contractor. Correspondence by the subcontractor directly sent to the Employer and or Employer's Representative will not be acknowledged.

Subcontractors are subject to approval by the Employer.

Sub-Clause 5.1 – General Design Obligations

Delete in Sub-Clause 5.1 the last paragraph:

"However, the Employer shall be ..."

Sub-Clause 5.2 – Contractor's Documents

Further requirements for Documentation are laid down in Part A5 “Project Descriptions and Procedures” and general document procedure.

Add to the third paragraph of Sub-Clause 5.2:

The Contractor shall submit to the Employer for review all relevant documents in 3 copies. If the Employer instructs that further Contractors Documents are required, the Contractor shall prepare them promptly within a timeframe to be agreed

Insert at the end of the Sub-Clause 5.2 the following:

Should it be found at any time after approval has been given by the Employer to any documents submitted by the Contractor that the said documents do not comply with the terms and conditions of the Contract or that the details do not agree with any documents submitted previously, such alterations and additions as may be deemed necessary by the Employer shall be made therein by the Contractor and the work carried out accordingly without extra payment to the Contractor thereof.

The Contractor shall, from the start of Construction up to and including the issuance of Taking Over Certificate provide correct keeping of the site logbook, civil construction book, health & safety manual as well as inspection record book in compliance with the effective regulations in Montenegro.

The Contractor shall prepare and furnish for the Employer's approval, Safety Report (On site), prepared in compliance with the effective regulations in Montenegro.

Sub-Clause 5.4 – Technical Standards and Regulations

Add after the first paragraph:

All materials and equipment supplied and all work carried out shall comply with the specific standards stated in the General Technical Requirements and Particular Technical Requirements as well as the relevant local standards, regardless of the language used, with the issues valid at the date of Letter of Acceptance.

The Contractor shall observe the standards and technical regulations of the Country. International standards and regulations, as laid down in the General and Particular Technical Requirements, shall be only used if they are more stringent than the standards of the Country or no local standards are available. The Contractor is obliged to present a list of standards as well as a report proving that the standards intended to be used are more stringent than the standards of the Country.

If no specific standard is stated the technical codes of the International Organization for Standardization (ISO) shall be applied as well as the relevant local standards. For the electrical equipment the relevant IEC standard shall apply as well as the relevant local standards. Goods and special guarantees beyond the scope of ISO and IEC, and if no local standard is available, shall conform at least to the following standards and codes in the following priority:

1. EN,
2. DIN and VDE standards
3. BS,
4. ASTM,
5. Other internationally accepted standards which ensure a quality equal to or higher than the standards mentioned above, but only if these are submitted in the English language edition and accepted by the Employer.

It is the Contractor's responsibility to provide sufficient evidence that any other standard the Contractor proposes (other than those mentioned above) will ensure an equivalent or higher standard.

Insert at the end of Sub-Clause 5.4 the following:

The Contractor shall supply to the Employer free of charge two sets of all standards used in connection with the works of the contract latest 4 weeks after commencement date. The same set shall be kept at the Site Office of the Contractor and shall be accessible to the Employer/Employer's Representative's site personnel whenever required during the site work.

Sub-Clause 5.6 – As Built Documents

Replace the last phrase of the first chapter of sub-clause 5.6 by the following:

Three paper copies in Montenegrin and 2 CD's with copies in electronic form, both in English and Montenegrin language, shall be supplied to the Employer prior to the date of commencement of the Tests on Completion.

Sub-Clause 5.7 – Operation and Maintenance Manuals

Insert at the end of Sub-Clause 5.7 the following:

Operating and Maintenance Manuals shall be submitted in two copies.

Sub-Clause 5.8 – Design Error

Insert at the end of Sub-Clause 5.8 the following:

The Contractor shall promptly inform the Employer of any error, omission, fault and other defect in the design and other documents for the Works which are discovered when reviewing the Contract documents or in the process of execution of the Works.

Sub-Clause 6.1 – Engagement of Staff and Labor

Add the following paragraphs to Clause 6.1:

The Contractor may import any personnel who are necessary for the execution of the Works. The Contractor must ensure that these personnel are provided with the required residence visas and work permits. The Contractor shall be responsible for the return to the place where they were recruited or to the domicile of imported Contractor's Personnel. In the event of death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

Sub-Clause 6.5 – Working Hours

Delete this sub-clause.

Sub-Clause 6.8 – Contractor's Superintendence

Add the following paragraphs to Clause 6.8:

The Contractor shall assign the Project Manager, andthe Site Managers and the Site Engineers for each site with adequate professional licenses and any other provisions required by the applicable regulations in Montenegro. The Project Manager shall be an experienced engineer and shall be the general coordinator of all activities of the Project and shall be the responsible person for the overall Project execution. The assigned Project Manager shall especially attend the Contract negotiations and all following contractual relevant meetings, and shall be the contact person for all major and important project related issues for the Employer / Employer's representative.

The assigned Site Managers and Site Engineers shall be present on the Sites as of the Commencement Date.The assigned Site Managers and Site Engineers, shall be always present on the Sites during working hours as well as during ongoing construction works.

If the above presence is not fulfilled, the Employer reserves the right to:
- stop the works without any claims from the Contractor.
- deduct the payments to the Contractor respectively.

The Employer shall be entitled to require in writing the departure from the Site of any member of staff of the Contractor, who by his misconduct and negligence violates the discipline, or acts improperly in the living and working area. The Contractor shall dismiss and replace such person.

The Contractor shall at his own cost undertake timely all prescribed measures to secure correct execution of the erection works, equipment, installations, plant and devices for safety of the labor, persons passing-by, traffic and neighboring structures, as well as for environmental and working area protection.

Sub-Clause 7.1 - Manner of Execution

Insert at the end of Sub-Clause 7.1 the following:

The materials furnished and used shall be new.

Sub-Clause 7.3 – Inspection

Delete in the second paragraph (b) the following words: “to the extent specified in the Contract”.

Insert at the end of Sub-Clause 7.3 the following:

Employer’s personnel in charge of supervision of the works may access the Site without any restrictions.

Sub-Clause 8.1: Commencement of Works

Sub-Paragraph (a) shall be deleted.
Sub-Paragraph (b): the words "within 42 days after" shall be deleted and add “within fourteen days after”

Sub-Clause 8.3 – Program

Add after the second sentence of Sub-Clause 8.3 the following:

“The bar chart of this time program will be frozen as stipulated in the Bidding documents”.

The words “of each major stage of the works” of paragraph (a) of Sub- Clause 8.3 shall be replaced by “of each stage of design, procurement, testing, manufacture, delivery to site, customs clearance, construction, supervision, erection, commissioning and trial operation”.

Add at the end of Sub-Clause 8.3, last sentence the words:
"within two weeks from the date of such notice".

Add to the last paragraph:

The time program shall be a network type program identifying the critical path and early/late starts and finish dates for all activities. The program shall be supported by information of resources that will be dedicated to each activity to accomplish each within the duration programmed.

Sub-Clause 8.7 – Delay Damages

Add to Sub-Clause 8.7 the following:

In Sub-Clause 8.7, the sum referred to in the second sentence shall be 0.1% of the Contract Price , as delay damages in respect of the Works, payable (per day) in the proportions of currencies in which the Contract Price is payable.

The maximum amount of delay damages shall be ten percent (10%) of the Contract Price.

Sub-Clause 9.1 – Contractor's Obligation

Add at the end of Sub-Clause 9.1 the following:

Technical Acceptance

The technical acceptance will be performed in accordance with the Law on spatial development and construction of structures (»Official Gazette of the Republic of Montenegro«, No 51/2008) with Amendments (»Official Gazette of the Republic of Montenegro«, No 34/11)

The technical acceptance will be organized by the Employer not later than 21 days after receiving a notice form the Contractor that the contracted services are completed.

Sub-Clause 10.1 – Taking Over of the Works

Add at the end of the second paragraph:

“Precondition for applying for Taking Over is the receipt of the Operation License.”, this applies only if boiler is to be installed.

The last paragraph of sub-clause 10. 1 shall be deleted.

The above requirements must be considered in the time schedule of the Contractor.

Sub-Clause 10.2 Taking Over of Parts of the Works

Delete the entire Sub-Clause 10.2 and replace by:

Parts of the works might be taken over separately. Handing over of parts of the works is at the sole discretion of the Employer.

Sub-Clause 11.1 – Completion of Outstanding Works and Remedying Defects

Delete the following from the first sentence:

“or as soon as practicable thereafter”

Add as sub-clause 11.1 (c):

“ undertake all modifications, adjustments as necessary for fulfilling the Contract requirements, and replace all parts and equipment which shall be found defective.

Replace the last sentence of Sub-Clause 11.1 by the following:

“If any such defect appears or damage occurs, the Employer or the Employer’s Representative shall forthwith notify the Contractor thereof. The Notice of Defects shall be given in writing. The Contractor shall act accordingly within 7 days from receipt of the Notice.”

Sub-Clause 11.3 –Extension of Defects Notification Period

Add the following:

If, during the Defects Notification Period, it is deemed necessary to replace some element due to functional failure, the Defects Notification Period for this element starts from the replacement of this part

Sub-Clause 11.9 – Performance Certificate

Delete all paragraphs except the first and add the following:

One month prior to expiration of the Defects Notification Period, including extensions subject to sub-clause 11.3, Extension of Defects Notification Period, after elimination of all defects, the Contractor shall in writing require Final Taking Over (Performance Certificate) and submit Statement for Final Payment Certificate.

Immediately after the Contractor's request, a Committee shall be nominated by the Employer to perform the Final Taking-Over, consisting of Technical Acceptance, only where building permit is issued, for other building Client’s acceptance and Final Payment Calculation. The Committee shall be nominated and perform all activities as for the Taking-Over.

The Employer may deem necessary to perform all tests as for the Taking-Over. The scope and method of tests are defined in the

Technical Requirements and Test Program. Results of such tests shall meet the required values, provided that use of equipment is carried out in accordance with the Operation and Maintenance Manuals.

If the Works do not satisfy the guaranteed technical characteristics, Final Taking-Over shall be postponed, and adequate period shall be granted to the Contractor for repair, adjustments and for repeated tests.

If results of repeated tests do not satisfy the guaranteed technical characteristics, with prescribed tolerances, the Employer may be entitled to reject Taking-Over of Delivery and Works subject to sub-clause 11.4 (c).

If the results of repeated tests are not acceptable to MoE new tests shall be performed. For these tests, the Employer shall determine a qualified institution or institutions, not included in the previous tests. Costs of such tests shall be borne by the disagreeing Party.

If Final Taking-Over is not completed and the Performance Certificate is not issued within 28 days after expiring of the Defects Notification Period including extensions subject to sub-clause 11.3, Extension of Defects Notification Period, the Contractor is entitled to claim additional costs, these costs shall be borne by the Employer.

Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

Sub-Clause 13.8 – Adjustments for Changes in Cost

Delete entire Sub-Clause 13.8.

Sub-Clause 14.1 - The Contract Price

Add paragraph (c) to Sub-Clause 14.1:

(c) any quantities which may be set out in a Schedule or in the description of the scope of supply are minimum estimated quantities and are not to be taken as the actual and correct quantities of the Works which the Contractor is required to execute on a Turnkey Basis to fulfill the purpose of the Works

Sub-Clause 14.2 - Advance Payment

Amend Sub-Clause 14.2 paragraph (a) to read as follows:

The Employer will make an advance payment to the Contractor in an amount stated of fifteen (15) percent of the Contract Price stated in the Contract agreement.

Sub-Clause 14.4 – Schedule for payments

Sub-Clause 14.4 shall be deleted in its entirety and substituted by the following:

The Employer shall pay to the Contractor in the following manner the Contract Sum adjusted to give effect to such additions thereto and such deductions therefrom as are provided in these Conditions:

14.4.1 Schedule for Payments

Payment for supply and delivery of the works, erection and civil engineering works will be made by the direct disbursement procedure in accordance with KfW's Guidelines for the Disbursement of Funds of Financial Co-operation with Developing Countries and Comparable Programs.

The Employer will pay to the Contractor under the terms and condition of KfW's Guidelines for the Disbursement, as follows:

For Works and Erection

15% of the contracted value as an advance payment against presentation of the Advance Payment Guarantee and Performance Security.

75% of the contracted value will be paid in bi-monthly instalments (i.e. every 2nd month), based on the progress of the work**s**

10% of the contracted value shall be the amount of the retention money, which will be paid as described in 14.9

14.4.2 Other Conditions

No extra payment in respect of overtime, additional materials, special conditions and hardship or otherwise shall be claimed by the Contractor.

Minimum amount of application for payments

Application for payments are not acceptable if the net amount thereof after all retention's and deductions would be less than 2.5% of Contract value.

Application for Payment on Erection and Construction Works

A statement in respect of progress or completion of the Works on Site shall be given, certified by the Employer / Employer's Representative.

Disbursement Schedule
The Contractor shall submit, together with each invoice, a disbursement schedule showing: invoice number, type of invoice, invoicing date, invoiced amount, amount received, date received. An updated version shall be added to the Progress Reports.

The Contractor shall submit the current status of invoicing for each item of the supply & services, by extending the price sheets by the following (in electronic form): already invoiced amount, current invoice & invoiced amount, remaining amount to be invoiced. An electronic copy of the modified price sheets shall be submitted together with each invoice.

Sub-Clause 14.8 – Delayed Payment

Delete entire Sub-Clause 14.8.

Sub-Clause 14.9 - Payment of Retention Money

Delete the last sentence in the first paragraph: It the Taking-Over certificate is issued for a Section, the relevant percentage of the first half of the Retention Money shall be paid when the section passes all the test.

Replace the words "the first half of the Retention Money" in the first paragraph by "the first part".

Replace the words "the second half" in the second paragraph by "the second part".

Replace the words "of either half" in the third paragraph by "of either part".

Insert at the end of the Sub-Clause:

The Employer shall make payment of the second part of the Retention Money to the Contractor if he obtains a guarantee, in a form and provided by an entity approved by the Employer, in amounts and currencies equal to the payment.

The Contractor shall ensure that the guarantee is valid and enforceable until the Contractor has executed and completed the works and remedied any defects, as specified for the Performance Security in Sub-Clause 4.2, and shall be returned to the Contractor accordingly. This release of retention shall be in lieu of the release of the second part of the Retention Money under the second paragraph of Sub-Clause 14.9.

Add to Clause 14 – Contract Price and Payment the following Sub-Clauses:

Sub-Clause 14.16 – Taxation

Except as otherwise stated, the following provisions shall be applied for the taxation of supplies and services.
There will not be tax or custom duty exemption for any service, material or equipment used under this contract.

The payment made to the Contractor for the services rendered by the local personnel shall not be exempted from the income tax of the Country.

It is the responsibility of the Contractor to acquaint himself fully with the tax and excise laws of the Country prior to the commencement of the Contract.

The Contractor shall make himself familiar with the administrative procedures for obtaining import permits and licenses and shall assist and cooperate with the Employer when obtaining the necessary permits and licenses and shall make available all necessary and appropriate documents in due time.

Sub-Clause 14.17 - Repayment Clause

If payments due under this Contract for goods and services are to be made from the Funds, any reimbursement, guarantee or similar claimable payments and any insurance paymentshallbeeffectedto KfW,FrankfurtamMain, IBAN: DE53 5002 0400 3800 0000 00, BIC: KFWIDEFF, account no.38 000 000 00foraccountof MoE.

Such funds may be re-utilized for the execution of the Projects with KfW's consent.

Sub-Clause 17.2 – Contractor's Care of the Works

The following sub-paragraphs shall be added:

The Contractor has to check the faultlessness of all equipment after arriving on site for erection. Any defects, detected after arrival of the equipment on site or during erection, are to be reported to the Employer immediately after detection of such defects and is to be included in the next Progress Report.

From commencement of Works up to issuance of Taking Over, the Contractor shall at his own cost provide guardians for the equipment

and materials, secure protection against damage, weathering, removal or destruction. It shall be the Contractor's obligation to construct fences and shelters, lighting, guardian service and all relevant measures in fulfillment of his duties.
In addition to correct storage and keeping of equipment, materials and tools necessary for the Works, the Contractor shall inspect the quantity and quality of the goods, by keeping records on received and delivered equipment, accompanied by technical documentation.

Sub-Clause 18.1 – General Requirements for Insurance

Replace the sixth paragraph of Sub-Clause 18.1 "The relevant insuring party shall ... to the other party" by the following:

"Within 28 days (calculated from commencement date) the contractor shall submit to the Employer:"

Insert at the end of Sub-Clause 18.1 the following:

Effectiveness of all insurance policies shall be from the first working day after the commencement date until issuing of the Performance Certificate in respect of the Works or any section or part there of as the case may be.

The insurance shall cover an amount of minimum 110 % of the contract value of the goods.

Sub-Clause 18.2 – Insurance for Work's and Contractors Equipment

The following sub-paragraphs shall be added:

The Contractor shall arrange in the contractual currency an all risk cargo insurance from a reputed insurance company covering all costs and expenditures for insurance till the material is covered by the inland transport insurance.

a) Insurance costs and payments
The insurance has to be taken out in freely convertible currency as far as foreign exchange costs are concerned.

The insurance cover note shall provide for payments to be made for the account of the Employer as per sub-clause 14.17.

b) Site storage/work/erection insurance

The Contractor shall arrange site storage/work/erection insurance including third party liability from a reputed insurance company and policies to be taken in foreign/local currency wherever necessary and the payment of premiums shall be made by the Contractor in local/foreign currency and the claims thereto may also be dealt with by the Contractor, if any. The above type of policy has to be taken by the Contractor wherever considered necessary as per approval of the Employer. The insurance cover shall be in accordance with the prevailing laws and regulations of the Country. The insurance shall be valid until issuing of Performance Certificate.

Sub-Clause 18.3 – Insurance against Injury to Persons and Damage to Property

Insert at the end of Sub-Clause 18.3 the following:

The insurance shall be for an minimum amount of EUR 40.000,- per occurrence or the equivalent amount in the currency of the Country.

Sub-Clause 20.1 – Contractor's Claims

Insert at the end of the first paragraph:

The notice shall make reference to this sub-clause 20.1. The notice shall be in writing (fax or letter but not being part of another document e.g. progress reports) and delivered by hand (against receipt) or submitted by fax. A notice not fulfilling these conditions will be considered as failure to give notice of a claim.

Sub-Clause 20.3 – Failure to Agree Dispute Adjudication Board

Insert at the end of Sub-Clause 20.3 the following:
The appointing entity or official shall be the President of FIDIC or a person appointed by its President.
FIDIC - Fédération Internationale des Ingénieurs-Conseils
P.O. Box 86
CH-1000 Lausanne 12
Switzerland
Tel.: +41-21-653 5003 Fax: +41-21-6535432

The Adjudicator so designated shall be deemed to be jointly accepted by the Employer and the Contractor.

D. Posebni uslovi ugovora

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Opšti dio

Uslovi Ugovora čine "Opšti uslovi", koji čine dio "Uslova ugovaranja za EPC/Ključ u ruke projekte" prvo izdanje od 1999. godine, u izdanju Međunarodne federacije inženjera konsultanata (Fédération Internationale des Ingénieurs-Conseils) (FIDIC), kao i "Posebne uslove", koji uključuju izmjene i dopune Opštih uslova.

Tamo gdje se pominju klauzule ili Podklauzule, to podrazumijeva, osim ukoliko nije drugačije utvrđeno, klauzulu ili podklauzulu u Opštim uslovima ugovora, ali sa izmjenama i dopunama koje su navedene u ovim Posebnim uslovima.

U slučaju da postoji bilo koja razlika između Opštih uslova ugovora i Posebnih uslova, Posebni uslovi će se smatrati važnijim.

Podklauzula 1.1 – Definicije

Dodati Klauzuli 1.1:

1.1.3.3 **"Rok za završetak radova"** mora biti 6 mjeseci za klaster od tri obrazovne ustanove

1.1.3.7 **"Obavještajni period za nedostatke"** mora biti 12 mjeseci, počevši od izdavanja sertifikata o preuzimanju

1.1.3.10 "**Licenca za rad**" podrazumijeva dokument izdat od strane nadležnog organa Crne Gore, nakon prijema od strane Tehničkog komiteta

1.1.4.4 **Stranu valutu** predstavlja "Euro"

1.1.6.2 **Zemlju** predstavlja Crna Gora

1.1.6.9 "**Inspekcija za građevinske radove**" je organ nadležan za obavljanje inspekcije tokom građevinskih radova

1.1.6.10 **"Osnova za ključ u ruke ili funkcionalna specifikacija"** označava cjelokupno pokrivanje radova u pogledu projektovanja, proizvodnje, ispitivanje, prevoz, izgradnju, instalaciju, prijem objekta, probni rad, funkcionisanje itd., cjelokupne mehaničke i električne opreme i djelove objekata na osnovu ugovora i obuhvatiće sve ove djelove zgrada i opreme ili radova, bez obzira da li su pomenuti u Tenderskim dokumentima ili ne, koji su potrebni kako bi objekat normalno funkcionisao, i kako bi se ispunio ugovoreni obim radova, karakteristike i svrha radova.

Podklauzula 1.3 – Komunikacija

Dodati podklauzuli 1.3:

Detalji vezani za komunikaciju tokom realizacije projekta, npr. adrese, sistem elektronske komunikacije su navedeni u Tenderskoj dokumentaciji.

Podklauzula 1.4 – Zakon i jezik

Izmijeniti i dopuniti podklauzulu 1.4 - Zakon i jezik na sledeći način:

a) Zakon koji se primjenjuje na Ugovor, jeste zakon koji je na snazi u Crnoj Gori.

b) Jezik ugovora je engleski jezik. Sva komunikacija, dokumentacija, Priručnici za upravljanje i održavanje, itd. moraju biti na engleskom jeziku, osim "Projekat izvedenog stanja" i Radna uputstva koja se dodatno dostavljaju na crnogorskom jeziku. Pored toga, oznake rezervnih djelova, kao i naljepnice, pločice sa imenima, oznake za instrukcije i upozorenja neophodne za identifikaciju i bezbijedan rad postrojenja, i svi natpisi moraju biti na jeziku zemlje.
c) Svi dokumenti potrebni za dobijanje dozvola do strane državnih organa, moraju biti i na jeziku zemlje.

Podklauzula 1.5 – Prioritet dokumenata

Izbrisati cijelu Podklauzulu 1.5 i izmijeniti je sa dolje navedenim:

Dokumenti koji čine Ugovor moraju se posmatrati na način na koji će međusobno objašnjavati jedan drugog. U cilju tumačenja, prioritet dokumenata je u skladu sa odredbama navedenim u Ugovoru.

Podklauzula 1.6 – Ugovor

Prva rečenica se mijenja sa:

Ugovor stupa na snagu, što će se smatrati početkom stupanja na snagu Ugovora, nakon što se ispune sljedeći uslovi:

1. Saglasnost od strane Njemačke razvojne banke (KfW) na dogovoreni i parafirani ugovorni sporazum
2. Potpisivanje ugovornog sporazuma
3. Izvođač radova je podnio Poslodavcu garanciju za dobro izvršavanje posla i garanciju za avansna plaćanja
4. Investitor je izvođaču radova izvršio avansno plaćanje.

Podklauzula 1.13 – Poštovanje zakona

Dodati kao novu stavku c):

Izvođač radova poštuje lokalne zakone i propise zemlje.

Najvažniji zakoni/propisi Crne Gore su:

- Zakon o uređenju prostora i izgradnji objekata ("Službeni list Crne Gore, broj 51/2008") sa izmjenama i dopunama ("Službeni list Crne Gore, No 34/11")
- Pravilnik o načinu izrade i sadržini tehničke dokumentacije ("Službeni list Republike Crne Gore, broj 22/2002")
- Pravilnik o sadržini i načinu vođenja građevinskog dnevnika, građevinske knjige i knjige inspekcije ("Službeni list Republike Crne Gore, broj 54/2001")
- Pravilnik o sadržini i načinu vršenja tehničke kontrole glavnih projekata ("Službeni list Republike Crne Gore, broj 54/2001")
- Pravilnik o sadržini i načinu vršenja stručnog nadzora tokom izgradnje objekata ("Službeni list Republike Crne Gore, broj 54/2001")
- Pravilnik o uslovima i načinu verifikacije i poništavanje verifikacije dozvola za strane državljane ("Službeni list Republike Crne Gore, broj 68/2008")
- Zakon o zaštiti na radu ("Službeni list Republike Crne Gore, broj 79/2004"), sa izmjenama i dopunama

- Zakon o inspekcijskom nadzoru ("Službeni list Republike Crne Gore, broj 39/2003"), sa izmjenama i dopunama.

Dodati kao novu stavku d):

Izvođač priprema Izvjestaju o bezbijednosti na gradilištu, posebno u pogledu bezbijednosti đaka i nastavnog osoblja tokom izvođenja građevinskih radova, u skladu sa propisima države, i dostavlja ga investitoru na odobrenje.

Dodati na kraju podklauzule 1.13:

Izvođač takođe dobija sve saglasnosti, uključujući dozvole za rad kao i odobrenja koja su potrebna za izvođenje radova. Sva potrebna dokumenta/informacije za dobijanje ovih dozvola, obezbjeđuje Investitor. Izvođač mora unaprijed navesti koja su dokumenta potrebna za dobijanje dozvole.

Podklauzula 3.1 – Predstavnik Investitora

Predstavnik investitora je:

FICHTNER GmbH & Co. KG
Jovana Tomasevica 9/2 - 11
81000 Podgorica
Crna Gora

Investitor je ovlastio Predstavnika Investitora za punu pomoć, konstantno obavještava Investitora o Projektu, kao i da djeluje uz njegovu saglasnost, a vezano za projektovanje, odobravanje dokumentacije, inspekciju i nadzor opreme za proizvodnju, testiranje, nadzor izgradnje i građevinskih radova, itd., za Isporuku i Radove tokom realizacije ugovora.

Dodatno, Predstavnik Investitora mora zahtijevati saglasnost Investitora prije izvršenja sljedećih poslova:

- Izdavanje naloga koji mogu izazvati izmjenu Ugovora
- Oslobađanje Izvođača radova od bilo koje odgovornosti u vezi sa Ugovorom.

Podklauzula 4.1 – Opšte obaveze Izvođača radova

Prvi pasus se zamjenjuje sa dolje navedenim:

"Izvođač radova će izvršiti i izvoditi radove u skladu sa Ugovorom i Projektom pripremljenim od strane Investitora, i mora otkloniti bilo koje nedostake u radovima. Nakon što se završe, rezultat radova će odgovarati svrsi kojoj su radovi i bili namijenjeni, kao što je navedeno u ugovoru..."

U drugom stavu:

"Projekat" se isključuje.

Podklauzula 4.19 – Struja, Voda i Gas

Dolje navedeno treba dodati:
Predmeti snabdijevanja na gradilištu će biti odgovornost Izvođača radova.
Predmeti snabdijevanja na gradilištu su: struja i voda.

a) Struja: 400/230 V 3 faza 4 zica 50 Hz
b) Voda: od vodovodne mreže.

Izvođač radova treba da uzme u obzir te troškove prilikom pripreme ponude.

Podklauzula 4.2 – Grancija za dobro izvršenje posla

Drugi stav se zamjenjuje sledećim:

Iznos garancije o dobro izvršenom poslu biće 10 (deset) posto ugovorne cijene, koja je navedena u Ugovornom sporazumu i izražava se u valutama i iznosima u kojima se isplaćuje ugovorna cijena.

Izvođač dostavlja garanciju o dobro izvršenom poslu, u obliku bankovne garancije, Investitoru, u roku od 14 dana nakon što su sve strane parafirale ugovorni sporazum, ali prije datuma početka. Potvrda o dobro izvršenom poslu izdaje eminentna međunarodna banka (koja je prihvatljiva Investitoru i Njemačkoj razvojnoj banci) u obliku koji je priložen u tenderskom dokumentu ili u drugom obliku, koji je odobren od strane Investitora i važiće najmanje do izdavanja potvrde o dobro izvršenom poslu.

Uspješni ponuđač će tokom pregovora radi dobijanja saglasnosti, dostaviti informacije o banci koja će biti zadužena za potvrdu o dobro izvršenom poslu.

Podklauzula 4.21 – Izvještaji o napretku

Ostali detalji su navedeni u dijelu A5 "Opis projekta i procedura".

Promijeniti naslov Podklauzule 4.21 u:

Izvještaji o napretku i Sastanci o napretku

Dodati podtački (i):

Detaljna procjena novčanog toka, svih uplata na koje Izvođač radova ima pravo po Ugovoru;

Na kraju Podklauzule dodati dolje navedeno:

Koordinacioni sastanci i sastanci sa projektantima

Prilikom realizacije Ugovora, Investitor može zatražiti koordinacione sastanke i sastanke sa projektantima, ili u sjedištu Investitora, u kancelarijama Predstavnika Investitora, na gradilištu, ili u kancelarijama Izvođača radova, po potrebi.

Cilj ovih sastanaka je da se kroz njih koordinira napredak rada i kontrole, diskutuje o procedurama odobravanja i tehničkim detaljima i da se diskutuje o svim drugim segmentima koje su od velikog značaja za Ugovor, kako bi se postigao nesmetan tok radova, kao i ekspeditivno snabdijevanje isporuke. Predstavnik Izvođača radova, kao i ostali odgovorni radnici i visoki predstavnici svih podizvođača moraju biti prisutni na ovom sastanku.

Sastanci o napretku na gradilištu

Prilikom gradnje na gradilištu i testiranja završetka radova, dnevni, nedeljni i mjesečni sastanci o napretku vršiće se na gradilištu, shodno zahtjevima Investitora ili Predstavnika Investitora. Ovi sastanci će sluziti kako bi se detaljno diskutovalo i razmatralo o progresu i napretku radova na gradilištu.

U cilju pružanja pomoći Poslodavcu ili Predstavniku Investitora u svom prikazu izvedenih radova tokom sastanaka, Izvođač će obezbijediti Poslodavcu ili Predstavniku Investitora detaljni raspored pojedinih stavki radova koje su završene, uz poređenje aktuelnog i planiranog rasporeda najmanje jedan (1) dan prije svakog sastanka.

Ukoliko bilo koji rad ili dio rada kasni, razlozi kašnjenja moraju biti obrazloženi i predlozi kako da se ubrzaju radovi moraju se podnijeti (Klauzula 8 [Početak, Kašnjenje i Obustava]).

Na svim Sastancima o napretku, Izvođač radova mora obezbijediti najmanje jednog ovlašćenog člana svoje organizacije kako bi se obavezao Poslodavcu kada je riječ o dogovorima postignutim tokom sastanaka.

Podklauzula 4.4 – Podizvođači

Na kraju pasusa (a) dodati sledeće:

Odstupanja, odnosno izmjene liste Podizvođača i dobavljača koja je poslata zajedno sa Ponudom nijesu dozvoljena bez pismenog odobrenja Investitora.

Dodati Podklauzuli 4.4 dolje navedeno:

Investitor neće priznati postojanje bilo kog podizvođača ili dobavljača u bilo kojoj stavci koja se odnosi na primjenu Ugovora. Sva korespondencija od strane podizvođača dostavlja se samo kroz Izvođača radova. Korespondencija podizovdjaca poslata direktno Izvođaču i/ili Predstavniku Izvođača neće biti priznata.

Podizvođači moraju biti odobreni od strane Investitora.

Podklauzula 5.1 – Opšte obaveze u projektovanju

Izbrisati Podklauzulu 5.1 u poslednjem pasusu:

"Međutim, Investitor je dužan da...".

Podklauzula 5.2 – Dokumentacija izvođača

Dodatni zahtjevi za dokumentaciju su utvrđeni u dijelu A5 "Opis projekta i procedura" i opštim postupkom dokumenata.

Dodati trećem pasusu Podklauzule 5.2:

Izvođač radova treba da dostavi poslodavcu na razmatranje sva relevantna dokumenta u 3 primjeraka. Ukoliko investitor uputi na to da su dodatna dokumenta potrebna, Izvođač će ih pripremiti bez odlaganja, u vremenskom roku sa kojim će se obije strane složiti.

Na kraju Podklauzule 5.2 dodati dolje navedeno:

Ukoliko se u bilo kom trenutku dođe do saznanja, nakon davanja odobrenja od strane investitora, da dokumentacija Izvođača nije u saglasnosti sa uslovima ovog Ugovora ili da se pojedini djelovi ne poklapaju sa dokumentacijom koja je ranije predata, takve izmjene će izvršiti Izvođač, ukoliko Investitor nalazi za shodno, a za taj dodatni rad Izvođač neće biti dodatno plaćen.

Izvođač će, od početka izgradnje do/uključujući i izdavanje sertifikata o preuzimanju radova, izdavati knjigu sa pravilnim vođenjem gradilišta, uputstvo za zdravlje i bezbjednost, kao i inspekcijsku upisnicu, u skladu sa važećim propisima u Crnoj Gori.

Izvođač će pripremiti i dostaviti na saglasnost Investitora, Izvještaj o bezbjednosti (na gradilištu), pripremljen u skladu sa važećim propisima u Crnoj Gori.

Podklauzula 5.4 – Tehnički standardi i propisi

Dodati poslije prvog pasusa:

Svi isporučeni materijali i oprema i svi sprovedeni radovi moraju biti u skladu sa specifičnim standardima navedenim u Opštim tehničkim uslovima i Posebnim tehničkim zahtjevima, kao i relevantnim lokalnim standardima, bez obzira na jezik koji se koristi, sa pitanjima koja su važeća na dan Prihvatanja pisma.

Izvođač radova mora poštovati standarde i tehničke zahtjeve zemlje. Međunarodni standardi i propisi, kao što je navedeno u Opštim i Posebnim tehničkim uslovima, koriste se samo u slučaju da su strožiji od standarda u zemlji ili ne postoje lokalni standardi koji su dostupni. Izvođač radova je dužan da dostavi spisak standarda, kao i izvještaj kojim se dokazuje da su standardi koji se namjeravaju koristiti strožiji od standarda u zemlji.

Ukoliko nijedan standard nije naveden, tehnički kodovi Međunarodne organizacije za standardizaciju (ISO) se primjenjuju, kao i relevantni lokalni standardi. Za električnu opremu, relevantni IEC standard se primjenjuje, kao i relevantni domaci standardi. Roba i posebne garancije koje su izvan opsega ISO i IEC, ukoliko lokalni standardi nijesu dostupni, moraju u najmanju ruku biti u skladu sa sledećim standardima i propisima u sledećem prioritetu:

1. EN,
2. DIN i VDE standardi
3. BS,
4. ASTM,
5. Drugi međunarodno priznati standardi koji obezbjeđuju kvalitet jedan ili veći od pomenutih standarda, ali samo ako su podnijeti na engleskom jeziku i prihvaćeni od strane Investitora.

Odgovornost je Izvođača radova da pruzi dovoljno dokaza da bilo koji drugi standard koji Izvođač predloži (osim onih koji su navedeni gore) obezbijedi isti ili viši standard.

Ubaciti na kraju Podklauzule 5.4 dolja navedeno:

Izvođač radova je u obavezi da Poslodavcu besplatno obezbijedi dva seta svih standarda koji će se koristiti prilikom radova predviđenih ugovorom, najkasnije 4 nedelje nakon započinjanja radova. Isti set se čuva u kancelariji izvođača radova na gradilištu i moraju biti dostupni osoblju na gradilištu Investitora/Predstavniku investitora kad god je to potrebno prilikom rada na gradilištu.

Podklauzula 5.6 – Dokumentacija izvedenog stanja

Na kraju Podklauzule 5.6 dodati dolje navedeno:

Broj primjeraka (3 štampane kopije na crnogorskom i 2 CD-a sa kopijama u elektronskoj verziji, na engleskom i crnogorskom jeziku) i datum podnošenja dokumentacije izvedenog stanja koja je data u Tenderskom dokumentu.

Podklauzula 5.7 – Uputstva za rad i održavanje

Na kraju Podklauzule 5.7 dodati dolje navedeno:

Broj kopija (2 primjerka) i datum podnošenja Uputstva za rad i održavanje je dat u Tenderskoj dokumentaciji.

Podklauzula 5.8 – Projektna greška

Na kraju Podklauzule 5.8 dodati dolje navedeno:

Izvođač radova mora odmah obavijestiti Investitora o bilo kojoj grešci, propustu i ostalim nedostacima u projektu i drugim dokumentima za radove, koji su otkriveni prilikom razmatranja Ugovora ili tokom procesa izvođenja radova.

Podklauzula 6.1 – Angažovanje osoblja i radnika

Dodati sljedeće stavove Klauzuli 6.1:

Izvođač može da angažuje bilo kog člana osoblja koji bi bio neophodan za izvršenje radova. Izvođač se mora pobrinuti o tome da svo osoblje ima potrebne vize za boravak i rad. Izvođač radova će biti odgovoran kada je u pitanu povratak na mjesto sa kojeg su bili angažovani ili u matičnu zemlju dovedenih članova osoblja Izvođača radova. U slučaju smrti u zemlji bilo kog člana osoblja ili članova njihovih porodica, Izvođač mora biti na sličan način odgovoran za organizovanje adekvatnih aranžmana za njihov povratak ili sahranu.

Podklauzula 6.5 – Radno vrijeme

Izbrisati ovu Podklauzulu.

Podklauzula 6.8 – Nadzor izvođača radova

Dodati sledeće stavove na Klauzuli 6.8:

Izvođač radova treba da predloži šefove gradilišta i pomoćnike šefova gradilišta sa odgovarajućim stručnim dozvolama i drugim odredbama koje su potrebne shodno važećim propisima u Crnoj Gori. Predloženi šefovi ili pomoćnici moraju uvijek biti prisutni na gradilištima u toku radnog vremena, kao i tokom aktuelnih radova. Ukoliko gore navedeno prisustvo nije ispunjeno, Investitor zadržava pravo da prekine radove, bez bilo kakvih potraživanja od strane ugovarača.

Investitor ima pravo da pismeno traži odlazak sa gradilišta bilo kog člana osoblja izvođača radova, koji zbog svog nedoličnog ponašanja i nemara krši disciplinu ili se ponaša na neadekvatan način u životnoj i radnoj sredini. Izvođač radova mora otpustiti i zamijeniti tu osobu.

Izvođač mora o svom trošku blagovremeno preduzeti sve propisane mjere, kako bi obezbijedio pravilno sprovođenje montažnih radova, opreme, instalacija, postrojenja i uređaja koji obezbjeđuju sigurnost rada, prolaznika, saobraćaja i susjednih objekata, kao i zaštitu životne i radne sredine.

Podklauzula 7.1 - Način izvođenja radova

Na kraju Podklauzule 7.1 dodati dolje navedeno:

Materijali koji će se koristiti moraju biti novi.

Podklauzula 7.3 – Inspekcija

U drugom pasusu (b) izbrisati sledeće riječi: "do stepena opisanog u Ugovoru".

Na kraju Podklauzule 7.3 dodati dolje navedeno:

Osoblje investitora, zaduženo za nadzor radova, može pristupati gradilištu bez ikakvih ograničenja.

Podklauzula 8.1: Početak radova

Podstav (a) se briše.

Podstav (b): riječi "u roku od 42 dana poslije" se brišu i umjesto njih se dodaje "u roku od 14 dana poslije".

Podklauzula 8.3 – Program radova

Nakon druge rečenice podklauzule 8.3 dodati sledeće:

"Dinamički plan će biti zamrznut, kao što je predviđeno u Tenderskoj dokumentaciji."

Riječi "za svaku glavnu fazu radova" iz pasusa (a) Podklauzule 8.3 zamjenjuje se sa "u svakoj fazi projektovanja, nabavke, ispitivanja, proizvodnje, isporuke na gradilištu, carinjenja, izgradnje, nadzora, montaže, puštanja u rad i probnog rada."

Na kraju podklauzule 8.3, poslednjoj rečenici dodati sledeće:

"u roku od dvije nedjelje od dana objavljivanja takvog obavještenja".

U poslednjem pasusu dodati sledeće:

Dinamički plan treba da bude program mrežnog tipa, koji će identifikovati kritični put kao i rano/kasno počinjanje, kao i datum završetka za sve aktivnosti. Plan treba da sadrži informacije koje će biti posvećene svakoj aktivnosti kako bi se realizovale u predviđenom roku.

Podklauzula 8.7 – Obeštećenje za kašnjenje

Podklauzuli 8.7 dodati sledeće:

U podklauzuli 8.7, suma iz druge rečenice je 0.1% od ugovorene cijene, kao obeštećenje za kašnjenje radova, koja će se moći plaćati na dnevnoj osnovi, proporcijalno valutama u kojima se ugovorena cijena plaća.

Maksimalni iznos obeštećenja za kašnjenje je deset posto (10%) od ugovorene cijene.

Podklauzula 9.1 – Obaveze izvođača radova

Na kraju poklauzule 9.1 dodati sledeće:

Tehnički prijem

Tehnički prijem će se vršiti u skladu sa Zakonom o uređenju prostora i izgradnji objekata (Službeni list RCG", broj 51/2008) sa Izmjenama i dopunama ("Službeni list RCG", broj 34/11).

Tehnički prijem će organizovati Investitor u roku od 21 dana od dana prijema obavještenja od strane Izvođača radova da su ugovorene usluge izvršene.

Podklauzula 10.1 – Prijem radova

Na kraju drugog pasusa dodati:

"Preduslov za podnošenje zahtjeva za prijem radova je prijem potvrde o upotrebi", to važi samo ukoliko kotao treba da se instalira.

Poslednji pasus Podklauzule 10.1 se briše.

Gore navedeni zahtjevi moraju se razmatrati u vremenskom rasporedu Izvođača.

Podklauzula 10.2 - Prijem pojedinih djelova radova

Izbrisati cijelu podklauzulu 10.2 i zamijeniti je dolje navedenim:

Djelovi radova se mogu preuzeti odvojeno. Preuzimanje djelova radova se vrši po odluci Investitora.

Podklauzula 11.1 – Završetak izuzetnih radova i otklanjanje nedostataka

Izbrisati sledeće iz prve rečenice:

"ili što je prije moguće nakon toga".

Dodati poklauzulu 11.1 (c):

"izvršiti sve izmjene, korekcije po potrebi za ispunjavanje uslova ugovora, i zamijeniti sve djelove i opremu koji su u kvaru".

Izmijeniti poslednju rečenicu podklauzule 11.1 sa dolje navedenim:

"Ukoliko se takav kvar ili oštećenje dogodi", Investitor ili Predstavnik Investitora će odmah obavijestiti Izvođača. Obavještenje o nedostacima se daje u pisanoj formi. Izvođač mora reagovati u roku od 7 dana od dana prijema obavještenja."

Podklauzula 11.3 –Produžetak perioda za obaveštenje o nedostacima

Dodati sledeće:

Ukoliko se, tokom roka za obavještenje o nedostacima, bude smatralo neophodnim da se zamjeni neki element zbog funkcionalnog kvara, rok za obavještenje o nedostacima za ovaj element počinje zamjenom ovog dijela.

Podklauzula 11.9 – Potvrda o dobrom izvršenju posla

Izbrisati sve stavove osim prvog i dodati sledeće:

Mjesec dana prije isteka roka za obavještenje o nedostacima, uključujući produžetke koji se odnose na podklauzule 11.3, Produžetak roka za obavještenje o nedostacima, nakon otklanjanja svih nedostaka, Izvođač će pismeno zahtijevati finalnu potvrdu o dobrom izvršenju posla i dostaviće Izjavu za finalno plaćanje.

Odmah nakon zahtjeva Izvođača, Investitor predlaže komisiju kako bi izvršila poslednji prijem, koji se sastoji od tehničkog prijema, samo u slučaju da je građevinska dozvola bila izdata, za ostale objekte prihvatanje od strane klijenta i obračun poslednje isplate. Komisija se predlaže i obavlja sve aktivnosti koje se odnose na prijem preuzimanje.

Investitor može smatrati neophodnim da se obave svi testovi potrebni za prijem. Obim i način ispitivanja su definisani u tehničkim uslovima i programu koji se odnosi na testiranja. Rezultati tih testova moraju ispuniti potrebne vrijednosti, pod uslovom da se korišćenje opreme vrši u skladu sa priručnikom za korišćenje i održavanje.

Ukoliko radovi ne ispunjavaju garantovane tehničke karakteristike, završni prijem biće odložen, a adekvatan period se odobrava Izvođaču za popravke, podešavanja i ponovna testiranja.

Ukoliko rezultati ponovljenih testiranja ne ispunjavaju garantovane tehničke karakteristike, sa propisanim tolerancijama, Investitor ima pravo da odbije prijem isporuke i radova koji su predmet podklauzule 11.4(c).

Ukoliko rezultati ponovljenih testiranja nisu prihvatljivi Ministarstvu ekonomije, izvršiće se novo testiranje. Za ove testove, Investitor je dužan da odredi kvalifikovanu instituciju ili institucije, koje nijesu bile uključene u prethodnim testiranjima. Troškove tih testiranja snovi strana koja se nije saglasila.

Ukoliko završni prijem nije završen i potvrda o dobro izvršenom poslu nije izdata 28 dana nakon isticanja perioda za obaveštavanje o manjkavostima, uključujući i produžetke navedene u podkauzuli 11.3, produžeci perioda za obaveštavanje o manjkavostima, izvođač ima pravo da zahtijeva dodatne troškove, koje će snositi investitor.

Smatraće se da samo potvrda o dobrom izvršenju predstavlja prijem radova.

Podklauzula 13.8 – Korekcije zbog izmjene u troškovima

Izbrisati cijelu podklauzulu 13.8

Podklauzula 14.1 – Ugovorna cijena

Dodati pasus (c) podklauzuli 14.1:

(c) sve količine koje mogu biti navedene u programu ili u opisu obima isporuke predstavljaju minimalne procijenjene količine i ne trebaju se smatrati stvarnim ili tačnim količinama radova, koje je Izvođač u obavezi da izvrši po sistemu "ključ u ruke", kako bi ispunio svrhu radova.

Podklauzula 14.2 – Avansno plaćanje

Izmijeniti i dopuniti stav (a) podklauzule 14.2, tako da glasi:

Investitor će uplatiti avans Izvođaču u iznosu od petnaest (15) posto od ugovorne cijene navedene u Ugovoru.

Podklauzula 14.4 – Vremenski raspored plaćanja

Podklauzula 14.4 se briše u cijelosti i mijenja na sledeći način:

Investitor je u obavezi da Izvođaču plati na sledeći način prilagođenu sumu iz Ugovora kako bi bili uključeni dodaci i odbici, shodno navedenom u ovim uslovima:

14.4.1 Raspored plaćanja

Plaćanje za nabavku i isporuku radova, montažu i radove niskogradnje uspostavlja se putem direktnog postupka isplate, u skladu sa KfW-ovim Smjernicama za isplate sredstava putem finansijske saradnje sa zemljama u razvoju i sličnim programima.

Investitor će platiti Izvođaču shodno uslovima i pravilima KfW-ovih smjernica za isplate, na sledeći način:

Za radove i izgradnju

15% ugovorne cijene kao avans shodno garanciji o avansnom plaćanju i potvrdi o dobrom izvršenju posla.
75% ugovorene cijene će se plaćati u dvomjesečne rate (tj. svaka 2 mjeseca), na osnovu napretka radova.
10% ugovorene cijene predstavlja iznos zadržanog novca koji će se uplatiti kao što je opisano u 14.9.

14.4.2 Ostali uslovi

Izvođač ne može tražiti dodatno plaćanje za prekovremeno radno vrijeme, dodatne materijale, posebne uslove, poteškoće ili slično.

Minimalni iznos zahtjeva za plaćanje

Zahtjev za plaćanje neće biti prihvaćen ukoliko je njegova neto vrijednost nakon svih zadržavanja i odbitaka manja od 2,5% od ugovorne cijene.

Zahtjev za plaćanje za izgradnju i građevinske radove

Potvrda o napretku ili završetku radova na gradilištu se mora priložiti, potpisana od strane Investitiora/Predstavnika Investitora.

Raspored isplata

Izvođač dostavlja, uz svaku fakturu, raspored isplata koji prikazuje: broj fakture, vrstu fakture, datum izdavanja računa, iznos fakture, primljen iznos, datum prijema. Ažurirana verzija dodaje se izvještajima o napretku.

Izvođač dostavlja aktuelni status fakturisanja za svaku tačku isporuke i usluga, proširujući liste cijena sledećim podacima (u elektronskoj formi): iznos računa, sadašnji iznos faktura i fakturisano, preostali iznos koji treba da se fakturiše. Elektronska verzija izmijenjene liste cijena šalje se zajedno sa svakom fakturom.

Podklauzula 14.8 – Odložena plaćanja

Izbrisati cijelu podklauzulu 14.8

Podklauzula 14.9 – Isplata zadržanog novca

Izbrisati poslednju rečenicu u prvom pasusu: Ukoliko je Potvrda o prijemu radova izdata samo za sekciju, relevantni procenat prve polovine zadržanog novca plaća se kada taj dio prođe sva testiranja.

Zamijeniti riječi “prva polovina zadržanog novca" u prvom pasusu sa “prvi dio”.

Zamijeniti riječi “druga polovina” u drugom pasusu sa “drugi dio”.

Zamijeniti riječi “bilo koje polovine” u trećem pasusu sa “bilo kog dijela”.

Na kraju podklauzule dodati:

Investitor je dužan da izvrši plaćanje drugog dijela zadržanog novca izvođaču radova ukoliko obezbijedi garanciju vidu obrasca od strane lica i odobrenu od strane Investitora, u iznosima i valutama jednakim tom plaćanju.

Izvođač mora obezbijediti da je garancija važeća i primjenljiva sve dok izvođač ne izvrši i završi radove i otkloni nedostatke, kako je navedeno u potvrdi o dobrom izvršenju posla u podklauzuli 4.2 i garancija će se shodno tome vratiti Izvođaču. Ovo puštanje zadržanog novca predstavljaće zamjenu za oslobađanje drugog dijela zadržanog novca, shodno drugom pasusu podklauzule 14.9.

Dodati Klauzuli 14 – Ugovorna cijena i plaćanje sledeće podklauzule:

Podklauzula 14.16 – Oporezivanje

Osim ukoliko nije drugačije navedeno, sledeće odredbe će se primijeniti za oporezivanje roba i usluga.

Neće biti oslobađanja od plaćanja poreza ili carine za bilo koju uslugu, materijal ili opremu koja se koristi u okviru ovog Ugovora.

Isplata prema Izvođaču za usluge od strane lokalnog osoblja neće biti oslobođene poreza na dobit u zemlji.

Odgovornost je izvođača da se u potpunosti upozna sa zakonom o porezu i akcizama zemlje prije početka Ugovora.

Izvođač se mora upoznati sa administrativnim procedurama za dobijanje dozvola i licenci za uvoz i pružiće podršku i sarađivaće sa Investitorom za dobijanje neophodnih dozvola i licenci i mora imati na raspolaganju sve neophodne i odgovarajuće dokumente u dogledno vrijeme.

Podklauzula 14.17 – Klauzula otplata

Ukoliko se plaćanja po osnovu ovog Ugovora za robe i usluge vrše iz fondova, bilo kojih naknada, garancija ili sličnih plaćanja ili osiguranja, plaćanja se vrše preko KfW, Frankfurt am Main (IBAN: DE53 5002 0400 3800 0000 00, BLZ 500 204 00, BIC: KFWIDEFF), broj računa 38 000 000 00 za račun Ministarstva ekonomije.

Takva sredstva mogu se ponovo koristiti za realizaciju projekata uz saglasnost KfW-a.

Podklauzula 17.2 – Izvođačeva briga o radovima

Treba dodati sledeći podstav:

Izvođač mora da provjeri ispravnost sve opreme prije dolaska na gradilište. Svi nedostaci otkriveni nakon dolaska opreme na gradilište ili tokom izvođenja radova, moraju se odmah nakon otkrivanja prijaviti poslodavcu i to se mora uključiti i naredni izvještaj o napretku.

Od početka do preuzimanja radova, Izvođač je dužan da o svom trošku obezbijedi stražara za opremu i materijale, sigurnosnu zaštitu od oštećenja, vremenskih uslova, uklanjanja ili oštećenja. Odgovornost je i obaveza Izvođača radova da izgradi ograde i skloništa, osvjetljenje, zaštitu i sve relevantne mjere za ispunjavanje svojih dužnosti.

Pored pravilnog skladištenja i čuvanja opreme, materijala, potrebnih alata za izvođenje radova, Izvođač mora pregledati količinu i kvalitet robe, kao i voditi evidenciju o primljenoj i isporučenoj opremi, zajedno sa tehničkom dokumentacijom.

Podklauzula 18.1 – Opšti uslovi za osiguranje

Zamijeniti šesti pasus podklauzule 18.1 “relevantna strana će…drugoj strani” sledećim:

“U roku od 28 dana (od početnog dana) Izvođač mora dostaviti Investitoru:”

Na kraju podklauzule 18.1 dodati sledeće:

Djelotvornost svih polisa osiguranja računaće se od prvog radnog dana nakon početka radova sve do izdavanja sertifikata o učinku u pogledu radova ili bilo kojeg dijela radova u zavisnosti od slučaja.

Osiguranje pokriva iznos od najmanje 110% ugovorene vrijednosti robe.

Podklauzula 18.2 – Osiguranje radova i opreme Izvođača

Treba dodati sledeći podstav:

Izvođač mora obezbijediti u ugovorenoj valuti osiguranje od svih vrsta rizika od strane eminentnog osiguravajućeg društva koja će pokriti sve troškove i izdatke za osiguranja sve dok je materijal pokriven unutrašnjim transportnim osiguranjem.

a) Troškovi osiguranja i isplata

Osiguranje se mora uzeti u slobodno-konvertibilnoj valuti, kada su u pitanju troškovi strane valute.

Napomena osiguranja će obezbijediti isplate za račun investitora, kao što je predviđeno podklauzulom 14.17.

b) Osiguranje mjesta za skladištenje/rad/montažu

Izvođač će obezbijediti osiguranje mjesta za skladištenje/rad/montažu uključujući odgovornost trećeg lica od strane eminentne osiguravajuće kuće u stranoj/domaćoj valuti kada je to neophodno i premijus plaćanje treba biti isplaćeno od strane izvođača u lokalnoj/stranoj valuti i potraživanja, ukoliko ih ima, se takođe vrše preko izvođača. Gore navedena polisa mora biti preduzeta od strane Izvođača kada se god to smatra neophodnim nakon dobijanja saglasnosti od strane Investitora. Osiguranje mora biti u skladu sa važećim zakonima i propisima zemlje. Osiguranje mora važiti do izdavanja potvrde o dobrom izvršenom poslu.

Podklauzula 18.3 – Osiguranje od povreda lica i štete imovini

Na kraju podklauzule 18.3 dodati sledeće:

Osiguranje mora biti u minimalnom iznosu od EUR 40.000, - po događaju ili ekvivalentni iznos u valuti zemlje.

Podklauzula 20.1 – Potraživanja ugovarača

Na kraju prvog pasusa dodati:

Obavještenje se mora pozvati na podklauzulu 20.1. Obavještenje mora biti u pisanoj formi (faks ili pismo, ali ne kao dio drugog dokumenta, npr. izvještaj o progresu) i predat ručno (sa potvrdom) ili poslat faksom. Obavještenje koje ne ispunjava ove uslove, smatraće se kao neuspjelo obavještenje o zahtjevu.

Podklauzula 20.3 – Nesaglasnost oko imenovanja Komisije za rješavanje sporova

Na kraju podkauzule 20.3 dodati sledeće:

Imenovano lice ili službenik mora biti predsjednik FIDIC-a ili lice koje imenuje predsjednik.

FIDIC - Fédération Internationale des Ingénieurs-Conseils
P.O. Box 86
CH-1000 Lausanne 12
Switzerland
Tel.: +41-21-653 5003 Fax: +41-21-6535432

Sudija koji je imenovan, smatraće se da je zajednički prihvaćen od strane investitora i izvođača.

E. General conditions of contract

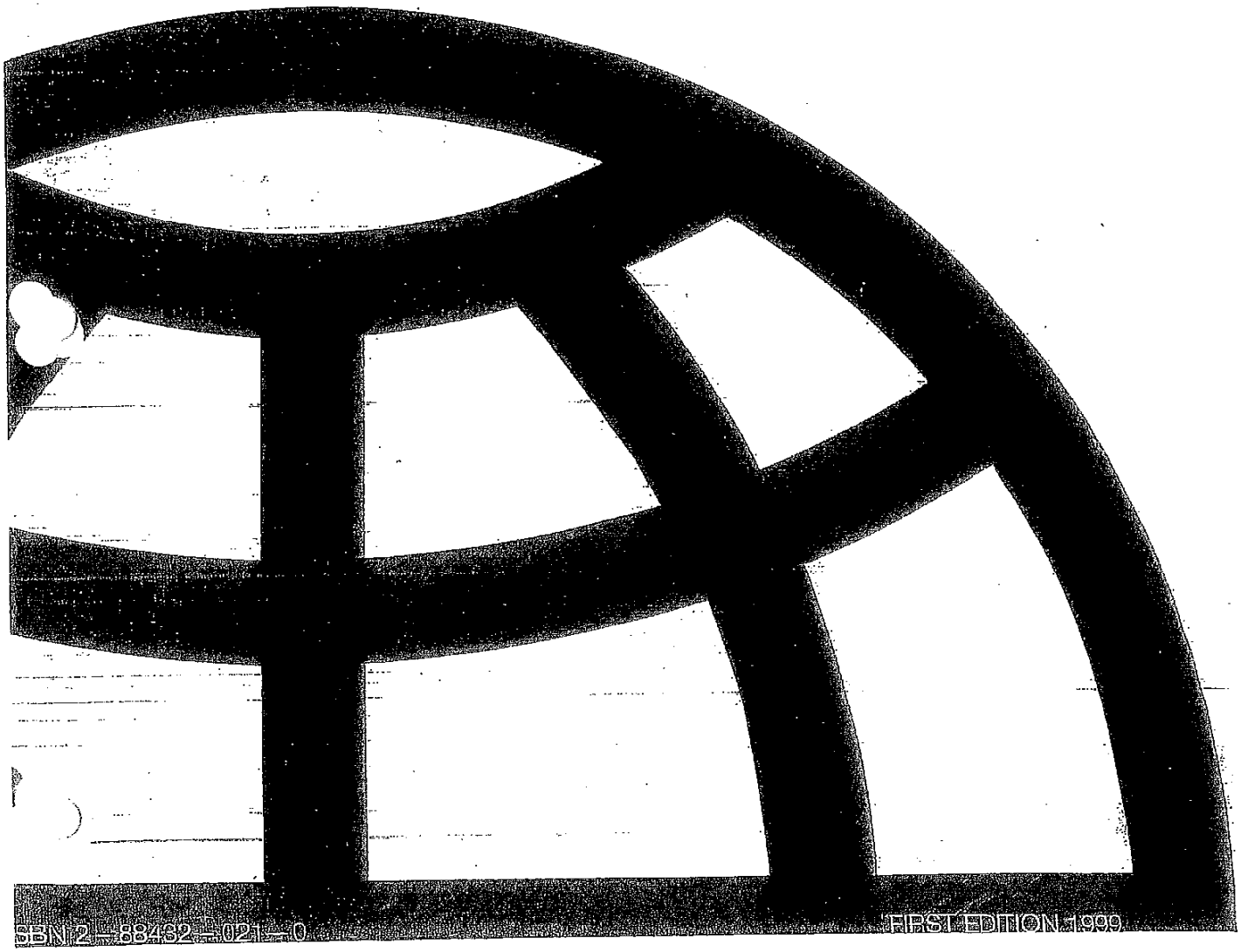
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General Conditions of Contract (FIDIC)

Fédération Internationale des Ingénieurs-Conseils
International Federation of Consulting Engineers
Internationale Vereinigung Beratender Ingenieure
Federación Internacional de Ingenieros Consultores

Conditions of Contract for **EPC/Turnkey Projects**

GENERAL CONDITIONS
GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS
FORMS OF TENDER, CONTRACT AGREEMENT AND
DISPUTE ADJUDICATION AGREEMENT



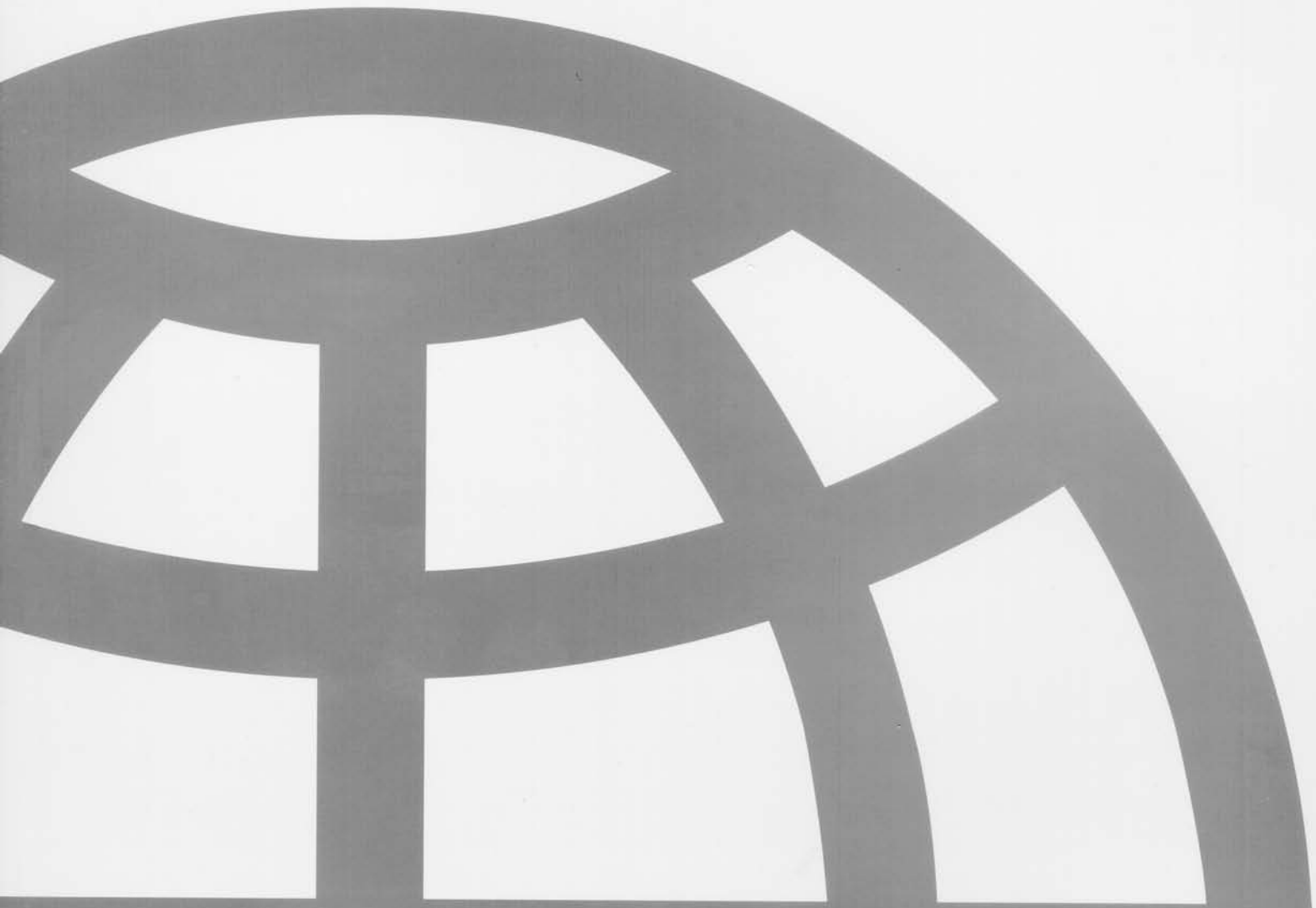
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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

ERRATA to the First Edition, 1999

The following significant errata are corrected in this reprinting of the First Edition of the EPC/Turnkey Contract. Several minor typographical errors and layout irregularities have also been corrected.

GENERAL PROVISIONS

Page 36 In the title of Sub-Clause 14.2, delete "Advanced" and substitute "Advance".

Page 54 In the fifth line of the fifth paragraph, after "Clause 20.4", insert the italicised title "[*Obtaining Dispute Adjudication Board's Decision*]".
Sub-Clause 20.4: in the fifth line, delete each of the italicised acronyms "*DAB*" and substitute the italicised "*Dispute Adjudication Board'"*.

Page 55 In the third paragraph: in the second line, delete the word "the" from the phrase "General Conditions of the Dispute Adjudication Agreement"; and in the sixth line, delete "Member" and substitute "member".

Page 59 In sub-paragraph (ii): delete "day's" and substitute "days'"; and in the third line, delete "an other" and substitute "another".
In the middle of the page, delete "Agreement until each member has been paid" and substitute "Agreement until each of the Members has been paid".
At the end of the next paragraph, after "a decision shall have", insert "been".
In the last sentence of Clause 6, delete the comma after the phrase "Any such notice".

Page 68 In the third line of Clause 6, delete the first two words "notice to".

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

Annexes Delete "© FIDIC".

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INTRODUCTORY NOTE TO FIRST EDITION

FIDIC's Red and Yellow Books (i.e. standard forms of contract for works of civil engineering construction and for electrical and mechanical works) have been in widespread use for several decades, and have been recognised - among other things - for their principles of balanced risk sharing between the Employer and the Contractor. These risk sharing principles have been beneficial for both parties, the Employer signing a contract at a lower price and only having further costs when particular unusual risks actually eventuate, and the Contractor avoiding pricing such risks which are not easy to evaluate. The principles of balanced risk sharing are continued in the new "Construction" and "Plant and Design-Build" Books.

During recent years it has been noticed that much of the construction market requires a form of contract where certainty of final price, and often of completion date, are of extreme importance. Employers on such turnkey projects are willing to pay more - sometimes considerably more - for their project if they can be more certain that the agreed final price will not be exceeded. Among such projects can be found many projects financed by private funds, where the lenders require greater certainty about a project's costs to the Employer than is allowed for under the allocation of risks provided for by FIDIC's traditional forms of contracts. Often the construction project (the EPC - Engineer, Procure, Construct - Contract) is only one part of a complicated commercial venture, and financial or other failure of this construction project will jeopardize the whole venture.

For such projects it is necessary for the Contractor to assume responsibility for a wider range of risks than under the traditional Red and Yellow Books. To obtain increased certainty of the final price, the Contractor is often asked to cover such risks as the occurrence of poor or unexpected ground conditions, and that what is set out in the requirements prepared by the Employer actually will result in the desired objective. If the Contractor is to carry such risks, the Employer obviously must give him the time and opportunity to obtain and consider all relevant information before the Contractor is asked to sign on a fixed contract price. The Employer must also realize that asking responsible contractors to price such risks will increase the construction cost and result in some projects not being commercially viable.

Even under such contracts the Employer does carry certain risks such as the risks of war, terrorism and the like and the other risks of Force Majeure, and it is always possible, and sometimes advisable, for the Parties to discuss other risk sharing arrangements before entering into the Contract. In the case of BOT (Build-Operate-Transfer) type projects, which are normally negotiated as a package, the allocation of risk provided for in the turnkey construction Contract negotiated initially between the Sponsors and the EPC Contractor may need to be adjusted in order to take into account the final allocation of all risks between the various contracts forming the total package.

Apart from the more recent and rapid development of privately financed projects demanding contract terms ensuring increased certainty of price, time and performance, it has long been apparent that many employers, particularly in the public sector, in a wide range of countries have demanded similar contract terms, at least for turnkey contracts. They have often irreverently taken the FIDIC Red or Yellow Books and altered the terms so that risks placed on the Employer in the FIDIC Books have been transferred to the Contractor, thus effectively removing FIDIC's traditional principles of balanced risk sharing. This need of many employers has not gone unnoticed, and FIDIC has considered it better for all parties for this need to be openly recognised and regularised. By providing a standard FIDIC form for use in such contracts, the Employer's requirements for more risk to be taken by the Contractor are clearly stated. Thus the Employer does not have to attempt to alter a standard form intended for another risk arrangement, and the Contractor is fully aware of

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the increased risks he must bear. Clearly the Contractor will rightly increase his tender price to account for such extra risks.

This form for EPC/Turnkey Projects is thus intended to be suitable, not only for EPC Contracts within a BOT or similar type venture, but also for all the many projects, both large and smaller, particularly E & M (Electrical and Mechanical) and other process plant projects, being carried out around the world by all types of employers, often in a civil law environment, where the government departments or private developers wish to implement their project on a fixed-price turnkey basis and with a strictly two party approach.

Employers using this form must realise that the "Employer's Requirements" which they prepare should describe the principle and basic design of the plant on a functional basis. The Tenderer should then be permitted and required to verify all relevant information and data and make any necessary investigations. He shall also carry out any necessary design and detailing of the specific equipment and plant he is offering, allowing him to offer solutions best suited to his equipment and experience. Therefore the tendering procedure has to permit discussions between the Tenderer and the Employer about technical matters and commercial conditions. All such matters, when agreed, shall then form part of the signed Contract.

Thereafter the Contractor should be given freedom to carry out the work in his chosen manner, provided the end result meets the performance criteria specified by the Employer. Consequently, the Employer should only exercise limited control over and should in general not interfere with the Contractor's work. Clearly the Employer will wish to know and follow progress of the work and be assured that the time programme is being followed. He will also wish to know that the work quality is as specified, that third parties are not being disturbed, that performance tests are met, and otherwise that the "Employer's Requirements" are being complied with.

A feature of this type of contract is that the Contractor has to prove the reliability and performance of his plant and equipment. Therefore special attention is given to the "Tests on Completion", which often take place over a considerable time period, and Taking Over shall take place only after successful completion of these tests.

FIDIC recognizes that privately-financed projects are usually subject to more negotiation than publicly-financed ones and that therefore changes are likely to have to be made in any standard form of contract proposed for projects within a BOT or similar type venture. Among other things, such form may need to be adapted to take account of the special, if not unique, characteristics of each project, as well as the requirements of lenders and others providing financing. Nevertheless, such changes do not do away with the need for a standard form.

These Conditions of Contract for EPC/Turnkey Projects are not suitable for use in the following circumstances:

- If there is insufficient time or information for tenderers to scrutinise and check the Employer's Requirements or for them to carry out their designs, risk assessment studies and estimating (taking particular account of Sub-Clauses 4.12 and 5.1).
- If construction will involve substantial work underground or work in other areas which tenderers cannot inspect.
- If the Employer intends to supervise closely or control the Contractor's work, or to review most of the construction drawings.
- If the amount of each interim payment is to be determined by an official or other intermediary.

FIDIC recommends that the Conditions of Contract for Plant and Design-Build be used in the above circumstances for Works designed by (or on behalf of) the Contractor.

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ACKNOWLEDGEMENTS

Fédération Internationale des Ingénieurs-Conseils (FIDIC) extends special thanks to the following members of its Update Task Group: Christopher Wade (Group Leader), SWECO-VBB, Sweden; Peter L Booen (Principal Drafter), GIBB Ltd, UK; Hermann Bayerlein, Fichtner, Germany; Christopher R Seppala (Legal Adviser), White & Case, France; and José F Speziale, IATASA, Argentina.

The preparation was carried out under the general direction of the FIDIC Contracts Committee which comprised John B Bowcock, Consulting Engineer, UK (Chairman); Michael Mortimer-Hawkins, SwedPower, Sweden; and Axel-Volkmar Jaeger, Schmidt Reuter Partner, Germany; together with K B (Tony) Norris as Special Adviser.

Drafts were reviewed by many persons and organisations, including those listed below. Their comments were duly studied by the Update Task Group and, where considered appropriate, have influenced the wording of the clauses. Mushtaq Ahmad, NESPAK, Pakistan; Peter Batty, Post Buckley International, USA; Roeland Bertrams, Clifford Chance, Netherlands; Charles G Borthwick, SwedPower, Sweden; Manfred Breege, Lahmeyer International, Germany; Pablo Bueno, TYPSA, Spain; Nael G Bunni, Consulting Engineer, Ireland; Ian Fraser, Beca Carter Hollings & Ferner, New Zealand; Roy Goode, Oxford University, UK; Dan W Graham, Bristows Cooke & Carpmael, UK; Mark Griffiths, Griffiths & Armour, UK; Geoffrey F Hawker, Consulting Engineer, UK; Hesse & Steinberger, VDMA, Germany; Poul E Hvilsted, Elsamprojekt, Denmark; Lennart Iwar, Lindahl, Sweden; Gordon L Jaynes, Whitman Breed Abbott & Morgan, UK; Tonny Jensen (Chairman of FIDIC Quality Management Committee), COWI, Denmark; Martin Klapper, Hopgood and Ganim, Australia; Philip Loots & Associates, South Africa; Neil McCole, Merz and McLellan, UK; Matthew Needham-Laing, Victoria Russell & Paul J Taylor, Berrymans Lace Mawer, UK; J Gordon Rees, Binnie Black & Veatch, UK; Tim Reynolds, Constant & Constant, UK; David R Wightman & Gerlando Butera, Nabarro Nathanson, UK; the Association of Japanese Consulting Engineers; the Construction Industry Authority of the Philippines; the Dutch Vereniging voor Bouwrecht; the European International Contractors (EIC); ORGAnisme de Liaison Industries Métalliques Européennes (ORGALIME); the International Association of Dredging Contractors; the International Bar Association; the Asian Development Bank; and the World Bank. Acknowledgement of reviewers does not mean that such persons or organizations approve of the wording of all clauses. In particular, EIC and ORGALIME have expressed reservations about some clauses of this EPC Contract.

FIDIC wishes to record its appreciation of the time and effort devoted by all the above.

The ultimate decision on the form and content of the document rests with FIDIC.

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FOREWORD

The Fédération Internationale des Ingénieurs-Conseils (FIDIC) published, in 1999, First Editions of four new standard forms of contract:

Conditions of Contract for Construction,
which are recommended for building or engineering works designed by the Employer or by his representative, the Engineer. Under the usual arrangements for this type of contract, the Contractor constructs the works in accordance with a design provided by the Employer. However, the works may include some elements of Contractor-designed civil, mechanical, electrical and/or construction works.

Conditions of Contract for Plant and Design-Build,
which are recommended for the provision of electrical and/or mechanical plant, and for the design and execution of building or engineering works. Under the usual arrangements for this type of contract, the Contractor designs and provides, in accordance with the Employer's requirements, plant and/or other works; which may include any combination of civil, mechanical, electrical and/or construction works.

Conditions of Contract for EPC/Turnkey Projects,
which may be suitable for the provision on a turnkey basis of a process or power plant, of a factory or similar facility, or of an infrastructure project or other type of development, where (i) a higher degree of certainty of final price and time is required, and (ii) the Contractor takes total responsibility for the design and execution of the project, with little involvement of the Employer. Under the usual arrangements for turnkey projects, the Contractor carries out all the Engineering, Procurement and Construction (EPC): providing a fully-equipped facility, ready for operation (at the "turn of the key").

Short Form of Contract,
which is recommended for building or engineering works of relatively small capital value. Depending on the type of work and the circumstances, this form may also be suitable for contracts of greater value, particularly for relatively simple or repetitive work or work of short duration. Under the usual arrangements for this type of contract, the Contractor constructs the works in accordance with a design provided by the Employer or by his representative (if any), but this form may also be suitable for a contract which includes, or wholly comprises, Contractor-designed civil, mechanical, electrical and/or construction works.

The forms are recommended for general use where tenders are invited on an international basis. Modifications may be required in some jurisdictions, particularly if the Conditions are to be used on domestic contracts. FIDIC considers the official and authentic texts to be the versions in the English language.

In the preparation of these Conditions of Contract for EPC/Turnkey Projects, it was recognised that, while there are many sub-clauses which will be generally applicable, there are some sub-clauses which must necessarily vary to take account of the

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circumstances relevant to the particular contract. The sub-clauses which were considered to be applicable to many (but not all) contracts have been included in the General Conditions, in order to facilitate their incorporation into each contract.

The General Conditions and the Particular Conditions will together comprise the Conditions of Contract governing the rights and obligations of the parties. It will be necessary to prepare the Particular Conditions for each individual contract, and to take account of those sub-clauses in the General Conditions which mention the Particular Conditions.

For this publication, the General Conditions were prepared on the following basis:

(i) interim payments, in respect of the lump sum Contract Price, will be made as work proceeds, and will typically be based on instalments specified in a schedule;

(ii) if the wording in the General Conditions necessitates further data which would typically be prescribed by the Employer, then the sub-clause makes reference to this data being contained in the Particular Conditions or in the Employer's Requirements;

(iii) where a sub-clause in the General Conditions deals with a matter on which different contract terms are likely to be applicable for different contracts, the principles applied in writing the sub-clause were:

(a) users would find it more convenient if any provisions which they did not wish to apply could simply be deleted or not invoked, than if additional text had to be written (in the Particular Conditions) because the General Conditions did not cover their requirements; or

(b) in other cases, where the application of (a) was thought to be inappropriate, the sub-clause contains the provisions which were considered applicable to most contracts.

For example, Sub-Clause 14.2 [*Advance Payment*] is included for convenience, not because of any FIDIC policy in respect of advance payments. This Sub-Clause becomes inapplicable (even if it is not deleted) if it is disregarded by not specifying the amount of the advance. It should therefore be noted that some of the provisions contained in the General Conditions may not be appropriate for an apparently-typical contract.

Further information on these aspects, example wording for other arrangements, and other explanatory material and a check-list and example wording to assist in the preparation of the Particular Conditions and the other tender documents, are included within this publication as Guidance for the Preparation of the Particular Conditions. Before incorporating any example wording, it must be checked to ensure that it is wholly suitable for the particular circumstances; if not, it must be amended.

Where example wording is amended, and in all cases where other amendments or additions are made, care must be taken to ensure that no ambiguity is created, either with the General Conditions or between the clauses in the Particular Conditions. It is essential that all these drafting tasks, and the entire preparation of the tender

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documents, are entrusted to personnel with the relevant expertise, including the contractual, technical and procurement aspects.

This publication concludes with example forms for the Letter of Tender, the Contract Agreement, and alternatives for the Dispute Adjudication Agreement. This Dispute Adjudication Agreement provides text for the agreement between the Employer, the Contractor and the person appointed to act either as sole adjudicator or as a member of a three-person dispute adjudication board; and incorporates (by reference) the terms in the Appendix to the General Conditions.

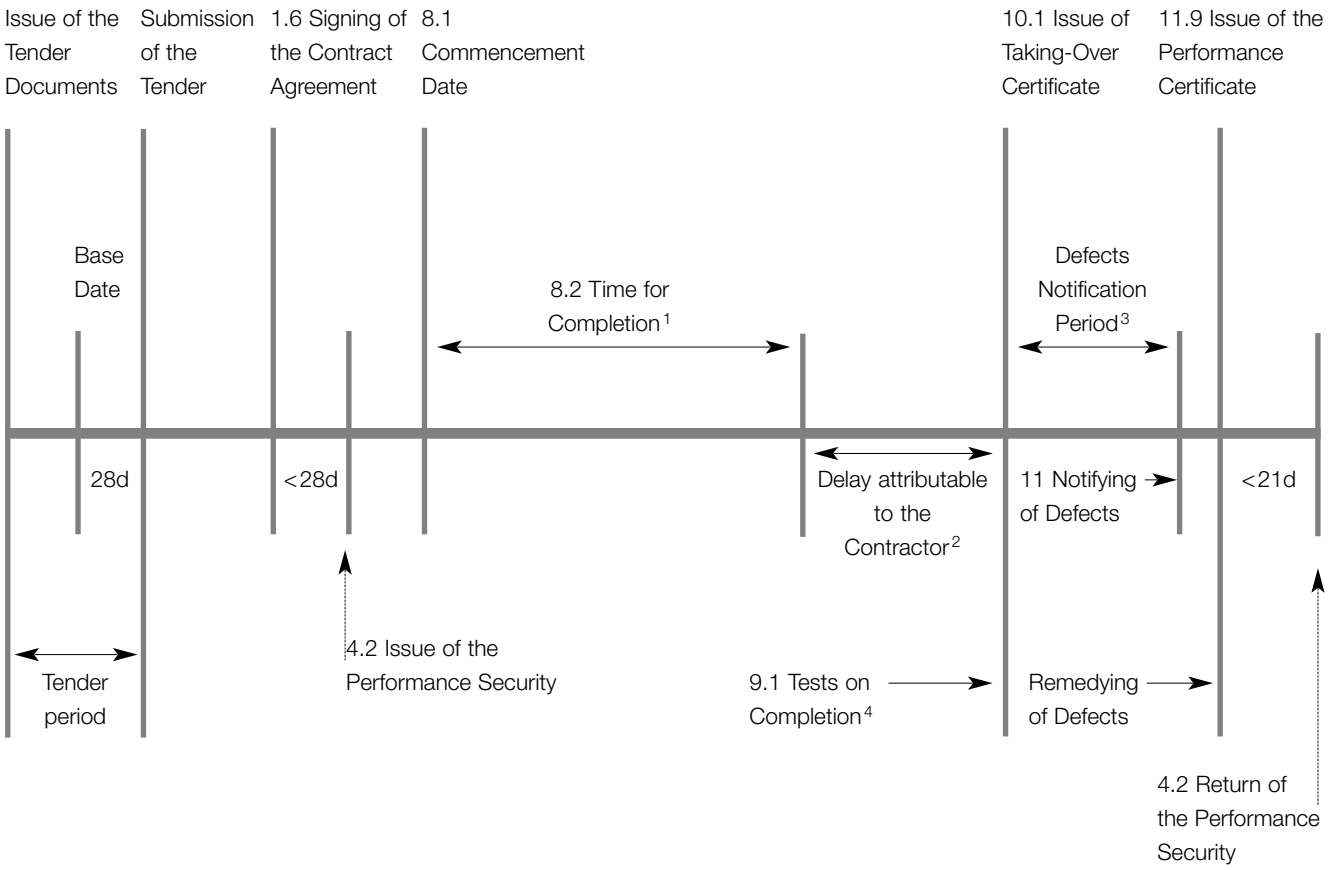
FIDIC intends to publish a guide to the use of its Conditions of Contract for Construction, for Plant and Design-Build, and for EPC/Turnkey Projects.

In order to clarify the sequence of Contract activities, reference may be made to the charts on the next two pages and to the Sub-Clauses listed below (some Sub-Clause numbers are also stated in the charts). The charts are illustrative and must not be taken into consideration in the interpretation of the Conditions of Contract.

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1.1.3.6	&	12.1	Tests after Completion (if any)
1.1.3.7	&	11.1	Defects Notification Period (as extended under 11.3)
1.1.3.8	&	11.9	Performance Certificate

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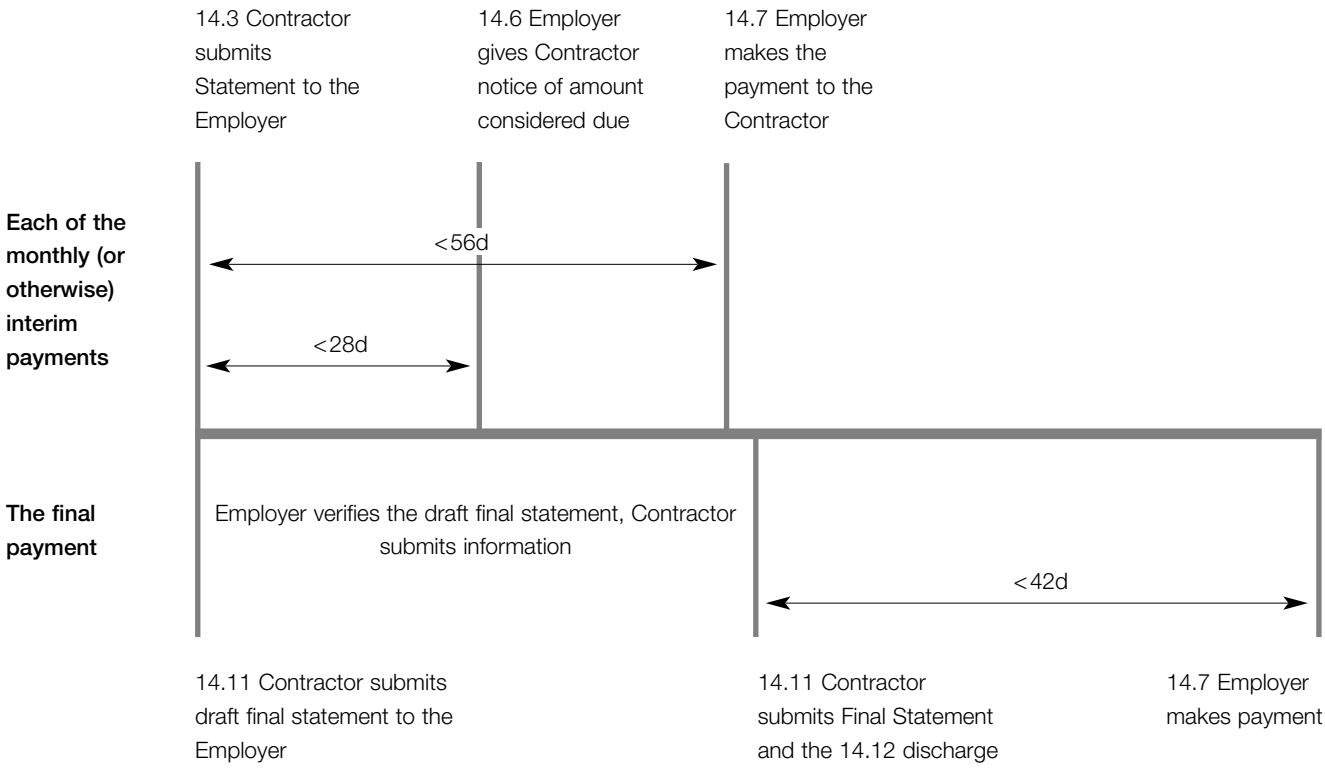


Typical sequence of Principal Events during Contracts for EC/Turnkey Projects

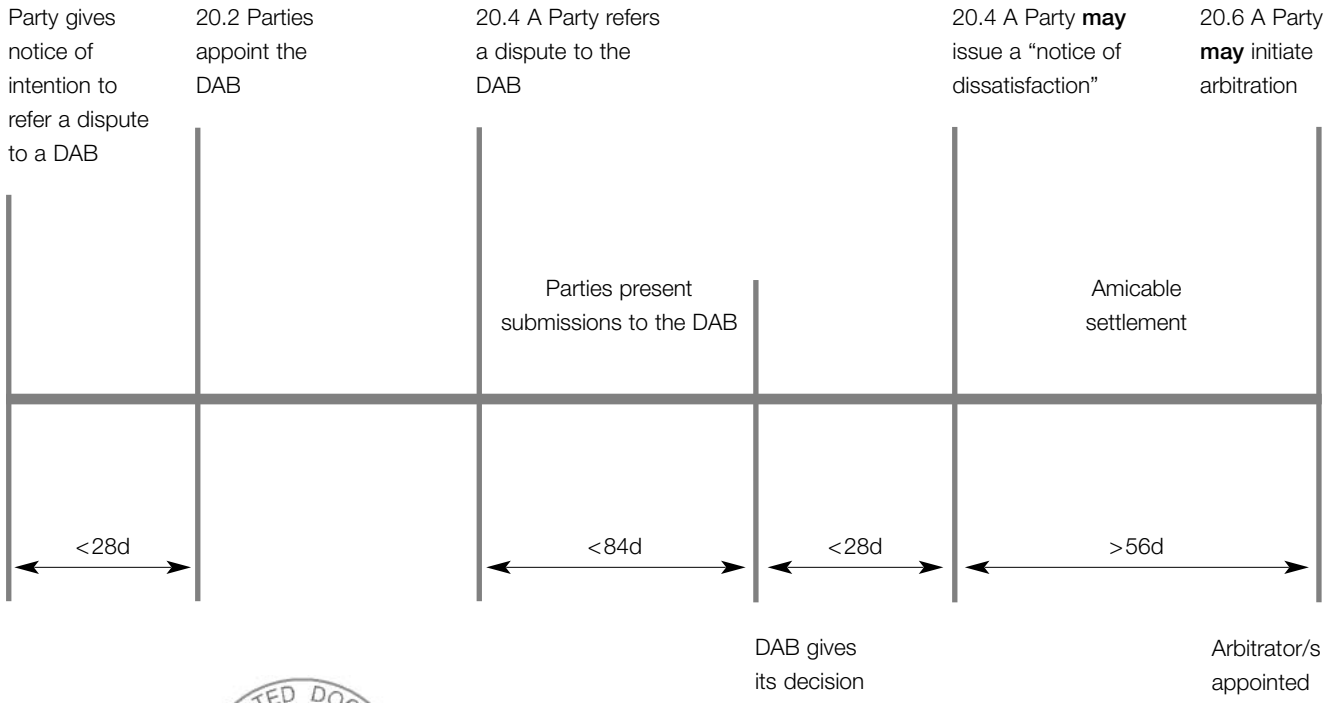
1. The Time for Completion is to be stated (in the Particular Conditions) as a number of days, to which is added any extensions of time under Sub-Clause 8.4.
2. In order to indicate the sequence of events, the above diagram is based upon the example of the Contractor failing to comply with Sub-Clause 8.2.
3. The Defects Notification Period is to be stated (in the Particular Conditions) as a number of days, to which is added any extensions under Sub-Clause 11.3.
4. Depending on the type of Works, Tests after Completion may also be required.

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Typical sequence of Payment Events envisaged in Clause 14



Typical sequence of Dispute Events envisaged in Clause 20

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GENERAL CONDITIONS

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

FORMS OF LETTER OF TENDER, CONTRACT AGREEMENT AND DISPUTE ADJUDICATION AGREEMENT

Conditions of Contract for **EPC/Turnkey Projects**

General Conditions

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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

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General Conditions

1 General Provisions

1.1 Definitions

In the Conditions of Contract ("these Conditions"), which include Particular Conditions and these General Conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.

1.1.1 The Contract

1.1.1.1 "**Contract**" means the Contract Agreement, these Conditions, the Employer's Requirements, the Tender, and the further documents (if any) which are listed in the Contract Agreement.

1.1.1.2 "**Contract Agreement**" means the contract agreement referred to in Sub-Clause 1.6 [*Contract Agreement*], including any annexed memoranda.

1.1.1.3 "**Employer's Requirements**" means the document entitled employer's requirements, as included in the Contract, and any additions and modifications to such document in accordance with the Contract. Such document specifies the purpose, scope, and/or design and/or other technical criteria, for the Works.

1.1.1.4 "**Tender**" means the Contractor's signed offer for the Works and all other documents which the Contractor submitted therewith (other than these Conditions and the Employer's Requirements, if so submitted), as included in the Contract.

1.1.1.5 "**Performance Guarantees**" and "**Schedule of Payments**" mean the documents so named (if any), as included in the Contract.

1.1.2 Parties and Persons

1.1.2.1 "**Party**" means the Employer or the Contractor, as the context requires.

1.1.2.2 "**Employer**" means the person named as employer in the Contract Agreement and the legal successors in title to this person.

1.1.2.3 "**Contractor**" means the person(s) named as contractor in the Contract Agreement and the legal successors in title to this person(s).

1.1.2.4 "**Employer's Representative**" means the person named by the Employer in the Contract or appointed from time to time by the Employer under Sub-Clause 3.1 [*The Employer's Representative*], who acts on behalf of the Employer.

1.1.2.5 "**Contractor's Representative**" means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under Sub-Clause 4.3 [*Contractor's Representative*], who acts on behalf of the Contractor.

1.1.2.6 "**Employer's Personnel**" means the Employer's Representative, the assistants referred to in Sub-Clause 3.2 [*Other Employer's Personnel*]

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and all other staff, labour and other employees of the Employer and of the Employer's Representative; and any other personnel notified to the Contractor, by the Employer or the Employer's Representative, as Employer's Personnel.

1.1.2.7 "**Contractor's Personnel**" means the Contractor's Representative and all personnel whom the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works.

1.1.2.8 "**Subcontractor**" means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.

1.1.2.9 "**DAB**" means the person or three persons so named in the Contract, or other person(s) appointed under Sub-Clause 20.2 [*Appointment of the Dispute Adjudication Board*] or Sub-Clause 20.3 [*Failure to Agree Dispute Adjudication Board*].

1.1.2.10 "**FIDIC**" means the Fédération Internationale des Ingénieurs-Conseils, the international federation of consulting engineers.

1.1.3 Dates, Tests, Periods and Completion

1.1.3.1 "**Base Date**" means the date 28 days prior to the latest date for submission of the Tender.

1.1.3.2 "**Commencement Date**" means the date notified under Sub-Clause 8.1 [*Commencement of Works*], unless otherwise defined in the Contract Agreement.

1.1.3.3 "**Time for Completion**" means the time for completing the Works or a Section (as the case may be) under Sub-Clause 8.2 [*Time for Completion*], as stated in the Particular Conditions (with any extension under Sub-Clause 8.4 [*Extension of Time for Completion*]), calculated from the Commencement Date.

1.1.3.4 "**Tests on Completion**" means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out under Clause 9 [*Tests on Completion*] before the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.5 "**Taking-Over Certificate**" means a certificate issued under Clause 10 [*Employer's Taking Over*].

1.1.3.6 "**Tests after Completion**" means the tests (if any) which are specified in the Contract and which are carried out under Clause 12 [*Tests after Completion*] after the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.7 "**Defects Notification Period**" means the period for notifying defects in the Works or a Section (as the case may be) under Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying Defects*], as stated in the Particular Conditions (with any extension under Sub-Clause 11.3 [*Extension of Defects Notification Period*]), calculated from the date on which the Works or Section is completed as certified under Sub-Clause

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10.1 [*Taking Over of the Works and Sections*]. If no such period is stated in the Particular Conditions, the period shall be one year.

1.1.3.8 "**Performance Certificate**" means the certificate issued under Sub-Clause 11.9 [*Performance Certificate*].

1.1.3.9 "**day**" means a calendar day and "**year**" means 365 days.

1.1.4 Money and Payments

1.1.4.1 "**Contract Price**" means the agreed amount stated in the Contract Agreement for the design, execution and completion of the Works and the remedying of any defects, and includes adjustments (if any) in accordance with the Contract.

1.1.4.2 "**Cost**" means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.

1.1.4.3 "**Final Statement**" means the statement defined in Sub-Clause 14.11 [*Application for Final Payment*].

1.1.4.4 "**Foreign Currency**" means a currency in which part (or all) of the Contract Price is payable, but not the Local Currency.

1.1.4.5 "**Local Currency**" means the currency of the Country.

1.1.4.6 "**Provisional Sum**" means a sum (if any) which is specified in the Contract as a provisional sum, for the execution of any part of the Works or for the supply of Plant, Materials or services under Sub-Clause 13.5 [*Provisional Sums*].

1.1.4.7 "**Retention Money**" means the accumulated retention moneys which the Employer retains under Sub-Clause 14.3 [*Application for Interim Payments*] and pays under Sub-Clause 14.9 [*Payment of Retention Money*].

1.1.4.8 "**Statement**" means a statement submitted by the Contractor as part of an application for payment under Clause 14 [*Contract Price and Payment*].

1.1.5 Works and Goods

1.1.5.1 "**Contractor's Equipment**" means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor's Equipment excludes Temporary Works, Employer's Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.

1.1.5.2 "**Goods**" means Contractor's Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.

1.1.5.3 "**Materials**" means things of all kinds (other than Plant) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.

1.1.5.4 "**Permanent Works**" means the permanent works to be designed and executed by the Contractor under the Contract.

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1.1.5.5 "**Plant**" means the apparatus, machinery and vehicles intended to form or forming part of the Permanent Works.

1.1.5.6 "**Section**" means a part of the Works specified in the Particular Conditions as a Section (if any).

1.1.5.7 "**Temporary Works**" means all temporary works of every kind (other than Contractor's Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.

1.1.5.8 "**Works**" mean the Permanent Works and the Temporary Works, or either of them as appropriate.

1.1.6 Other Definitions

1.1.6.1 "**Contractor's Documents**" means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature supplied by the Contractor under the Contract; as described in Sub-Clause 5.2 [*Contractor's Documents*].

1.1.6.2 "**Country**" means the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.

1.1.6.3 "**Employer's Equipment**" means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Employer's Requirements; but does not include Plant which has not been taken over by the Employer.

1.1.6.4 "**Force Majeure**" is defined in Clause 19 [*Force Majeure*].

1.1.6.5 "**Laws**" means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.

1.1.6.6 "**Performance Security**" means the security (or securities, if any) under Sub-Clause 4.2 [*Performance Security*].

1.1.6.7 "**Site**" means the places where the Permanent Works are to be executed and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.

1.1.6.8 "**Variation**" means any change to the Employer's Requirements or the Works, which is instructed or approved as a variation under Clause 13 [*Variations and Adjustments*].

1.2 Interpretation

In the Contract, except where the context requires otherwise:

(a) words indicating one gender include all genders;
(b) words indicating the singular also include the plural and words indicating the plural also include the singular;
(c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
(d) "written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

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The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

1.3

Communications

Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices and requests, these communications shall be:

(a) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as stated in the Particular Conditions; and
(b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract. However:

(i) if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and
(ii) if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to the address from which the request was issued.

Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed.

1.4

Law and Language

The Contract shall be governed by the law of the country (or other jurisdiction) stated in the Particular Conditions.

If there are versions of any part of the Contract which are written in more than one language, the version which is in the ruling language stated in the Particular Conditions shall prevail.

The language for communications shall be that stated in the Particular Conditions. If no language is stated there, the language for communications shall be the language in which the Contract (or most of it) is written.

1.5

Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

(a) the Contract Agreement,
(b) the Particular Conditions,
(c) these General Conditions,
(d) the Employer's Requirements,
(e) the Tender and any other documents forming part of the Contract.

1.6

Contract Agreement

The Contract shall come into full force and effect on the date stated in the Contract Agreement. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer.

1.7

Assignment

Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party:

(a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party, and

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(b) may, as security in favour of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.

1.8

Care and Supply of Documents

Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Employer six copies of each of the Contractor's Documents.

The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Employer's Requirements, the Contractor's Documents, and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.

If a Party becomes aware of an error or defect of a technical nature in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.

1.9

Confidentiality

Both Parties shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out obligations under it or to comply with applicable Laws. The Contractor shall not publish, permit to be published, or disclose any particulars of the Works in any trade or technical paper or elsewhere without the previous agreement of the Employer.

1.10

Employer's Use of Contractor's Documents

As between the Parties, the Contractor shall retain the copyright and other intellectual property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.

The Contractor shall be deemed (by signing the Contract) to give to the Employer a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:

(a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works,
(b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and
(c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor.

The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.

1.11

Contractor's Use of Employer's Documents

As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Employer's Requirements and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract.

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They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

1.12

Confidential Details

The Contractor shall not be required to disclose, to the Employer, any information which the Contractor described in the Tender as being confidential. The Contractor shall disclose any other information which the Employer may reasonably require in order to verify the Contractor's compliance with the Contract.

1.13

Compliance with Laws

The Contractor shall, in performing the Contract, comply with applicable Laws. Unless otherwise stated in the Particular Conditions:

(a) the Employer shall have obtained (or shall obtain) the planning, zoning or similar permission for the Permanent Works, and any other permissions described in the Employer's Requirements as having been (or being) obtained by the Employer; and the Employer shall indemnify and hold the Contractor harmless against and from the consequences of any failure to do so; and

(b) the Contractor shall give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the Laws in relation to the design, execution and completion of the Works and the remedying of any defects; and the Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so.

1.14

Joint and Several Liability

If the Contractor constitutes (under applicable Laws) a joint venture, consortium or other unincorporated grouping of two or more persons:

(a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;

(b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and

(c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.

2 The Employer

2.1

Right of Access to the Site

The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Particular Conditions. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Employer's Requirements. However, the Employer may withhold any such right or possession until the Performance Security has been received.

If no such time is stated in the Particular Conditions, the Employer shall give the Contractor right of access to, and possession of, the Site with effect from the Commencement Date.

If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall

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give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.

2.2

Permits, Licences or Approvals

The Employer shall (where he is in a position to do so) provide reasonable assistance to the Contractor at the request of the Contractor:

(a) by obtaining copies of the Laws of the Country which are relevant to the Contract but are not readily available, and
(b) for the Contractor's applications for any permits, licences or approvals required by the Laws of the Country:

    (i) which the Contractor is required to obtain under Sub-Clause 1.13 [*Compliance with Laws*],
    (ii) for the delivery of Goods, including clearance through customs, and
    (iii) for the export of Contractor's Equipment when it is removed from the Site.

2.3

Employer's Personnel

The Employer shall be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:

(a) co-operate with the Contractor's efforts under Sub-Clause 4.6 [*Co-operation*], and
(b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of Sub-Clause 4.8 [*Safety Procedures*] and under Sub-Clause 4.18 [*Protection of the Environment*].

2.4

Employer's Financial Arrangements

The Employer shall submit, within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price (as estimated at that time) in accordance with Clause 14 [*Contract Price and Payment*]. If the Employer intends to make any material change to his financial arrangements, the Employer shall give notice to the Contractor with detailed particulars.

2.5

Employer's Claims

If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, he shall give notice and particulars to the Contractor. However, notice is not required for payments due under Sub-Clause 4.19 [*Electricity, Water and Gas*], under Sub-Clause 4.20 [*Employer's Equipment and Free-Issue Material*], or for other services requested by the Contractor.

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The notice shall be given as soon as practicable after the Employer became aware of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.

The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Employer shall then proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defects Notification Period in accordance with Sub-Clause 11.3 [*Extension of Defects Notification Period*].

The Employer may deduct this amount from any moneys due, or to become due, to the Contractor. The Employer shall only be entitled to set off against or make any deduction from an amount due to the Contractor, or to otherwise claim against the Contractor, in accordance with this Sub-Clause or with sub-paragraph (a) and/or (b) of Sub-Clause 14.6 [*Interim Payments*].

3 The Employer's Administration

3.1 The Employer's Representative

The Employer may appoint an Employer's Representative to act on his behalf under the Contract. In this event, he shall give notice to the Contractor of the name, address, duties and authority of the Employer's Representative.

The Employer's Representative shall carry out the duties assigned to him, and shall exercise the authority delegated to him, by the Employer. Unless and until the Employer notifies the Contractor otherwise, the Employer's Representative shall be deemed to have the full authority of the Employer under the Contract, except in respect of Clause 15 [*Termination by Employer*].

If the Employer wishes to replace any person appointed as Employer's Representative, the Employer shall give the Contractor not less than 14 days' notice of the replacement's name, address, duties and authority, and of the date of appointment.

3.2 Other Employer's Personnel

The Employer or the Employer's Representative may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation or revocation shall not take effect until a copy of it has been received by the Contractor.

Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

3.3 Delegated Persons

All these persons, including the Employer's Representative and assistants, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by a delegated person, in accordance with the delegation, shall have the same effect as though the act had been an act of the Employer. However:

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(a) unless otherwise stated in the delegated person's communication relating to such act, it shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances;
(b) any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the Employer to reject the work, Plant or Materials; and
(c) if the Contractor questions any determination or instruction of a delegated person, the Contractor may refer the matter to the Employer, who shall promptly confirm, reverse or vary the determination or instruction.

3.4 Instructions

The Employer may issue to the Contractor instructions which may be necessary for the Contractor to perform his obligations under the Contract. Each instruction shall be given in writing and shall state the obligations to which it relates and the Sub-Clause (or other term of the Contract) in which the obligations are specified. If any such instruction constitutes a Variation, Clause 13 [*Variations and Adjustments*] shall apply.

The Contractor shall take instructions from the Employer, or from the Employer's Representative or an assistant to whom the appropriate authority has been delegated under this Clause.

3.5 Determinations

Whenever these Conditions provide that the Employer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Employer shall consult with the Contractor in an endeavour to reach agreement. If agreement is not achieved, the Employer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

The Employer shall give notice to the Contractor of each agreement or determination, with supporting particulars. Each Party shall give effect to each agreement or determination, unless the Contractor gives notice, to the Employer, of his dissatisfaction with a determination within 14 days of receiving it. Either Party may then refer the dispute to the DAB in accordance with Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*].

4 The Contractor

4.1 Contractor's General Obligations

The Contractor shall design, execute and complete the Works in accordance with the Contract, and shall remedy any defects in the Works. When completed, the Works shall be fit for the purposes for which the Works are intended as defined in the Contract.

The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

The Works shall include any work which is necessary to satisfy the Employer's Requirements, or is implied by the Contract, and all works which (although not mentioned in the Contract) are necessary for stability or for the completion, or safe and proper operation, of the Works.

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The Contractor shall be responsible for the adequacy, stability and safety of all Site operations, of all methods of construction and of all the Works.

The Contractor shall, whenever required by the Employer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Employer.

4.2 Performance Security

The Contractor shall obtain (at his cost) a Performance Security for proper performance, in the amount and currencies stated in the Particular Conditions. If an amount is not stated in the Particular Conditions, this Sub-Clause shall not apply.

The Contractor shall deliver the Performance Security to the Employer within 28 days after both Parties have signed the Contract Agreement. The Performance Security shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.

The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects. If the terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works have been completed and any defects have been remedied.

The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract in the event of:

(a) failure by the Contractor to extend the validity of the Performance Security as described in the preceding paragraph, in which event the Employer may claim the full amount of the Performance Security,
(b) failure by the Contractor to pay the Employer an amount due, as either agreed by the Contractor or determined under Sub-Clause 2.5 [*Employer's Claims*] or Clause 20 [*Claims, Disputes and Arbitration*], within 42 days after this agreement or determination,
(c) failure by the Contractor to remedy a default within 42 days after receiving the Employer's notice requiring the default to be remedied, or
(d) circumstances which entitle the Employer to termination under Sub-Clause 15.2 [*Termination by Employer*], irrespective of whether notice of termination has been given.

The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not entitled to make the claim.

The Employer shall return the Performance Security to the Contractor within 21 days after the Contractor has become entitled to receive the Performance Certificate.

4.3 Contractor's Representative

The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract.

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Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Employer for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked, or if the appointed person fails to act as Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.

The Contractor shall not, without the prior consent of the Employer, revoke the appointment of the Contractor's Representative or appoint a replacement.

The Contractor's Representative shall, on behalf of the Contractor, receive instructions under Sub-Clause 3.4 [*Instructions*].

The Contractor's Representative may delegate any powers, functions and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Employer has received prior notice signed by the Contractor's Representative, naming the person and specifying the powers, functions and authority being delegated or revoked.

The Contractor's Representative and all these persons shall be fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

4.4

Subcontractors

The Contractor shall not subcontract the whole of the Works.

The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as if they were the acts or defaults of the Contractor. Where specified in the Particular Conditions, the Contractor shall give the Employer not less than 28 days' notice of:

(a) the intended appointment of the Subcontractor, with detailed particulars which shall include his relevant experience,
(b) the intended commencement of the Subcontractor's work, and
(c) the intended commencement of the Subcontractor's work on the Site.

4.5

Nominated Subcontractors

In this Sub-Clause, "nominated Subcontractor" means a Subcontractor whom the Employer, under Clause 13 [*Variations and Adjustments*], instructs the Contractor to employ as a Subcontractor. The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by notice to the Employer as soon as practicable, with supporting particulars.

4.6

Co-operation

The Contractor shall, as specified in the Contract or as instructed by the Employer, allow appropriate opportunities for carrying out work to:

(a) the Employer's Personnel,
(b) any other contractors employed by the Employer, and
(c) the personnel of any legally constituted public authorities,

who may be employed in the execution on or near the Site of any work not included in the Contract.

Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to incur Cost in an amount which was not reasonably foreseeable by an

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experienced contractor by the date for submission of the Tender. Services for these personnel and other contractors may include the use of Contractor's Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.

The Contractor shall be responsible for his construction activities on the Site, and shall co-ordinate his own activities with those of other contractors to the extent (if any) specified in the Employer's Requirements.

If, under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Employer in the time and manner stated in the Employer's Requirements.

4.7 Setting Out

The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.

4.8 Safety Procedures

The Contractor shall:

(a) comply with all applicable safety regulations,
(b) take care for the safety of all persons entitled to be on the Site,
(c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,
(d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [*Employer's Taking Over*], and
(e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

4.9 Quality Assurance

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Employer shall be entitled to audit any aspect of the system.

Details of all procedures and compliance documents shall be submitted to the Employer for information before each design and execution stage is commenced. When any document of a technical nature is issued to the Employer, evidence of the prior approval by the Contractor himself shall be apparent on the document itself.

Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

4.10 Site Data

The Employer shall have made available to the Contractor for his information, prior to the Base Date, all relevant data in the Employer's possession on subsurface and hydrological conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data which come into the Employer's possession after the Base Date.

The Contractor shall be responsible for verifying and interpreting all such data. The Employer shall have no responsibility for the accuracy, sufficiency or completeness of such data, except as stated in Sub-Clause 5.1 [*General Design Responsibilities*].

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4.11 Sufficiency of the Contract Price

The Contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Contract Price.

Unless otherwise stated in the Contract, the Contract Price covers all the Contractor's obligations under the Contract (including those under Provisional Sums, if any) and all things necessary for the proper design, execution and completion of the Works and the remedying of any defects.

4.12 Unforeseeable Difficulties

Except as otherwise stated in the Contract:

(a) the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Works;
(b) by signing the Contract, the Contractor accepts total responsibility for having foreseen all difficulties and costs of successfully completing the Works; and
(c) the Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs.

4.13 Rights of Way and Facilities

The Contractor shall bear all costs and charges for special and/or temporary rights-of-way which he may require, including those for access to the Site. The Contractor shall also obtain, at his risk and cost, any additional facilities outside the Site which he may require for the purposes of the Works.

4.14 Avoidance of Interference

The Contractor shall not interfere unnecessarily or improperly with:

(a) the convenience of the public, or
(b) the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others.

The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

4.15 Access Route

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.

Except as otherwise stated in these Conditions:

(a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes;
(b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;
(c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route,
(d) the Employer does not guarantee the suitability or availability of particular access routes, and
(e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.

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4.16 Transport of Goods

Unless otherwise stated in the Particular Conditions:

(a) the Contractor shall give the Employer not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
(b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting all Goods and other things required for the Works; and
(c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.

4.17 Contractor's Equipment

The Contractor shall be responsible for all Contractor's Equipment. When brought on to the Site, Contractor's Equipment shall be deemed to be exclusively intended for the execution of the Works.

4.18 Protection of the Environment

The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values indicated in the Employer's Requirements, and shall not exceed the values prescribed by applicable Laws.

4.19 Electricity, Water and Gas

The Contractor shall, except as stated below, be responsible for the provision of all power, water and other services he may require.

The Contractor shall be entitled to use for the purposes of the Works such supplies of electricity, water, gas and other services as may be available on the Site and of which details and prices are given in the Employer's Requirements. The Contractor shall, at his risk and cost, provide any apparatus necessary for his use of these services and for measuring the quantities consumed.

The quantities consumed and the amounts due (at these prices) for such services shall be agreed or determined in accordance with Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*]. The Contractor shall pay these amounts to the Employer.

4.20 Employer's Equipment and Free-Issue Material

The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Employer's Requirements. Unless otherwise stated in the Employer's Requirements:

(a) the Employer shall be responsible for the Employer's Equipment, except that
(b) the Contractor shall be responsible for each item of Employer's Equipment whilst any of the Contractor's Personnel is operating it, driving it, directing it or in possession or control of it.

The appropriate quantities and the amounts due (at such stated prices) for the use of Employer's Equipment shall be agreed or determined in accordance with Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*]. The Contractor shall pay these amounts to the Employer.

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The Employer shall supply, free of charge, the "free-issue materials" (if any) in accordance with the details stated in the Employer's Requirements. The Employer shall, at his risk and cost, provide these materials at the time and place specified in the Contract. The Contractor shall then visually inspect them, and shall promptly give notice to the Employer of any shortage, defect or default in these materials. Unless otherwise agreed by both Parties, the Employer shall immediately rectify the notified shortage, defect or default.

After this visual inspection, the free-issue materials shall come under the care, custody and control of the Contractor. The Contractor's obligations of inspection, care, custody and control shall not relieve the Employer of liability for any shortage, defect or default not apparent from a visual inspection.

4.21

Progress Reports

Unless otherwise stated in the Particular Conditions, monthly progress reports shall be prepared by the Contractor and submitted to the Employer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates.

Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

Each report shall include:

(a) charts and detailed descriptions of progress, including each stage of design, Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection, testing, commissioning and trial operation;
(b) photographs showing the status of manufacture and of progress on the Site;
(c) for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:

  (i) commencement of manufacture,
  (ii) Contractor's inspections,
  (iii) tests, and
  (iv) shipment and arrival at the Site;

(d) the details described in Sub-Clause 6.10 [*Records of Contractor's Personnel and Equipment*];
(e) copies of quality assurance documents, test results and certificates of Materials;
(f) list of Variations, notices given under Sub-Clause 2.5 [*Employer's Claims*] and notices given under Sub-Clause 20.1 [*Contractor's Claims*];
(g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
(h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardize the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.

4.22

Security of the Site

Unless otherwise stated in the Particular Conditions:

(a) the Contractor shall be responsible for keeping unauthorised persons off the Site, and

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(b) authorised persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by (or on behalf of) the Employer, as authorised personnel of the Employer's other contractors on the Site.

4.23

Contractor's Operations on Site

The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Employer as working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.

During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.

Upon the issue of the Taking-Over Certificate for the Works, the Contractor shall clear away and remove all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave the Site and the Works in a clean and safe condition. However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfil obligations under the Contract.

4.24

Fossils

All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any of these findings.

The Contractor shall, upon discovery of any such finding, promptly give notice to the Employer, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this further notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

5 Design

5.1

General Design Obligations

The Contractor shall be deemed to have scrutinised, prior to the Base Date, the Employer's Requirements (including design criteria and calculations, if any). The Contractor shall be responsible for the design of the Works and for the accuracy of such Employer's Requirements (including design criteria and calculations), except as stated below.

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The Employer shall not be responsible for any error, inaccuracy or omission of any kind in the Employer's Requirements as originally included in the Contract and shall not be deemed to have given any representation of accuracy or completeness of any data or information, except as stated below. Any data or information received by the Contractor, from the Employer or otherwise, shall not relieve the Contractor from his responsibility for the design and execution of the Works.

However, the Employer shall be responsible for the correctness of the following portions of the Employer's Requirements and of the following data and information provided by (or on behalf of) the Employer:

(a) portions, data and information which are stated in the Contract as being immutable or the responsibility of the Employer,
(b) definitions of intended purposes of the Works or any parts thereof,
(c) criteria for the testing and performance of the completed Works, and
(d) portions, data and information which cannot be verified by the Contractor, except as otherwise stated in the Contract.

5.2 Contractor's Documents

The Contractor's Documents shall comprise the technical documents specified in the Employer's Requirements, documents required to satisfy all regulatory approvals, and the documents described in Sub-Clause 5.6 [*As-Built Documents*] and Sub-Clause 5.7 [*Operation and Maintenance Manuals*]. Unless otherwise stated in the Employer's Requirements, the Contractor's Documents shall be written in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

The Contractor shall prepare all Contractor's Documents, and shall also prepare any other documents necessary to instruct the Contractor's Personnel.

If the Employer's Requirements describe the Contractor's Documents which are to be submitted to the Employer for review, they shall be submitted accordingly, together with a notice as described below. In the following provisions of this Sub-Clause, (i) "review period" means the period required by the Employer for review, and (ii) "Contractor's Documents" exclude any documents which are not specified as being required to be submitted for review.

Unless otherwise stated in the Employer's Requirements, each review period shall not exceed 21 days, calculated from the date on which the Employer receives a Contractor's Document and the Contractor's notice. This notice shall state that the Contractor's Document is considered ready, both for review in accordance with this Sub-Clause and for use. The notice shall also state that the Contractor's Document complies with the Contract, or the extent to which it does not comply.

The Employer may, within the review period, give notice to the Contractor that a Contractor's Document fails (to the extent stated) to comply with the Contract. If a Contractor's Document so fails to comply, it shall be rectified, resubmitted and reviewed in accordance with this Sub-Clause, at the Contractor's cost.

For each part of the Works, and except to the extent that the Parties otherwise agree:

(a) execution of such part of the Works shall not commence prior to the expiry of the review periods for all the Contractor's Documents which are relevant to its design and execution;
(b) execution of such part of the Works shall be in accordance with these Contractor's Documents, as submitted for review; and

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(c) if the Contractor wishes to modify any design or document which has previously been submitted for review, the Contractor shall immediately give notice to the Employer. Thereafter, the Contractor shall submit revised documents to the Employer in accordance with the above procedure.

Any such agreement (under the preceding paragraph) or any review (under this Sub-Clause or otherwise) shall not relieve the Contractor from any obligation or responsibility.

5.3

Contractor's Undertaking

The Contractor undertakes that the design, the Contractor's Documents, the execution and the completed Works will be in accordance with:

(a) the Laws in the Country, and
(b) the documents forming the Contract, as altered or modified by Variations.

5.4

Technical Standards and Regulations

The design, the Contractor's Documents, the execution and the completed Works shall comply with the Country's technical standards, building, construction and environmental Laws, Laws applicable to the product being produced from the Works, and other standards specified in the Employer's Requirements, applicable to the Works, or defined by the applicable Laws.

All these Laws shall, in respect of the Works and each Section, be those prevailing when the Works or Section are taken over by the Employer under Clause 10 [*Employer's Taking Over*]. References in the Contract to published standards shall be understood to be references to the edition applicable on the Base Date, unless stated otherwise.

If changed or new applicable standards come into force in the Country after the Base Date, the Contractor shall give notice to the Employer and (if appropriate) submit proposals for compliance. In the event that:

(a) the Employer determines that compliance is required, and
(b) the proposals for compliance constitute a variation,

then the Employer shall initiate a Variation in accordance with Clause 13 [*Variations and Adjustments*].

5.5

Training

The Contractor shall carry out the training of Employer's Personnel in the operation and maintenance of the Works to the extent specified in the Employer's Requirements. If the Contract specifies training which is to be carried out before taking-over, the Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until this training has been completed.

5.6

As-Built Documents

The Contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the Works, showing the exact as-built locations, sizes and details of the work as executed. These records shall be kept on the Site and shall be used exclusively for the purposes of this Sub-Clause. Two copies shall be supplied to the Employer prior to the commencement of the Tests on Completion.

In addition, the Contractor shall supply to the Employer as-built drawings of the Works, showing all Works as executed, and submit them to the Employer for review

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under Sub-Clause 5.2 [*Contractor's Documents*]. The Contractor shall obtain the consent of the Employer as to their size, the referencing system, and other relevant details.

Prior to the issue of any Taking-Over Certificate, the Contractor shall supply to the Employer the specified numbers and types of copies of the relevant as-built drawings, in accordance with the Employer's Requirements. The Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until the Employer has received these documents.

5.7

Operation and Maintenance Manuals

Prior to commencement of the Tests on Completion, the Contractor shall supply to the Employer provisional operation and maintenance manuals in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair the Plant.

The Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until the Employer has received final operation and maintenance manuals in such detail, and any other manuals specified in the Employer's Requirements for these purposes.

5.8

Design Error

If errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the Contractor's Documents, they and the Works shall be corrected at the Contractor's cost, notwithstanding any consent or approval under this Clause.

6 Staff and Labour

6.1

Engagement of Staff and Labour

Except as otherwise stated in the Employer's Requirements, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, housing, feeding and transport.

6.2

Rates of Wages and Conditions of Labour

The Contractor shall pay rates of wages, and observe conditions of labour, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

6.3

Persons in the Service of Others

The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.

6.4

Labour Laws

The Contractor shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.

6.5

Working Hours

No work shall be carried out on the Site on locally recognised days of rest, or outside normal working hours, unless:

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(a) otherwise stated in the Contract,
(b) the Employer gives consent, or
(c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Employer.

6.6

Facilities for Staff and Labour

Except as otherwise stated in the Employer's Requirements, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Employer's Requirements.

The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

6.7

Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send, to the Employer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Employer may reasonably require.

6.8

Contractor's Superintendence

Throughout the design and execution of the Works, and as long thereafter as is necessary to fulfil the Contractor's obligations, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the work.

Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications (defined in Sub-Clause 1.4 [*Law and Language*]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works.

6.9

Contractor's Personnel

The Contractor's Personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. The Employer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:

(a) persists in any misconduct or lack of care,
(b) carries out duties incompetently or negligently,

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(c) fails to conform with any provisions of the Contract, or
(d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.

6.10

Records of Contractor's Personnel and Equipment

The Contractor shall submit, to the Employer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Employer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

6.11

Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.

7 Plant, Materials and Workmanship

7.1

Manner of Execution

The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:

(a) in the manner (if any) specified in the Contract,
(b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and
(c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.

7.2

Samples

The Contractor shall submit samples to the Employer, for review in accordance with the procedures for Contractor's Documents described in Sub-Clause 5.2 [*Contractor's Documents*], as specified in the Contract and at the Contractor's cost. Each sample shall be labelled as to origin and intended use in the Works.

7.3

Inspection

The Employer's Personnel shall at all reasonable times:

(a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
(b) during production, manufacture and construction (at the Site and, to the extent specified in the Contract, elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.

The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

In respect of the work which Employer's Personnel are entitled to examine, inspect, measure and/or test, the Contractor shall give notice to the Employer whenever any such work is ready and before it is covered up, put out of sight, or packaged for

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storage or transport. The Employer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Employer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Employer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.

7.4 Testing

This Sub-Clause shall apply to all tests specified in the Contract, other than the Tests after Completion (if any).

The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Employer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.

The Employer may, under Clause 13 [*Variations and Adjustments*], vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.

The Employer shall give the Contractor not less than 24 hours' notice of the Employer's intention to attend the tests. If the Employer does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Employer, and the tests shall then be deemed to have been made in the Employer's presence.

If the Contractor suffers delay and/or incurs Cost from complying with these instructions or as a result of a delay for which the Employer is responsible, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

The Contractor shall promptly forward to the Employer duly certified reports of the tests. When the specified tests have been passed, the Employer shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Employer has not attended the tests, he shall be deemed to have accepted the readings as accurate.

7.5 Rejection

If, as a result of an examination, inspection, measurement or testing, any Plant, Materials, design or workmanship is found to be defective or otherwise not in accordance with the Contract, the Employer may reject the Plant, Materials, design or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect and ensure that the rejected item complies with the Contract.

If the Employer requires this Plant, Materials, design or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and

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retesting cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer.

7.6

Remedial Work

Notwithstanding any previous test or certification, the Employer may instruct the Contractor to:

(a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract,
(b) remove and re-execute any other work which is not in accordance with the Contract, and
(c) execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

If the Contractor fails to comply with any such instruction, which complies with Sub-Clause 3.4 [*Instructions*], the Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay to the Employer all costs arising from this failure.

7.7

Ownership of Plant and Materials

Each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:

(a) when it is delivered to the Site;
(b) when the Contractor is entitled to payment of the value of the Plant and Materials under Sub-Clause 8.10 [*Payment for Plant and Materials in Event of Suspension*].

7.8

Royalties

Unless otherwise stated in the Employer's Requirements, the Contractor shall pay all royalties, rents and other payments for:

(a) natural Materials obtained from outside the Site, and
(b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.

8 Commencement, Delays and Suspension

8.1
Commencement of Works

Unless otherwise stated in the Contract Agreement:

(a) the Employer shall give the Contractor not less than 7 days' notice of the Commencement Date; and
(b) the Commencement Date shall be within 42 days after the date on which the Contract comes into full force and effect under Sub-Clause 1.6 [*Contract Agreement*].

The Contractor shall commence the design and execution of the Works as soon as is reasonably practicable after the Commencement Date, and shall then proceed with the Works with due expedition and without delay.

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8.2 Time for Completion

The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:

(a) achieving the passing of the Tests on Completion, and
(b) completing all work which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*].

8.3 Programme

The Contractor shall submit a time programme to the Employer within 28 days after the Commencement Date. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Unless otherwise stated in the Contract, each programme shall include:

(a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each major stage of the Works,
(b) the periods for reviews under Sub-Clause 5.2 [*Contractor's Documents*],
(c) the sequence and timing of inspections and tests specified in the Contract, and
(d) a supporting report which includes:

    (i) a general description of the methods which the Contractor intends to adopt for the execution of each major stage of the Works, and
    (ii) the approximate number of each class of Contractor's Personnel and of each type of Contractor's Equipment for each major stage.

Unless the Employer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.

The Contractor shall promptly give notice to the Employer of specific probable future events or circumstances which may adversely affect or delay the execution of the Works. In this event, or if the Employer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Employer in accordance with this Sub-Clause.

8.4 Extension of Time for Completion

The Contractor shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [*Taking Over of the Works and Sections*] is or will be delayed by any of the following causes:

(a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [*Variation Procedure*]),
(b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions, or
(c) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors on the Site.

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Employer in accordance with Sub-

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Clause 20.1 [*Contractor's Claims*]. When determining each extension of time under Sub-Clause 20.1, the Employer shall review previous determinations and may increase, but shall not decrease, the total extension of time.

8.5

Delays Caused by Authorities

If the following conditions apply, namely:

(a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,
(b) these authorities delay or disrupt the Contractor's work, and
(c) the delay or disruption was not reasonably foreseeable by an experienced contractor by the date for submission of the Tender,

then this delay or disruption will be considered as a cause of delay under sub-paragraph (b) of Sub-Clause 8.4 [*Extension of Time for Completion*].

8.6

Rate of Progress

If, at any time:

(a) actual progress is too slow to complete within the Time for Completion, and/or
(b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [*Programme*],

other than as a result of a cause listed in Sub-Clause 8.4 [*Extension of Time for Completion*], then the Employer may instruct the Contractor to submit, under Sub-Clause 8.3 [*Programme*], a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.

Unless the Employer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 8.7 below.

8.7

Delay Damages

If the Contractor fails to comply with Sub-Clause 8.2 [*Time for Completion*], the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Particular Conditions, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Particular Conditions.

These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [*Termination by Employer*] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.

8.8

Suspension of Work

The Employer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.

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The Employer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 8.9, 8.10 and 8.11 shall not apply.

8.9

Consequences of Suspension

If the Contractor suffers delay and/or incurs Cost from complying with the Employer's instructions under Sub-Clause 8.8 [*Suspension of Work*] and/or from resuming the work, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [*Suspension of Work*].

8.10

Payment for Plant and Materials in Event of Suspension

The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:

(a) the work on Plant or delivery of Plant and/or Materials has been suspended for more than 28 days, and
(b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Employer's instructions.

8.11

Prolonged Suspension

If the suspension under Sub-Clause 8.8 [*Suspension of Work*] has continued for more than 84 days, the Contractor may request the Employer's permission to proceed. If the Employer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Employer, treat the suspension as an omission under Clause 13 [*Variations and Adjustments*] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [*Termination by Contracto*r].

8.12

Resumption of Work

After the permission or instruction to proceed is given, the Parties shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension.

9 Tests on Completion

9.1 Contractor's Obligations

The Contractor shall carry out the Tests on Completion in accordance with this Clause and Sub-Clause 7.4, [*Testing*] after providing the documents in accordance with Sub-Clause 5.6 [*As-Built Documents*] and Sub-Clause 5.7 [*Operation and Maintenance Manuals*].

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The Contractor shall give to the Employer not less than 21 days' notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion. Unless otherwise agreed, Tests on Completion shall be carried out within 14 days after this date, on such day or days as the Employer shall instruct.

Unless otherwise stated in the Particular Conditions, the Tests on Completion shall be carried out in the following sequence:

(a) pre-commissioning tests, which shall include the appropriate inspections and ("dry" or "cold") functional tests to demonstrate that each item of Plant can safely under-take the next stage, (b);
(b) commissioning tests, which shall include the specified operational tests to demonstrate that the Works or Section can be operated safely and as specified, under all available operating conditions; and
(c) trial operation, which shall demonstrate that the Works or Section perform reliably and in accordance with the Contract.

During trial operation, when the Works are operating under stable conditions, the Contractor shall give notice to the Employer that the Works are ready for any other Tests on Completion, including performance tests to demonstrate whether the Works conform with criteria specified in the Employer's Requirements and with the Performance Guarantees.

Trial operation shall not constitute a taking-over under Clause 10 [*Employer's Taking Over*]. Unless otherwise stated in the Particular Conditions, any product produced by the Works during trial operation shall be the property of the Employer.

In considering the results of the Tests on Completion, appropriate allowances shall be made for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed each of the Tests on Completion described in sub-paragraph (a), (b) or (c), the Contractor shall submit a certified report of the results of these Tests to the Employer.

9.2 Delayed Tests

If the Tests on Completion are being unduly delayed by the Employer, Sub-Clause 7.4 [*Testing*] (fifth paragraph) and/or Sub-Clause 10.3 [*Interference with Tests on Completion*] shall be applicable.

If the Tests on Completion are being unduly delayed by the Contractor, the Employer may by notice require the Contractor to carry out the Tests within 21 days after receiving the notice. The Contractor shall carry out the Tests on such day or days within that period as the Contractor may fix and of which he shall give notice to the Employer

If the Contractor fails to carry out the Tests on Completion within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. These Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.

9.3 Retesting

If the Works, or a Section, fail to pass the Tests on Completion, Sub-Clause 7.5 [*Rejection*] shall apply, and the Employer or the Contractor may require the failed Tests, and Tests on Completion on any related work, to be repeated under the same terms and conditions.

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9.4 Failure to Pass Tests on Completion

If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 9.3 [*Retesting*], the Employer shall be entitled to:

(a) order further repetition of Tests on Completion under Sub-Clause 9.3;
(b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in sub-paragraph (c) of Sub-Clause 11.4 [*Failure to Remedy Defects*]; or
(c) issue a Taking-Over Certificate.

In the event of sub-paragraph (c), the Contractor shall proceed in accordance with all other obligations under the Contract, and the Contract Price shall be reduced by such amount as shall be appropriate to cover the reduced value to the Employer as a result of this failure. Unless the relevant reduction for this failure is stated (or its method of calculation is defined) in the Contract, the Employer may require the reduction to be (i) agreed by both Parties (in full satisfaction of this failure only) and paid before this Taking-Over Certificate is issued, or (ii) determined and paid under Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*].

10 Employer's Taking Over

10.1 Taking Over of the Works and Sections

Except as stated in Sub-Clause 9.4 [*Failure to Pass Tests on Completion*], the Works shall be taken over by the Employer when (i) the Works have been completed inaccordance with the Contract, including the matters described in Sub-Clause 8.2 [*Time for Completion*] and except as allowed in sub-paragraph (a) below, and (ii) a Taking-Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.

The Contractor may apply by notice to the Employer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.

The Employer shall, within 28 days after receiving the Contractor's application:

(a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or
(b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.

If the Employer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.

10.2 Taking Over of Parts of the Works

Parts of the Works (other than Sections) shall not be taken over or used by the Employer, except as may be stated in the Contract or as may be agreed by both Parties.

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10.3 Interference with Tests on Completion

If the Contractor is prevented, for more than 14 days, from carrying out the Tests on Completion by a cause for which the Employer is responsible, the Contractor shall carry out the Tests on Completion as soon as practicable.

If the Contractor suffers delay and/or incurs Cost as a result of this delay in carrying out the Tests on Completion, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

11 Defects Liability

11.1 Completion of Outstanding Work and Remedying Defects

In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract (fair wear and tear excepted) by the expiry date of the relevant Defects Notification Period or as soon as practicable thereafter, the Contractor shall:

(a) complete any work which is outstanding on the date stated in a Taking-Over Certificate, within such reasonable time as is instructed by the Employer, and
(b) execute all work required to remedy defects or damage, as may be notified by the Employer on or before the expiry date of the Defects Notification Period for the Works or Section (as the case may be).

If a defect appears or damage occurs, the Employer shall notify the Contractor accordingly.

11.2 Cost of Remedying Defects

All work referred to in sub-paragraph (b) of Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying Defects*] shall be executed at the risk and cost of the Contractor, if and to the extent that the work is attributable to:

(a) the design of the Works,
(b) Plant, Materials or workmanship not being in accordance with the Contract,
(c) improper operation or maintenance which was attributable to matters for which the Contractor is responsible (under Sub-Clauses 5.5 to 5.7 or otherwise), or
(d) failure by the Contractor to comply with any other obligation.

If and to the extent that such work is attributable to any other cause, the Employer shall give notice to the Contractor accordingly, and Sub-Clause 13.3 [*Variation Procedure*] shall apply.

11.3 Extension of Defects Notification Period

The Employer shall be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to an extension of the Defects Notification Period for the Works or a Section if and to the extent that the Works, Section or a major item of Plant (as the case may be, and after taking over) cannot be used for the purposes for which they are intended by reason of a defect or damage. However, a Defects Notification Period shall not be extended by more than two years.

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If delivery and/or erection of Plant and/or Materials was suspended under Sub-Clause 8.8 [*Suspension of Work*] or Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*], the Contractor's obligations under this Clause shall not apply to any defects or damage occurring more than two years after the Defects Notification Period for the Plant and/or Materials would otherwise have expired.

11.4

Failure to Remedy Defects

If the Contractor fails to remedy any defect or damage within a reasonable time, a date may be fixed by (or on behalf of) the Employer, on or by which the defect or damage is to be remedied. The Contractor shall be given reasonable notice of this date.

If the Contractor fails to remedy the defect or damage by this notified date and this remedial work was to be executed at the cost of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Employer may (at his option):

(a) carry out the work himself or by others, in a reasonable manner and at the Contractor's cost, but the Contractor shall have no responsibility for this work; and the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay to the Employer the costs reasonably incurred by the Employer in remedying the defect or damage;

(b) agree or determine a reasonable reduction in the Contract Price in accordance with Sub-Clause 3.5 [*Determinations*]; or

(c) if the defect or damage deprives the Employer of substantially the whole benefit of the Works or any major part of the Works, terminate the Contract as a whole, or in respect of such major part which cannot be put to the intended use. Without prejudice to any other rights, under the Contract or otherwise, the Employer shall then be entitled to recover all sums paid for the Works or for such part (as the case may be), plus financing costs and the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor.

11.5

Removal of Defective Work

If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.

11.6

Further Tests

If the work of remedying of any defect or damage may affect the performance of the Works, the Employer may require the repetition of any of the tests described in the Contract, including Tests on Completion and/or Tests after Completion. The requirement shall be made by notice within 28 days after the defect or damage is remedied.

These tests shall be carried out in accordance with the terms applicable to the previous tests, except that they shall be carried out at the risk and cost of the Party liable, under Sub-Clause 11.2 [*Cost of Remedying Defects*], for the cost of the remedial work.

11.7

Right of Access

Until the Performance Certificate has been issued, the Contractor shall have the right of access to all parts of the Works and to records of the operation and performance of the Works, except as may be inconsistent with the Employer's reasonable security restrictions.

11.8

Contractor to Search

The Contractor shall, if required by the Employer, search for the cause of any defect, under the direction of the Employer. Unless the defect is to be remedied at the cost

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of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Cost of the search plus reasonable profit shall be agreed or determined in accordance with Sub-Clause 3.5 [*Determinations*] and shall be added to the Contract Price.

11.9

Performance Certificate

Performance of the Contractor's obligations shall not be considered to have been completed until the Employer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.

The Employer shall issue the Performance Certificate within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects. If the Employer fails to issue the Performance Certificate accordingly:

(a) the Performance Certificate shall be deemed to have been issued on the date 28 days after the date on which it should have been issued, as required by this Sub-Clause, and
(b) Sub-Clause 11.11 [*Clearance of Site*] and sub-paragraph (a) of Sub-Clause 14.14 [*Cessation of Employer's Liability*] shall be inapplicable.

Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

11.10

Unfulfilled Obligations

After the Performance Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.

11.11

Clearance of Site

Upon receiving the Performance Certificate, the Contractor shall remove any remaining Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works from the Site.

If all these items have not been removed within 28 days after the Employer issues the Performance Certificate, the Employer may sell or otherwise dispose of any remaining items. The Employer shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site.

Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.

12 Tests after Completion

12.1

Procedure for Tests after Completion

If Tests after Completion are specified in the Contract, this Clause shall apply. Unless otherwise stated in the Particular Conditions:

(a) the Employer shall provide all electricity, fuel and materials, and make the Employer's Personnel and Plant available;
(b) the Contractor shall provide any other plant, equipment and suitably qualified

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and experienced staff, as are necessary to carry out the Tests after Completion efficiently; and

(c) the Contractor shall carry out the Tests after Completion in the presence of such Employer's and/or Contractor's Personnel as either Party may reasonably request.

The Tests after Completion shall be carried out as soon as is reasonably practicable after the Works or Section have been taken over by the Employer. The Employer shall give to the Contractor 21 days' notice of the date after which the Tests after Completion will be carried out. Unless otherwise agreed, these Tests shall be carried out within 14 days after this date, on the day or days determined by the Employer.

The results of the Tests after Completion shall be compiled and evaluated by the Contractor, who shall prepare a detailed report. Appropriate account shall be taken of the effect of the Employer's prior use of the Works.

12.2

Delayed Tests

If the Contractor incurs Cost as a result of any unreasonable delay by the Employer to the Tests after Completion, the Contractor shall (i) give notice to the Employer and (ii) be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this Cost and profit.

If, for reasons not attributable to the Contractor, a Test after Completion on the Works or any Section cannot be completed during the Defects Notification Period (or any other period agreed upon by both Parties), then the Works or Section shall be deemed to have passed this Test after Completion.

12.3

Retesting

If the Works, or a Section, fail to pass the Tests after Completion:

(a) sub-paragraph (b) of Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying of Defects*] shall apply, and

(b) either Party may then require the failed Tests, and the Tests after Completion on any related work, to be repeated under the same terms and conditions.

If and to the extent that this failure and retesting are attributable to any of the matters listed in sub-paragraphs (a) to (d) of Sub-Clause 11.2 [*Cost of Remedying Defects*] and cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer.

12.4

Failure to Pass Tests after Completion

If the following conditions apply, namely:

(a) the Works, or a Section, fail to pass any or all of the Tests after Completion,

(b) the relevant sum payable as non-performance damages for this failure is stated (or its method of calculation is defined) in the Contract, and

(c) the Contractor pays this relevant sum to the Employer during the Defects Notification Period,

then the Works or Section shall be deemed to have passed these Tests after Completion.

If the Works, or a Section, fail to pass a Test after Completion and the Contractor proposes to make adjustments or modifications to the Works or such Section, the Contractor may be instructed by (or on behalf of) the Employer that right of access to

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the Works or Section cannot be given until a time that is convenient to the Employer. The Contractor shall then remain liable to carry out the adjustments or modifications and to satisfy this Test, within a reasonable period of receiving notice by (or on behalf of) the Employer of the time that is convenient to the Employer. However, if the Contractor does not receive this notice during the relevant Defects Notification Period, the Contractor shall be relieved of this obligation and the Works or Section (as the case may be) shall be deemed to have passed this Test after Completion.

If the Contractor incurs additional Cost as a result of any unreasonable delay by the Employer in permitting access to the Works or Plant by the Contractor, either to investigate the causes of a failure to pass a Test after Completion or to carry out any adjustments or modifications, the Contractor shall (i) give notice to the Employer and (ii) be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this Cost and profit.

13 Variations and Adjustments

13.1
Right to Vary

Variations may be initiated by the Employer at any time prior to issuing the Taking-Over Certificate for the Works, either by an instruction or by a request for the Contractor to submit a proposal. A Variation shall not comprise the omission of any work which is to be carried out by others.

The Contractor shall execute and be bound by each Variation, unless the Contractor promptly gives notice to the Employer stating (with supporting particulars) that (i) the Contractor cannot readily obtain the Goods required for the Variation, (ii) it will reduce the safety or suitability of the Works, or (iii) it will have an adverse impact on the achievement of the Performance Guarantees. Upon receiving this notice, the Employer shall cancel, confirm or vary the instruction.

13.2
Value Engineering

The Contractor may, at any time, submit to the Employer a written proposal which (in the Contractor's opinion) will, if adopted, (i) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer.

The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [*Variation Procedure*].

13.3
Variation Procedure

If the Employer requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:

(a) a description of the proposed design and/or work to be performed and a programme for its execution,
(b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [*Programme*] and to the Time for Completion, and
(c) the Contractor's proposal for adjustment to the Contract Price.

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The Employer shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [*Value Engineering*] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.

Each instruction to execute a Variation, with any requirements for the recording of Costs, shall be issued by the Employer to the Contractor, who shall acknowledge receipt.

Upon instructing or approving a Variation, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine adjustments to the Contract Price and the Schedule of Payments. These adjustments shall include reasonable profit, and shall take account of the Contractor's submissions under Sub-Clause 13.2 [*Value Engineering*] if applicable.

13.4 Payment in Applicable Currencies

If the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved or determined as stated above, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.

13.5 Provisional Sums

Each Provisional Sum shall only be used, in whole or in part, in accordance with the Employer's instructions, and the Contract Price shall be adjusted accordingly. The total sum paid to the Contractor shall include only such amounts, for the work, supplies or services to which the Provisional Sum relates, as the Employer shall have instructed. For each Provisional Sum, the Employer may instruct:

(a) work to be executed (including Plant, Materials or services to be supplied) by the Contractor and valued under Sub-Clause 13.3 [*Variation Procedure*]; and/or

(b) Plant, Materials or services to be purchased by the Contractor, for which there shall be added to the Contract Price less the original Provisional Sums:

  (i) the actual amounts paid (or due to be paid) by the Contractor, and

  (ii) a sum for overhead charges and profit, calculated as a percentage of these actual amounts by applying the relevant percentage rate (if any) stated in the Contract.

The Contractor shall, when required by the Employer, produce quotations, invoices, vouchers and accounts or receipts in substantiation.

13.6 Daywork

For work of a minor or incidental nature, the Employer may instruct that a Variation shall be executed on a daywork basis. The work shall then be valued in accordance with the daywork schedule included in the Contract, and the following procedure shall apply. If a daywork schedule is not included in the Contract, this Sub-Clause shall not apply.

Before ordering Goods for the work, the Contractor shall submit quotations to the Employer. When applying for payment, the Contractor shall submit invoices, vouchers and accounts or receipts for any Goods.

Except for any items for which the daywork schedule specifies that payment is not due, the Contractor shall deliver each day to the Employer accurate statements in

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duplicate which shall include the following details of the resources used in executing the previous day's work:

(a) the names, occupations and time of Contractor's Personnel,
(b) the identification, type and time of Contractor's Equipment and Temporary Works, and
(c) the quantities and types of Plant and Materials used.

One copy of each statement will, if correct, or when agreed, be signed by the Employer and returned to the Contractor. The Contractor shall then submit priced statements of these resources to the Employer, prior to their inclusion in the next Statement under Sub-Clause 14.3 [*Application for Interim Payments*].

13.7

Adjustments for Changes in Legislation

The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.

If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 *[Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determination*s] to agree or determine these matters.

13.8

Adjustments for Changes in Costs

If the Contract Price is to be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, the adjustments shall be calculated in accordance with the provisions in the Particular Conditions.

14 Contract Price and Payment

14.1

The Contract Price

Unless otherwise stated in the Particular Conditions:

(a) payment for the Works shall be made on the basis of the lump sum Contract Price, subject to adjustments in accordance with the Contract; and
(b) the Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs, except as stated in Sub-Clause 13.7 [*Adjustments for Changes in Legislation*].

14.2

Advance Payment

The Employer shall make an advance payment, as an interest-free loan for mobilization and design, when the Contractor submits a guarantee in accordance with this Sub-Clause including the details stated in the Particular Conditions. If the Particular Conditions does not state:

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(a) the amount of the advance payment, then this Sub-Clause shall not apply;
(b) the number and timing of instalments, then there shall be only one;
(c) the applicable currencies and proportions, then they shall be those in which the Contract Price is payable; and/or
(d) the amortisation rate for repayments, then it shall be calculated by dividing the total amount of the advance payment by the Contract Price stated in the Contract Agreement less Provisional Sums.

The Employer shall pay the first instalment after receiving (i) a Statement (under Sub-Clause 14.3 [*Application for Interim Payments*]), (ii) the Performance Security in accordance with Sub-Clause 4.2 [*Performance Security*], and (iii) a guarantee in amounts and currencies equal to the advance payment. This guarantee shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer. Unless and until the Employer receives this guarantee, this Sub-Clause shall not apply.

The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount may be progressively reduced by the amount repaid by the Contractor. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.

The advance payment shall be repaid through proportional deductions in interim payments. Deductions shall be made at the amortization rate stated in the Particular Conditions (or, if not so stated, as stated in sub-paragraph (d) above), which shall be applied to the amount otherwise due (excluding the advance payment and deductions and repayments of retention), until such time as the advance payment has been repaid.

If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [*Termination by Employer*], Clause 16 [*Suspension and Termination by Contractor*] or Clause 19 [*Force Majeure*] (as the case may be), the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer.

14.3

Application for Interim Payments

The Contractor shall submit a Statement in six copies to the Employer after the end of the period of payment stated in the Contract (if not stated, after the end of each month), in a form approved by the Employer, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the relevant report on progress in accordance with Sub-Clause 4.21 [*Progress Reports*].

The Statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable, in the sequence listed:

(a) the estimated contract value of the Works executed and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (f) below);
(b) any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] and Sub-Clause 13.8 [*Adjustments for Changes in Cost*];
(c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Particular Conditions to the total of the

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above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Particular Conditions;

(d) any amounts to be added and deducted for the advance payment and repayments in accordance with Sub-Clause 14.2 [*Advance Payment*];

(e) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 20 [*Claims, Disputes and Arbitration*]; and

(f) the deduction of amounts included in previous Statements.

14.4

Schedule of Payments

If the Contract includes a Schedule of Payments specifying the instalments in which the Contract Price will be paid, then unless otherwise stated in this Schedule:

(a) the instalments quoted in the Schedule of Payments shall be the estimated contract values for the purposes of sub-paragraph (a) of Sub-Clause 14.3 [*Application for Interim Payments*], subject to Sub-Clause 14.5 [*Plant and Materials intended for the Works*]; and

(b) if these instalments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to be less than that on which the Schedule of Payments was based, then the Employer may proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine revised instalments, which shall take account of the extent to which progress is less than that on which the instalments were previously based.

If the Contract does not include a Schedule of Payments, the Contractor shall submit non-binding estimates of the payments which he expects to become due during each quarterly period. The first estimate shall be submitted within 42 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals, until the Taking-Over Certificate has been issued for the Works.

14.5

Plant and Materials intended for the Works

If the Contractor is entitled, under the Contract, to an interim payment for Plant and Materials which are not yet on the Site, the Contractor shall nevertheless not be entitled to such payment unless:

(a) the relevant Plant and Materials are in the Country and have been marked as the Employer's property in accordance with the Employer's instructions; or

(b) the Contractor has delivered, to the Employer, evidence of insurance and a bank guarantee in a form and issued by an entity approved by the Employer in amounts and currencies equal to such payment. This guarantee may be in a similar form to the form referred to in Sub-Clause 14.2 [*Advance Payment*] and shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration.

14.6

Interim Payments

No amount will be paid until the Employer has received and approved the Performance Security. Thereafter, the Employer shall within 28 days after receiving a Statement and supporting documents, give to the Contractor notice of any items in the Statement with which the Employer disagrees, with supporting particulars. Payments due shall not be withheld, except that:

(a) if any thing supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or

(b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Employer, the

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value of this work or obligation may be withheld until the work or obligation has been performed.

The Employer may, by any payment, make any correction or modification that should properly be made to any amount previously considered due. Payment shall not be deemed to indicate the Employer's acceptance, approval, consent or satisfaction.

14.7

Timing of Payments

Except as otherwise stated in Sub-Clause 2.5 [*Employer's Claims*], the Employer shall pay to the Contractor:

(a) the first instalment of the advance payment within 42 days after the date on which the Contract came into full force and effect or within 21 days after the Employer receives the documents in accordance with Sub-Clause 4.2 [*Performance Security*] and Sub-Clause 14.2 [*Advance Payment*], whichever is later;

(b) the amount which is due in respect of each Statement, other than the Final Statement, within 56 days after receiving the Statement and supporting documents; and

(c) the final amount due, within 42 days after receiving the Final Statement and written discharge in accordance with Sub-Clause 14.11 [*Application for Final Payment*] and Sub-Clause 14.12 [*Discharge*].

Payment of the amount due in each currency shall be made into the bank account, nominated by the Contractor, in the payment country (for this currency) specified in the Contract.

14.8

Delayed Payment

If the Contractor does not receive payment in accordance with Sub-Clause 14.7 [*Timing of Payments*], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay.

Unless otherwise stated in the Particular Conditions, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency of payment, and shall be paid in such currency.

The Contractor shall be entitled to this payment without formal notice, and without prejudice to any other right or remedy.

14.9

Payment of Retention Money

When the Taking-Over Certificate has been issued for the Works, and the Works have passed all specified tests (including the Tests after Completion, if any), the first half of the Retention Money shall be paid to the Contractor. If a Taking-Over Certificate is issued for a Section, the relevant percentage of the first half of the Retention Money shall be paid when the Section passes all tests.

Promptly after the latest of the expiry dates of the Defects Notification Periods, the outstanding balance of the Retention Money shall be paid to the Contractor. If a Taking-Over Certificate was issued for a Section, the relevant percentage of the second half of the Retention Money shall be paid promptly after the expiry date of the Defects Notification Period for the Section.

However, if any work remains to be executed under Clause 11 [*Defects Liability*] or Clause 12 [*Tests after Completion*], the Employer shall be entitled to withhold the estimated cost of this work until it has been executed.

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The relevant percentage for each Section shall be the percentage value of the Section as stated in the Contract. If the percentage value of a Section is not stated in the Contract, no percentage of either half of the Retention Money shall be released under this Sub-Clause in respect of such Section.

14.10

Statement at Completion

Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Employer six copies of a Statement at completion with supporting documents, in accordance with Sub-Clause 14.3 [*Application for Interim Payments*], showing:

(a) the value of all work done in accordance with the Contract up to the date stated in the Taking-Over Certificate for the Works,
(b) any further sums which the Contractor considers to be due, and
(c) an estimate of any other amounts which the Contractor considers will become due to him under the Contract. Estimated amounts shall be shown separately in this Statement at completion.

The Employer shall then give notice to the Contractor in accordance with Sub-Clause 14.6 [*Interim Payments*] and make payment in accordance with Sub-Clause 14.7 [*Timing of Payments*].

14.11

Application for Final Payment

Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Employer, six copies of a draft final statement with supporting documents showing in detail in a form approved by the Employer:

(a) the value of all work done in accordance with the Contract, and
(b) any further sums which the Contractor considers to be due to him under the Contract or otherwise.

If the Employer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Employer may reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Employer the final statement as agreed. This agreed statement is referred to in these Conditions as the "Final Statement".

However if, following discussions between the Parties and any changes to the draft final statement which are agreed, it becomes evident that a dispute exists, the Employer shall pay the agreed parts of the draft final statement in accordance with Sub-Clause 14.6 [*Interim Payments*] and Sub-Clause 14.7 [*Timing of Payments*]. Thereafter, if the dispute is finally resolved under Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] or Sub-Clause 20.5 [*Amicable Settlement*], the Contractor shall then prepare and submit to the Employer a Final Statement.

14.12

Discharge

When submitting the Final Statement, the Contractor shall submit a written discharge which confirms that the total of the Final Statement represents full and final settlement of all moneys due to the Contractor under or in connection with the Contract. This discharge may state that it becomes effective when the Contractor has received the Performance Security and the out-standing balance of this total, in which event the discharge shall be effective on such date.

14.13

Final Payment

In accordance with sub-paragraph (c) of Sub-Clause 14.7 [*Timing of Payments*], the Employer shall pay to the Contractor the amount which is finally due, less all amounts

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previously paid by the Employer and any deductions in accordance with Sub-Clause 2.5 [*Employer's Claims*].

14.14

Cessation of Employer's Liability

The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it:

(a) in the Final Statement and also
(b) (except for matters or things arising after the issue of the Taking-Over Certificatefor the Works) in the Statement at completion described in Sub-Clause 14.10 [*Statement at Completion*].

However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default or reckless misconduct by the Employer.

14.15

Currencies of Payment

The Contract Price shall be paid in the currency or currencies named in the Contract Agreement. Unless otherwise stated in the Particular Conditions, if more than one currency is so named, payments shall be made as follows:

(a) if the Contract Price was expressed in Local Currency only:

  (i) the proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Contract Agreement, except as otherwise agreed by both Parties;
  (ii) payments and deductions under Sub-Clause 13.5 [*Provisional Sums*] and Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] shall be made in the applicable currencies and proportions; and
  (iii) other payments and deductions under sub-paragraphs (a) to (d) of Sub-Clause 14.3 [*Application for Interim Payments*] shall be made in the currencies and proportions specified in sub-paragraph (a)(i) above;

(b) payment of the damages specified in the Particular Conditions shall be made in the currencies and proportions specified in the Particular Conditions;
(c) other payments to the Employer by the Contractor shall be made in the currency in which the sum was expended by the Employer, or in such currency as may be agreed by both Parties;
(d) if any amount payable by the Contractor to the Employer in a particular currency exceeds the sum payable by the Employer to the Contractor in that currency, the Employer may recover the balance of this amount from the sums otherwise payable to the Contractor in other currencies; and
(e) if no rates of exchange are stated in the Contract, they shall be those prevailing on the Base Date and determined by the central bank of the Country.

15 Termination by Employer

15.1

Notice to Correct

If the Contractor fails to carry out any obligation under the Contract, the Employer may by notice require the Contractor to make good the failure and to remedy it within a specified reasonable time.

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15.2
Termination by Employer

The Employer shall be entitled to terminate the Contract if the Contractor:

(a) fails to comply with Sub-Clause 4.2 [*Performance Security*] or with a notice under Sub-Clause 15.1 [*Notice to Correct*],
(b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract,
(c) without reasonable excuse fails to proceed with the Works in accordance with Clause 8 [*Commencement, Delays and Suspension*],
(d) subcontracts the whole of the Works or assigns the Contract without the required agreement,
(e) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events, or
(f) gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward:

    (i) for doing or forbearing to do any action in relation to the Contract, or
    (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract,

    or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.

In any of these events or circumstances, the Employer may, upon giving 14 days' notice to the Contractor, terminate the Contract and expel the Contractor from the Site. However, in the case of sub-paragraph (e) or (f), the Employer may by notice terminate the Contract immediately.

The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.

The Contractor shall then leave the Site and deliver any required Goods, all Contractor's Documents, and other design documents made by or for him, to the Employer. However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the notice (i) for the assignment of any sub-contract, and (ii) for the protection of life or property or for the safety of the Works.

After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor.

The Employer shall then give notice that the Contractor's Equipment and Temporary Works will be released to the Contractor at or near the Site. The Contractor shall promptly arrange their removal, at the risk and cost of the Contractor. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall then be paid to the Contractor.

15.3
Valuation at Date of Termination

As soon as practicable after a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine the value of the Works,

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Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.

15.4

Payment after Termination

After a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Employer may:

(a) proceed in accordance with Sub-Clause 2.5 [*Employer's Claims*],
(b) with-hold further payments to the Contractor until the costs of design, execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the Employer, have been established, and/or
(c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the Works, after allowing for any sum due to the Contractor under Sub-Clause 15.3 [*Valuation at Date of Termination*]. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.

15.5

Employer's Entitlement to Termination

The Employer shall be entitled to terminate the Contract, at any time for the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after the later of the dates on which the Contractor receives this notice or the Employer returns the Performance Security. The Employer shall not terminate the Contract under this Sub-Clause in order to execute the Works himself or to arrange for the Works to be executed by another contractor.

After this termination, the Contractor shall proceed in accordance with Sub-Clause 16.3 [*Cessation of Work and Removal of Contractor's Equipment*] and shall be paid in accordance with Sub-Clause 19.6 [*Optional Termination, Payment and Release*].

16 Suspension and Termination by Contractor

16.1

Contractor's Entitlement to Suspend Work

If the Employer fails to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*] or Sub-Clause 14.7 [*Timing of Payments*], the Contractor may, after giving not less than 21 days' notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the reasonable evidence or payment, as the case may be and as described in the notice.

The Contractor's action shall not prejudice his entitlements to financing charges under Sub-Clause 14.8 [*Delayed Payment*] and to termination under Sub-Clause 16.2 [*Termination by Contractor*].

If the Contractor subsequently receives such evidence or payment (as described in the relevant Sub-Clause and in the above notice) before giving a notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.

If the Contractor suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and

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(b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

16.2

Termination by Contractor

The Contractor shall be entitled to terminate the Contract if:

(a) the Contractor does not receive the reasonable evidence within 42 days after giving notice under Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*] in respect of a failure to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*],
(b) the Contractor does not receive the amount due within 42 days after the expiry of the time stated in Sub-Clause 14.7 [*Timing of Payments*] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.5 [*Employer's Claims*]),
(c) the Employer substantially fails to perform his obligations under the Contract,
(d) the Employer fails to comply with Sub-Clause 1.7 [*Assignment*],
(e) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.11 [*Prolonged Suspension*], or
(f) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events.

In any of these events or circumstances, the Contractor may, upon giving 14 days' notice to the Employer, terminate the Contract. However, in the case of sub-paragraph (e) or (f), the Contractor may by notice terminate the Contract immediately.

The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.

16.3

Cessation of Work and Removal of Contractor's Equipment

After a notice of termination under Sub-Clause 15.5 [*Employer's Entitlement to Termination*], Sub-Clause 16.2 [*Termination by Contractor*] or Sub-Clause 19.6 [*Optional Termination, Payment and Release*] has taken effect, the Contractor shall promptly:

(a) cease all further work, except for such work as may have been instructed by the Employer for the protection of life or property or for the safety of the Works,
(b) hand over Contractor's Documents, Plant, Materials and other work, for which the Contractor has received payment, and
(c) remove all other Goods from the Site, except as necessary for safety, and leave the Site.

16.4

Payment on Termination

After a notice of termination under Sub-Clause 16.2 [*Termination by Contractor*] has taken effect, the Employer shall promptly:

(a) return the Performance Security to the Contractor,
(b) pay the Contractor in accordance with Sub-Clause 19.6 [*Optional Termination, Payment and Release*], and
(c) pay to the Contractor the amount of any loss of profit or other loss or damage sustained by the Contractor as a result of this termination.

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17 Risk and Responsibility

17.1
Indemnities

The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:

(a) bodily injury, sickness, disease or death, of any person whatsoever arising out of or in the course of or by reason of the design, execution and completion of the Works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and

(b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss:

  (i) arises out of or in the course of or by reason of the design, execution and completion of the Works and the remedying of any defects, and

  (ii) is not attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, their respective agents, or anyone directly or indirectly employed by any of them.

The Employer shall indemnify and hold harmless the Contractor, the Contractor's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of (1) bodily injury, sickness, disease or death, which is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (2) the matters for which liability may be excluded from insurance cover, as described in sub-paragraphs (d)(i), (ii) and (iii) of Sub-Clause 18.3 [*Insurance Against Injury to Persons and Damage to Property*].

17.2
Contractor's Care of the Works

The Contractor shall take full responsibility for the care of the Works and Goods from the Commencement Date until the Taking-Over Certificate is issued (or is deemed to be issued under Sub-Clause 10.1 [*Taking Over of the Works and Sections*]) for the Works, when responsibility for the care of the Works shall pass to the Employer. If a Taking-Over Certificate is issued (or is so deemed to be issued) for any Section of the Works, responsibility for the care of the Section shall then pass to the Employer.

After responsibility has accordingly passed to the Employer, the Contractor shall take responsibility for the care of any work which is outstanding on the date stated in a Taking-Over Certificate, until this outstanding work has been completed.

If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 17.3 [*Employer's Risks*], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that the Works, Goods and Contractor's Documents conform with the Contract.

The Contractor shall be liable for any loss or damage caused by any actions performed by the Contractor after a Taking-Over Certificate has been issued. The Contractor shall also be liable for any loss or damage which occurs after a Taking-Over Certificate has been issued and which arose from a previous event for which the Contractor was liable.

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17.3 Employer's Risks

The risks referred to in Sub-Clause 17.4 below are:

(a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
(b) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country,
(c) riot, commotion or disorder within the Country by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors,
(d) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and
(e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds.

17.4 Consequences of Employer's Risks

If and to the extent that any of the risks listed in Sub-Clause 17.3 above results in loss or damage to the Works, Goods or Contractor's Documents, the Contractor shall promptly give notice to the Employer and shall rectify this loss or damage to the extent required by the Employer.

If the Contractor suffers delay and/or incurs Cost from rectifying this loss or damage, the Contractor shall give a further notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
(b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this further notice, the Employer shall proceed in accordance with Sub Clause 3.5 [*Determinations*] to agree or determine these matters.

17.5 Intellectual and Industrial Property Rights

In this Sub-Clause, "infringement" means an infringement (or alleged infringement) of any patent, registered design, copyright, trade mark, trade name, trade secret or other intellectual or industrial property right relating to the Works; and "claim" means a claim (or proceedings pursuing a claim) alleging an infringement.

Whenever a Party does not give notice to the other Party of any claim within 28 days of receiving the claim, the first Party shall be deemed to have waived any right to indemnity under this Sub-Clause.

The Employer shall indemnify and hold the Contractor harmless against and from any claim alleging an infringement which is or was:

(a) an unavoidable result of the Contractor's compliance with the Employer's Requirements, or
(b) a result of any Works being used by the Employer:

    (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or
    (ii) in conjunction with any thing not supplied by the Contractor, unless such use was disclosed to the Contractor prior to the Base Date or is stated in the Contract.

The Contractor shall indemnify and hold the Employer harmless against and from any other claim which arises out of or in relation to (i) the Contractor's design,

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manufacture, construction or execution of the Works, (ii) the use of Contractor's Equipment, or (iii) the proper use of the Works.

If a Party is entitled to be indemnified under this Sub-Clause, the indemnifying Party may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it. The other Party shall, at the request and cost of the indemnifying Party, assist in contesting the claim. This other Party (and its Personnel) shall not make any admission which might be prejudicial to the indemnifying Party, unless the indemnifying Party failed to take over the conduct of any negotiations, litigation or arbitration upon being requested to do so by such other Party.

17.6 Limitation of Liability

Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than under Sub-Clause 16.4 [*Payment on Termination*] and Sub-Clause 17.1 [*Indemnities*].

The total liability of the Contractor to the Employer, under or in connection with the Contract other than under Sub-Clause 4.19 [*Electricity, Water and Gas*], Sub-Clause 4.20 [*Employer's Equipment and Free-Issue Material*], Sub-Clause 17.1 [*Indemnities*] and Sub-Clause 17.5 [*Intellectual and Industrial Property Rights*], shall not exceed the sum stated in the Particular Conditions or (if a sum is not so stated) the Contract Price stated in the Contract Agreement.

This Sub-Clause shall not limit liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

18 Insurance

18.1 General Requirements for Insurances

In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause.

Wherever the Contractor is the insuring Party, each insurance shall be effected with insurers and in terms approved by the Employer. These terms shall be consistent with any terms agreed by both Parties before they signed the Contract Agreement. This agreement of terms shall take precedence over the provisions of this Clause.

Wherever the Employer is the insuring Party, each insurance shall be effected with insurers and in terms consistent with the details annexed to the Particular Conditions.

If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause, (i) the Contractor shall act under the policy on behalf of these additional joint insured except that the Employer shall act for Employer's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.

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The relevant insuring Party shall, within the respective periods stated in the Particular Conditions (calculated from the Commencement Date), submit to the other Party:

(a) evidence that the insurances described in this Clause have been effected, and
(b) copies of the policies for the insurances described in Sub-Clause 18.2 [*Insurance of Works and Contractor's Equipment*] and Sub-Clause 18.3 [*Insurance against Injury to Persons and Damage to Property*].

When each premium is paid, the insuring Party shall submit evidence of payment to the other Party.

Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Works and ensure that insurance is maintained in accordance with this Clause.

Neither Party shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.

If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.

Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring Party.

Payments by one Party to the other Party shall be subject to Sub-Clause 2.5 [*Employer's Claims*] or Sub-Clause 20.1 [*Contractor's Claims*], as applicable.

18.2 Insurance for Works and Contractor's Equipment

The insuring Party shall insure the Works, Plant, Materials and Contractor's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 18.1 [*General Requirements for Insurances*], until the date of issue of the Taking-Over Certificate for the Works.

The insuring Party shall maintain this insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable arising from a cause occurring prior to the issue of the Taking-Over Certificate, and for loss or damage caused by the Contractor or Subcontractors in the course of any other operations (including those under Clause 11 [*Defects Liability*] and Clause 12 [*Tests after Completion*]).

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The insuring Party shall insure the Contractor's Equipment for not less than the full replacement value, including delivery to Site. For each item of Contractor's Equipment, the insurance shall be effective while it is being transported to the Site and until it is no longer required as Contractor's Equipment.

Unless otherwise stated in the Particular Conditions, insurances under this Sub-Clause:

(a) shall be effected and maintained by the Contractor as insuring Party,
(b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated between the Parties for the sole purpose of rectifying the loss or damage,
(c) shall cover all loss and damage from any cause not listed in Sub-Clause 17.3 [*Employer's Risks*],
(d) shall also cover loss or damage from the risks listed in sub-paragraph (c) of Sub-Clause 17.3 [*Employer's Risks*], with deductibles per occurrence of not more than the amount stated in the Particular Conditions (if an amount is not so stated, this sub-paragraph (d) shall not apply), and
(e) may however exclude loss of, damage to, and reinstatement of:

    (i) a part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below),
    (ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship,
    (iii) a part of the Works which has been taken over by the Employer, except to the extent that the Contractor is liable for the loss or damage, and
    (iv) Goods while they are not in the Country, subject to Sub-Clause 14.5 [*Plant and Materials intended for the Works*].

If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Contractor shall (as insuring Party) give notice to the Employer, with supporting particulars. The Employer shall then (i) be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to payment of an amount equivalent to such commercially reasonable terms as the Contractor should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 18.1 [*General Requirements for Insurances*].

18.3 Insurance against Injury to Persons and Damage to Property

The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 18.2 [*Insurance for Works and Contractor's Equipment*]) or to any person (except persons insured under Sub-Clause 18.4 [*Insurance for Contractor's Personnel*]), which may arise out of the Contractor's performance of the Contract and occurring before the issue of the Performance Certificate.

This insurance shall be for a limit per occurrence of not less than the amount stated in the Particular Conditions, with no limit on the number of occurrences. If an amount is not stated in the Contract, this Sub-Clause shall not apply.

Unless otherwise stated in the Particular Conditions, the insurances specified in this Sub-Clause:

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(a) shall be effected and maintained by the Contractor as insuring Party,
(b) shall be in the joint names of the Parties,
(c) shall be extended to cover liability for all loss and damage to the Employer's property (except things insured under Sub-Clause 18.2) arising out of the Contractor's performance of the Contract, and
(d) may however exclude liability to the extent that it arises from:

(i) the Employer's right to have the Permanent Works executed on, over, under, in or through any land, and to occupy this land for the Permanent Works,
(ii) damage which is an unavoidable result of the Contractor's obligations to execute the Works and remedy any defects, and
(iii) a cause listed in Sub-Clause 17.3 [*Employer's Risks*], except to the extent that cover is available at commercially reasonable terms.

18.4

Insurance for Contractor's Personnel

The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.

The Employer shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.

The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.

19 Force Majeure

19.1
Definition of Force Majeure

In this Clause, "Force Majeure" means an exceptional event or circumstance:

(a) which is beyond a Party's control,
(b) which such Party could not reasonably have provided against before entering into the Contract,
(c) which, having arisen, such Party could not reasonably have avoided or overcome, and
(d) which is not substantially attributable to the other Party.

Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:

(i) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
(ii) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war,
(iii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel and other employees of the Contractor and Sub-contractors,
(iv) munitions of war, explosive materials, ionising radiation or contamination

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by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and

(v) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.

19.2

Notice of Force Majeure

If a Party is or will be prevented from performing any of its obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.

The Party shall, having given notice, be excused performance of such obligations for so long as such Force Majeure prevents it from performing them.

Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.

19.3

Duty to Minimise Delay

Each Party shall at all times use all reasonable endeavours to minimise any delay in the performance of the Contract as a result of Force Majeure.

A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

19.4

Consequences of Force Majeure

If the Contractor is prevented from performing any of his obligations under the Contract by Force Majeure of which notice has been given under Sub-Clause 19.2 [*Notice of Force Majeure*], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and

(b) if the event or circumstance is of the kind described in sub-paragraphs (i) to (iv) of Sub-Clause 19.1 [*Definition of Force Majeure*] and, in the case of sub-paragraphs (ii) to (iv), occurs in the Country, payment of any such Cost.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

19.5

Force Majeure Affecting Subcontractor

If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's non-performance or entitle him to relief under this Clause.

19.6

Optional Termination, Payment and Release

If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under Sub-Clause 19.2 [*Notice of Force Majeure*], or for multiple periods which total more than 140 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with Sub-Clause 16.3 [*Cessation of Work and Removal of Contractor's Equipment*].

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Upon such termination, the Employer shall pay to the Contractor:

(a) the amounts payable for any work carried out for which a price is stated in the Contract;
(b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
(c) any other Cost or liability which in the circumstances was reasonably incurred by the Contractor in the expectation of completing the Works;
(d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and
(e) the Cost of repatriation of the Contractor's staff and labour employed wholly in connection with the Works at the date of termination.

19.7

Release from Performance under the Law

Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises which makes it impossible or unlawful for either or both Parties to fulfil its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance:

(a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract, and
(b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under Sub-Clause 19.6 [*Optional Termination, Payment and Release*] if the Contract had been terminated under Sub-Clause 19.6.

20 Claims, Disputes and Arbitration

20.1

Contractor's Claims

If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Employer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Employer. Without admitting liability, the Employer may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to

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keep further contemporary records. The Contractor shall permit the Employer to inspect all these records, and shall (if instructed) submit copies to the Employer.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Employer, the Contractor shall send to the Employer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

(a) this fully detailed claim shall be considered as interim;
(b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Employer may reasonably require; and
(c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Employer.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Employer and approved by the Contractor, the Employer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such time.

Each interim payment shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

The Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [*Extension of Time for Completion*], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

20.2 Appointment of the Dispute Adjudication Board

Disputes shall be adjudicated by a DAB in accordance with Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*]. The Parties shall jointly appoint a DAB by the date 28 days after a Party gives notice to the other Party of its intention to refer a dispute to a DAB in accordance with Sub-Clause 20.4.

The DAB shall comprise, as stated in the Particular Conditions, either one or three suitably qualified persons ("the members"). If the number is not so stated and the Parties do not agree otherwise, the DAB shall comprise three persons.

If the DAB is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The Parties shall consult both these members and shall agree upon the third member, who shall be appointed to act as chairman.

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However, if a list of potential members is included in the Contract, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DAB.

The agreement between the Parties and either the sole member ("adjudicator") or each of the three members shall incorporate by reference the General Conditions of Dispute Adjudication Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed between them.

The terms of the remuneration of either the sole member or each of the three members, shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

If at any time the Parties so agree, they may appoint a suitably qualified person or persons to replace any one or more members of the DAB. Unless the Parties agree otherwise, the appointment will come into effect if a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment. The replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DAB (including each member) shall expire when the DAB has given its decision on the dispute referred to it under Sub-Clause 20.4, [*Obtaining Dispute Adjudication Board Decision*], unless other disputes have been referred to the DAB by that time under Sub-Clause 20.4, in which event the relevant date shall be when the DAB has also given decisions on those disputes.

20.3

Failure to Agree Dispute Adjudication Board

If any of the following conditions apply, namely:

(a) the Parties fail to agree upon the appointment of the sole member of the DAB by the date stated in the first paragraph of Sub-Clause 20.2,
(b) either Party fails to nominate a member (for approval by the other Party) of a DAB of three persons by such date,
(c) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DAB by such date, or
(d) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation or termination of appointment,

then the appointing entity or official named in the Particular Conditions shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DAB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

20.4

Obtaining Dispute Adjudication Board's Decision

If a dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Employer, then after a DAB has been appointed pursuant to Sub-Clauses 20.2 [*Appointment of the Dispute Adjudication Board*] and 20.3 [*Failure to Agree Dispute Adjudication Board*], either Party may refer the dispute in writing to the DAB for its decision, with a copy to the other Party. Such reference shall state that it is given under this Sub-Clause.

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For a DAB of three persons, the DAB shall be deemed to have received such reference on the date when it is received by the chairman of the DAB.

Both Parties shall promptly make available to the DAB all information, access to the Site, and appropriate facilities, as the DAB may require for the purposes of making a decision on such dispute. The DAB shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or the advance payment referred to in Clause 6 of the Appendix - General Conditions of Dispute Adjudication Agreement, whichever date is later, or within such other period as may be proposed by the DAB and approved by both Parties, the DAB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. However, if neither of the Parties has paid in full the invoices submitted by each member pursuant to Clause 6 of the Appendix, the DAB shall not be obliged to give its decision until such invoices have been paid in full. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the Works in accordance with the Contract.

If either Party is dissatisfied with the DAB's decision, then either Party may, within 28 days after receiving the decision, give notice to the other Party of its dissatisfaction. If the DAB fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference or such payment, then either Party may, within 28 days after this period has expired, give notice to the other Party of its dissatisfaction.

In either event, this notice of dissatisfaction shall state that it is given under this Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in Sub-Clause 20.7 [*Failure to Comply with Dispute Adjudication Board's Decision*] and Sub-Clause 20.8 [*Expiry of Dispute Adjudication Board's Appointment*], neither Party shall be entitled to commence arbitration of a dispute unless a notice of dissatisfaction has been given in accordance with this Sub-Clause.

If the DAB has given its decision as to a matter in dispute to both Parties, and no notice of dissatisfaction has been given by either Party within 28 days after it received the DAB's decision, then the decision shall become final and binding upon both Parties.

20.5

Amicable Settlement

Where notice of dissatisfaction has been given under Sub-Clause 20.4 above, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of dissatisfaction was given, even if no attempt at amicable settlement has been made.

20.6

Arbitration

Unless settled amicably, any dispute in respect of which the DAB's decision (if any) has not become final and binding shall be finally settled by international arbitration. Unless otherwise agreed by both Parties:

(a) the dispute shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce,

(b) the dispute shall be settled by three arbitrators appointed in accordance with these Rules, and

(c) the arbitration shall be conducted in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

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The arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of (or on behalf of) the Employer, and any decision of the DAB, relevant to the dispute.

Neither Party shall be limited in the proceedings before the arbitrator(s) to the evidence or arguments previously put before the DAB to obtain its decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction. Any decision of the DAB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties and the DAB shall not be altered by reason of any arbitration being conducted during the progress of the Works.

20.7

Failure to Comply with Dispute Adjudication Board's Decision

In the event that:

(a) neither Party has given notice of dissatisfaction within the period stated in Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*],
(b) the DAB's related decision (if any) has become final and binding, and
(c) a Party fails to comply with this decision,

then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [*Arbitration*]. Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] and Sub-Clause 20.5 [*Amicable Settlement*] shall not apply to this reference.

20.8

Expiry of Dispute Adjudication Board's Appointment

If a dispute arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works and there is no DAB in place, whether by reason of the expiry of the DAB's appointment or otherwise:

(a) Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] and Sub-Clause 20.5 [Amicable Settlement] shall not apply, and
(b) the dispute may be referred directly to arbitration under Sub-Clause 20.6 [*Arbitration*].

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APPENDIX

General Conditions of Dispute Adjudication Agreement

1
Definitions

Each "Dispute Adjudication Agreement" is a tripartite agreement by and between:

(a) the "Employer";
(b) the "Contractor"; and
(c) the "Member" who is defined in the Dispute Adjudication Agreement as being:
  (i) the sole member of the "DAB" (or "adjudicator") and, where this is the case, all references to the "Other Members" do not apply,
  or
  (ii) one of the three persons who are jointly called the "DAB" (or "dispute adjudication board") and, where this is the case, the other two persons are called the "Other Members".

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Adjudication Agreement, which incorporates this Appendix. In the Dispute Adjudication Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

2
General Provisions

The Dispute Adjudication Agreement shall take effect when the Employer, the Contractor and each of the Members (or Member) have respectively each signed a dispute adjudication agreement.

When the Dispute Adjudication Agreement has taken effect, the Employer and the Contractor shall each give notice to the Member accordingly. If the Member does not receive either notice within six months after entering into the Dispute Adjudication Agreement, it shall be void and ineffective.

This employment of the Member is a personal appointment. No assignment or subcontracting of the Dispute Adjudication Agreement is permitted without the prior written agreement of all the parties to it and of the Other Members (if any).

3
Warranties

The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Employer's Representative. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is:

(a) experienced in the work which the Contractor is to carry out under the Contract,
(b) experienced in the interpretation of contract documentation, and
(c) fluent in the the language for communications defined in the Contract.

4
General Obligations of the Member

The Member shall:

(a) have no interest financial or otherwise in the Employer or the Contractor, nor any financial interest in the Contract except for payment under the Dispute Adjudication Agreement;

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(b) not previously have been employed as a consultant or otherwise by the Employer or the Contractor, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Adjudication Agreement;
(c) have disclosed in writing to the Employer, the Contractor and the Other Members (if any), before entering into the Dispute Adjudication Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer or employee of the Employer or the Contractor, and any previous involvement in the overall project of which the Contract forms part;
(d) not, for the duration of the Dispute Adjudication Agreement, be employed as a consultant or otherwise by the Employer or the Contractor, except as may be agreed in writing by the Employer, the Contractor and the Other Members (if any);
(e) comply with the annexed procedural rules and with Sub-Clause 20.4 of the Conditions of Contract;
(f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
(g) not while a Member enter into discussions or make any agreement with the Employer or the Contractor regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Adjudication Agreement;
(h) ensure his/her availability for any site visit and hearings as are necessary; and
(i) treat the details of the Contract and all the DAB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members (if any).

5

General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DAB's activities under the Contract and the Dispute Adjudication Agreement, and except to the extent that prior agreement is given by the Employer, the Contractor and the Other Members (if any). The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any):
(a) be appointed as an arbitrator in any arbitration under the Contract;
(b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
(c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he/she is relieved from liability under the preceding paragraph.

6

Payment

The Member shall be paid as follows, in the currency named in the Dispute Adjudication Agreement:
(a) a daily fee which shall be considered as payment in full for:

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(i) each working day spent reading submissions, attending hearings (if any), preparing decisions, or making site visits (if any); and

(ii) each day or part of a day up to maximum of two days travel time in each direction for the journey (if any) between the Member's home and site or an other location of a meeting with Other Members (if any) and/or the Employer and the Contractor;

(b) all reasonable expenses incurred in connection with the Member's duties, including the cost of secretarial services, telephone calls, courier charges, faxes and telexes, travel expenses, hotel and subsistence costs; a receipt shall be required for each item in excess of five percent of the daily fee referred to in sub-paragraph (a) of this Clause; and

(c) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The daily fee shall be as specified in the Dispute Adjudication Agreement.

Immediately after the Dispute Adjudication Agreement takes effect, the Member shall, before engaging in any activities under the Dispute Adjudication Agreement, submit to the Contractor, with a copy to the Employer, an invoice for (a) an advance of twenty-five (25) percent of the estimated total amount of daily fees to which he/she will be entitled and (b) an advance equal to the estimated total expenses that he/she shall incur in connection with his/her duties. Payment of such invoice shall be made by the Contractor upon his receipt of the invoice. The Member shall not be obliged to engage in activities under the Dispute Adjudication Agreement until each of the Members has been paid in full for invoices submitted under this paragraph.

Thereafter the Member shall submit to the Contractor, with a copy to the Employer, invoices for the balance of his/her daily fees and expenses, less the amounts advanced. The DAB shall not be obliged to render its decision until invoices for all daily fees and expenses of each Member for making a decision shall have been paid in full.

Unless paid earlier in accordance with the above, the Contractor shall pay each of the Member's invoices in full within 28 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Adjudication Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the DAB; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Sub-Clause 14.8 of the Conditions of Contract.

If the Member does not receive payment of the amount due within 28 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice to to the Employer and the Contractor. The notice shall take effect when received by them both. Any such notice shall be final and binding on the Employer, the Contractor and the Member.

7 Default of the Member

If the Member fails to comply with any obligation under Clause 4, he/she shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other

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rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the DAB which are rendered void or ineffective.

8

Default of the Member

Any dispute or claim arising out of or in connection with this Dispute Adjudication Agreement, or the breach, termination or invalidity thereof, shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

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Annex PROCEDURAL RULES

1 The Employer and the Contractor shall furnish to the DAB one copy of all documents which the DAB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the matter in dispute. All communications between the DAB and the Employer or the Contractor shall be copied to the other Party. If the DAB comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.

2 The DAB shall proceed in accordance with Sub-Clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DAB shall:

(a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
(b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.

3 The DAB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.

4 Except as otherwise agreed in writing by the Employer and the Contractor, the DAB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer and the Contractor, and to proceed in the absence of any party who the DAB is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.

5 The Employer and the Contractor empower the DAB, among other things, to:

(a) establish the procedure to be applied in deciding a dispute,
(b) decide upon the DAB's own jurisdiction, and as to the scope of any dispute referred to it,
(c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules,
(d) take the initiative in ascertaining the facts and matters required for a decision,
(e) make use of its own specialist knowledge, if any,
(f) decide upon the payment of financing charges in accordance with the Contract,
(g) decide upon any provisional relief such as interim or conservatory measures, and
(h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Employer, relevant to the dispute.

6 The DAB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DAB shall make and give its decision in accordance with Sub-Clause 20.4, or as otherwise agreed by the Employer and the Contractor in writing. If the DAB comprises three persons:

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(a) it shall convene in private after a hearing, if any, in order to have discussions and prepare its decision;

(b) it shall endeavour to reach a unanimous decision: if this proves impossible, the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and

(c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:

(i) either the Employer or Contractor does nor agree that they do so, or

(ii) the absent Member is the chairman, and he/she instructs the other Members to not make a decision.

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GENERAL CONDITIONS

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

FORMS OF LETTER OF TENDER, CONTRACT AGREEMENT AND DISPUTE ADJUDICATION AGREEMENT

Conditions of Contract for **EPC/Turnkey Projects**

Guidance for the Preparation of Particular Conditions

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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

Guidance
for the Preparation of Particular Conditions

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Guidance for the Preparation of Particular Conditions

INTRODUCTION

The terms of the Conditions of Contract for EPC/Turnkey Projects have been prepared by the Fédération Internationale des Ingénieurs-Conseils (FIDIC) and are recommended where one entity takes total responsibility for an engineering project, including design, manufacture, delivery and installation of plant, and the design and execution of building or engineering works, tenders having been invited on an international basis. Modifications to the Conditions may be required in some legal jurisdictions, particularly if they are to be used on domestic contracts.

Major turnkey projects may require some negotiation between the parties. Having studied the variety of options offered by tenderers, the Employer may consider it essential to meet and discuss with them the technical options which the Employer considers preferable. Under the usual arrangements for this type of contract, the Contractor carries out the Engineering, Procurement and Construction, and provides a fully-equipped facility, ready for operation (at the "turn of the key").

The guidance hereafter is intended to assist writers of the Particular Conditions by giving options for various sub-clauses where appropriate. As far as possible, example wording is included, between lines. In some cases, however, only an aide-memoire is given.

Before incorporating any example wording, it must be checked to ensure that it is wholly suitable for the particular circumstances. Unless it is considered suitable, example wording should be amended before use.

Where example wording is amended, and in all cases where other amendments or additions are made, care must be taken to ensure that no ambiguity is created, either with the General Conditions or between the clauses in the Particular Conditions.

In the preparation of the Conditions of Contract to be included in the tender documents for a contract, the following text can be used:

> The Conditions of Contract comprise the "General Conditions", which form part of the "Conditions of Contract for EPC/Turnkey Projects" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following "Particular Conditions", which include amendments and additions to such General Conditions.

The following Sub-Clauses of the General Conditions require data to be included in the Particular Conditions:

1.1.3.3 & 8.2	Time for Completion
1.1.3.7 & 11.1	Defects Notification Period
1.1.5.6	Definition of each Section, if any
1.3	Electronic systems for communications
1.4	Laws and languages
2.1	Time for possession of the Site
4.2	Performance Security

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4.4	Notice of Subcontractors
8.7/12.4 & 14.15(d)	Delay/performance damages
13.8	Adjustments for changes in Cost
14.2	Advance payment(s)
14.3(c)	Retention
17.6	Limitation of liability
18.1	Employer's insurance (if any). Evidence of insurances
18.2(d)	Insurance of Employer's risks
18.3	Insurance against injury to persons and damage to property
20.2	Number of members of the dispute adjudication board
20.3	Appointing entity for the dispute adjudication board

Notes on the Preparation of Tender Documents

The tender documents should be prepared by suitably-qualified engineers who are familiar with the technical aspects of the required works, and a review by suitably-qualified lawyers may be advisable. The tender documents issued to tenderers will consist of the Conditions of Contract and the Employer's Requirements, and (possibly) the preferred form for the Letter of Tender. In addition, each of the Tenderers should receive the data referred to in Sub-Clause 4.10, and the Instructions to Tenderers to advise them of any matters which the Employer wishes them to include in their Tender but which do not form part of the Employer's Requirements for the Works.

When the Contract Agreement is signed by the Employer and the Contractor, the Contract (which then comes into full force and effect) includes the Tender and any memoranda annexed to the Contract Agreement.

The Employer's Requirements should specify the particular requirements for the completed Works on a functional basis, including detailed requirements on quality and scope, and may require the Contractor to supply items such as consumables. The matters referred to in some or all of the following Sub-Clauses might be included:

1.8	Number of copies of Contractor's Documents
1.13	Permissions obtained by the Employer
2.1	Phased possession of foundations, structures, plant or means of access
4.1	Intended purposes for which the Works are required
4.6	Other contractors (and others) on the Site
4.7	Setting-out points, lines and levels of reference
4.18	Environmental constraints
4.19	Electricity, water, gas and other services available on the Site
4.20	Employer's Equipment and free-issue material
5.1	Requirements, data and information for which the Employer is responsible
5.2	Contractor's Documents required for review
5.4	Technical standards and building regulations
5.5	Operational training for the Employer's Personnel
5.6	As-built drawings and other records of the Works
5.7	Operation and maintenance manuals
6.6	Facilities for Personnel
7.2	Samples
7.3	Off-Site inspection requirements
7.4	Testing during manufacture and/or construction
9.1	Tests on Completion
9.4	Damages for failure to pass Tests on Completion
12.1	Tests after Completion
12.4	Damages for failure to pass Tests after Completion

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Many Sub-Clauses in the General Conditions make reference to the Particular Conditions for such data as would typically be specified by the Employer, or to the Tender for such data as would typically be specified by the tenderer.

The Instructions to Tenderers may need to specify any constraints on the data proposed in the Tender, and/or specify the extent of other information which each Tenderer is to include with his Tender. If each Tenderer is to produce a parent company guarantee and/or a tender security, these requirements (which apply prior to the Contract becoming effective) should be included in the Instructions to Tenderers: example forms are annexed to this document as Annexes A and B. The Instructions may include matters referred to in some or all of the following Sub-Clauses:

4.3	Contractor's Representative (name and curriculum vitae)
4.9	Quality Assurance system
9.1	Tests on Completion
12.1	Tests after Completion
18	Insurances
20	Resolution of disputes

Turnkey contracts typically include design, construction, fixtures, fittings and equipment (f.f.e.), the scope of which should be defined in the Employer's Requirements. Full consideration should be given to detailed requirements, such as the extent to which the Works are to be fully equipped, ready for operation, with spare parts and consumables provided for operation for a specified period. In addition, the Contractor may be required to operate the Works, either for a few months' trial operation period under Sub-Clause 9.1(c), or for some years' operation.

Understandably, tenderers are often reluctant, in the face of intense competition, to incur great expense in the preparation of tender designs. When preparing the Instructions to Tenderers, thought should be given as to the extent of detail which tenderers can realistically be expected to prepare and include in their Tenders. The extent of detail required should be described in the Instructions to Tenderers. Note that there can be no description in the documents which will constitute the Contract, which only comes into full force and effect when the Agreement is signed.

Consideration may be given to offering some remuneration to tenderers if, in order to provide a responsive Tender, they have to undertake studies or carry out design work of a conceptual nature.

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Clause 1 General Provisions

Sub-Clause 1.1 Definitions

The Particular Conditions should specify the Time for Completion for the Works, and the Defects Notification Period.

If the Works are to be taken-over in stages, which is unusual under a turnkey contract, the Particular Conditions should specify each stage as a Section, and should define its scope, geographical extent and Time for Completion.

It may be necessary to amend some of the definitions. For example:

1.1.3.1 the Base Date could be defined as a particular calendar date
1.1.4.4 one particular Foreign Currency may be required by the financing institution
1.1.4.5 a different currency may be required to be the contract Local Currency
1.1.6.2 the references to "Country" may be inappropriate for a cross-border Site

Sub-Clause 1.2 Interpretation

If the references to "profit" are to be more precisely specified, this Sub-Clause may be varied:

EXAMPLE

At the end of Sub-Clause 1.2, insert:

In these Conditions, provisions including the expression "Cost plus reasonable profit" require this profit to be one-twentieth (5%) of this Cost.

Sub-Clause 1.3 Communications

The Particular Conditions should specify the systems of electronic communications (if any), and may also specify the address for the Contractor's notices to the Employer.

Sub-Clause 1.4 Laws and Language

The Particular Conditions should specify:

(a) the law which will govern the Contract,

(b) (if any part of the Contract has been written in one language and then translated) the ruling language, and

(c) (if communications are not to be written in the same language as that in which the Contract is written) the language for communications.

Sub-Clause 1.5 Priority of Documents

An order of precedence is usually necessary, in case a conflict is subsequently found among the contract documents. If no order of precedence is to be prescribed, this Sub-Clause may be varied:

EXAMPLE

Delete Sub-Clause 1.5 and substitute:

The documents forming the Contract are to be taken as mutually explanatory of one another. If an ambiguity or discrepancy is found, the priority shall be such as may be accorded by the governing law.

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Sub-Clause 1.6 Contract Agreement

The Contract Agreement is the document which brings the Contract into effect, and is usually preceded by negotiation. The Contract Agreement should therefore be drawn up with care. The form of Agreement should be included in the tender documents as an annex to the Particular Conditions: an example form is included at the end of this publication.

The Contract Agreement must state the name of each Party, the Contract Price, the currencies of payment, the amount due in each currency, and any pre-conditions which are to be satisfied before the Contract comes into full force and effect: all as agreed by the Parties. If lengthy tender negotiations were necessary, it may be considered advisable for the Contract Agreement to record the Base Date and/or Commencement Date also.

If the Employer wished to anticipate the possibility of issuing a letter of acceptance, the Sub-Clause may be amended by deleting the first sentence, which states that the Contract comes into full force and effect when the Parties sign the Contract Agreement. The Letter of Tender should then include the following paragraph:

> "Unless and until a formal Agreement is prepared and executed this Letter of Tender, together with your written acceptance thereof, shall constitute a binding contract between us."

Sub-Clause 1.10 Employer's Use of Contractor's Document

Additional provisions may be required, if all rights to particular items of computer software (for example) are to be assigned to the Employer. The provisions should take account of the applicable Laws.

Sub-Clause 1.13 Compliance with Laws

If the Employer is to arrange import permits and the like, alternative provisions may be appropriate:

EXAMPLE SUB-CLAUSE FOR A PLANT CONTRACT

Insert at the end of Sub-Clause 1.13:

However, the Contractor shall submit, in good time, the details of Goods to the Employer, who shall then promptly obtain all import permits or licences required for these Goods

The Employer shall also obtain or grant all consents including permits-to-work, wayleaves and approvals required for the Works.

Sub-Clause 1.14 Joint and Several Liability

For a major contract, detailed requirements for the joint venture may need to be specified. For example, it may be desirable for each member to produce a parent company guarantee: an example form is annexed to this document as Annex A.

These requirements, which apply prior to the Contract becoming effective, should be included in the Instructions to Tenderers. The Employer will wish the leader of the joint venture to be appointed at an early stage, providing a single point of contact thereafter, and will not wish to be involved in a dispute between the members of a joint venture. The Employer should scrutinise the joint venture agreement carefully, and it may have to be approved by the project's financing institutions.

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Clause 2 The Employer

Sub-Clause 2.1 Right of Access to the Site

The Particular Conditions should specify the time(s) by which the Employer will give the Contractor right of access to the Site, if after the Commencement Date. It may be essential for the Contractor to have early access to the Site for the purposes of survey and sub-surface investigations. If the Employer is arranging for work to be carried out on the Site before right of access is granted, details should be given in the Employer's Requirements.

Sub-Clause 2.3 Employer's Personnel

These provisions should be reflected in the Employer's contracts with any other contractors on the Site.

Clause 3 The Employer's Administration

Sub-Clause 3.1 The Employer's Representative

Although the Employer is not required to appoint a representative, such an appointment may assist the Employer's administration. If the Employer wishes to appoint an independent consulting engineer as the Employer's Representative, he may be named in the Particular Conditions.

Clause 4 The Contractor

Sub-Clause 4.2 Performance Security

The Particular Conditions should specify the amount and currencies of the Performance Security, unless it is not required.

EXAMPLE	The amount of the Performance Security shall be ten percent (10%) of the Contract Price stated in the Contract Agreement, and shall be expressed in the currencies and proportions in which the Contract Price is payable.

The acceptable form(s) of Performance Security should be included in the tender documents, annexed to the Particular Conditions. Example forms are annexed to this document as Annex C and Annex D. They incorporate two sets of Uniform Rules published by the International Chamber of Commerce (the "ICC", which is based at 38 Cours Albert 1er, 75008 Paris, France), which also publishes guides to these Uniform Rules. These example forms and the wording of the Sub-Clause may have to be amended to comply with applicable law.

EXAMPLE	At the end of the second paragraph of Sub-Clause 4.2, insert: If the Performance Security is in the form of a bank guarantee, it shall be issued either (a) by a bank located in the Country, or (b) directly by a foreign bank acceptable to the Employer. If the Performance Security is not in the form of a bank guarantee, it shall be furnished by a financial entity registered, or licensed to do business, in the Country.

Sub-Clause 4.3 Contractor's Representative

If the Representative is known at the time of submission of the Tender, the Tenderer may propose

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the Representative. The Tenderer may wish to propose alternatives, especially if the contract award seems likely to be delayed. If the ruling language is not the same as the language for day to day communications (under Sub-Clause 1.4), or if for any other reason it is necessary to stipulate that the Contractor's Representative shall be fluent in a particular language, one of the following sentences may be added.

EXAMPLE

At the end of Sub-Clause 4.3, add:

The Contractor's Representative and all these persons shall also be fluent in _____ (*insert name of language*)

EXAMPLE

At the end of Sub-Clause 4.3, add:

If the Contractor's Representative, or these persons, is not fluent in _____ (*insert name of language*), the Contractor shall make a competent interpreter available during all working hours.

Sub-Clause 4.4 Subcontractor

If the Employer wishes to receive the notices under this Sub-Clause, his requirements should be specified in the Particular Conditions:

EXAMPLE

The Contractor shall give the notices described in sub-paragraphs (a), (b) and (c) of Sub-Clauses 4.4 in respect of the following Subcontractors:

(list the relevant activities and/or parts of the Works)

Sub-Clause 4.12 Unforeseeable Difficulties

If the Works include tunnelling or other substantial sub-surface construction, it is usually preferable for the risk of unforeseen ground conditions to be allocated to the Employer. Responsible contractors will be reluctant to take the risks of unknown ground conditions which are difficult or impossible to estimate in advance. The Conditions of Contract for Plant and Design-Build should be used in these circumstances for works designed by (or on behalf of) the Contract.

Sub-Clause 4.19 Electricity, Water and Gas

If services are to be available for the Contractor to use, the Employer's Requirements should give details, including locations and prices.

Sub-Clause 4.20 Employer's Equipment and Free-Issue Material

For this Sub-Clause to apply, the Employer's Requirements should describe each item which the Employer will provide and/or operate and should specify all necessary details. With some types of facilities, further provisions may be necessary, in order to clarify aspects such as liability and insurance.

Sub-Clause 4.22 Security of the Site

If the Contractor is sharing occupation of the Site with others, Sub-Clauses 4.8 and/or 4.22 may require amendment, and the Employer's obligations should be specified.

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Clause 5 Design

Sub-Clause 5.1 General Design Obligations

If the Employer's Requirements include an outline design, in order (for example) to establish the feasibility of the project, tenderers should be advised of the extent to which the outline design is a suggestion or a requirement. If this Sub-Clause is considered inappropriate, the provisions in FIDIC's Conditions of Contract for Plant and Design-Build may be preferred.

Sub-Clause 5.2 Contractor's Documents

The "Contractor's Documents" are defined as the documents which the Contractor must submit to the Employer, as specified elsewhere in the Contract, which typically may not include all the technical documents which the Contractor's Personnel will need in order to execute the Works. For example, it may be appropriate for the Employer's Requirements for a plant contract to specify that the Contractor's Documents shall include drawings showing how the Plant is to be affixed and any other information required for:

(a) preparing suitable foundations or other means of support,

(b) providing suitable access on the Site, for the Plant and any necessary equipment, to the place where the Plant is to be erected, and/or

(c) making necessary connections to the Plant.

Different "review periods" may be specified, taking account of the time necessary to review the different types of drawing, and/or of the possibility of substantial submissions at particular stages of the design process.

Clause 6 Staff and Labour

Sub-Clause 6.6 Facilities for Staff and Labour

If the Employer will make some accommodation available, his obligations to do so should be specified.

Sub-Clause 6.8 Contractor's Superintendence

If the ruling language is not the same as the language for day to day communications (under Sub-Clause 1.4), or if for any other reason it is necessary to stipulate that the Contractor's superintending staff shall be fluent in a particular language, the following sentence may be added.

EXAMPLE

Insert at the end of Sub-Clause 6.8:

A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of

(*insert name of language*)

or the Contractor shall have a sufficient number of competent interpreters available on Site during all working hours.

Additional Sub-Clauses

It may be necessary to add a few sub-clauses to take account of the circumstances and locality of the Site:

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EXAMPLE SUB-CLAUSE

Foreign Staff and Labour

The Contractor may import any personnel who are necessary for the execution of the Works. The Contractor must ensure that these personnel are provided with the required residence visas and work permits. The Contractor shall be responsible for the return to the place where they were recruited or to their domicile of imported Contractor's Personnel. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

EXAMPLE SUB-CLAUSE

Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal by Contractor's Personnel.

EXAMPLE SUB-CLAUSE

Arms and Ammunition

The Contractor shall not give, barter or otherwise dispose of to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

EXAMPLE SUB-CLAUSE

Festivals and Religious Customs

The Contractor shall respect the Country's recognised festivals, days of rest and religious or other customs.

Clause 7 Plant, Materials and Workmanship

Additional Sub-Clause

If the Contract is being financed by an institution whose rules or policies require a restriction on the use of its funds, a further sub-clause may be added:

EXAMPLE SUB-CLAUSE

All Goods shall have their origin in eligible source countries as defined in

(insert name of published guidelines for procurement).

Goods shall be transported by carriers from these eligible source countries, unless exempted by the Employer in writing on the basis of potential excessive costs or delays. Surety, insurance and banking services shall be provided by insurers and bankers from the eligible source countries.

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Clause 8 Commencement, Delays and Suspension

Sub-Clause 8.7 Delay Damages

Under many legal systems, the amount of these pre-defined damages must represent a reasonable pre-estimate of the Employer's probable loss in the event of delay. The Particular Conditions should specify the daily sum, for the Works and for each Section, expressed either as an amount or as a percentage: see also Sub-Clause 14.15(b).

EXAMPLE

In Sub-Clause 8.7, the sum referred to in the second sentence shall be 0.02% of the Contract Price as delay damages in respect of the Works, payable (per day) in the proportions of currencies in which the Contract Price is payable. For each Section, such daily sum shall be 0.02% of the final contract value of such Section, payable (per day) in such currencies. The maximum amount of delay damages shall be ten percent (10%) of the Contract Price stated in the Contract Agreement.

Additional Sub-Clause

Incentives for early completion may be included in the tender documents (although Sub-Clause 13.2 refers to accelerated completion):

EXAMPLE SUB-CLAUSE

Sections are required to be completed by the dates given in the Employer's Requirements in order that these Sections may be occupied and used by the Employer in advance of the completion of the whole of the Works. Details of the work required to be executed to entitle the Contractor to bonus payments and the amount of the bonuses are stated in the Employer's Requirements.

For the purposes of calculating bonus payments, these dates for completion of Sections are fixed. No adjustments of the dates by reason of granting an extension of the Time for Completion will be allowed.

Clause 9 Tests on Completion

Sub-Clause 9.1 Contractor's Obligations

The Employer's Requirements should describe the tests which the Contractor is to carry out before being entitled to a Taking-Over Certificate. It may also be appropriate for the Tender to include detailed arrangements, instrumentation, etc. If the Works are to be tested and taken-over in stages, the tests requirements may have to take account of the effect of some parts of the Works being incomplete.

The wording in the sub-paragraphs includes the conditions which are typically applicable for a plant contract, but otherwise may require amendment. In particular, sub-paragraph (c) refers to trial operation, during which any product produced by the Works becomes the property of the Employer. He thus becomes responsible for disposing of it, and entitled to retain the proceeds from selling it. If the product is to be retained by the Contractor, the Sub-Clause should be amended accordingly.

Sub-Clause 9.4 Failure to Pass Tests on Completion

If the reduction referred to in the final paragraph, based on the extent of the failure, is to be defined in the Particular Conditions or in the Employer's Requirements, minimum acceptable performance criteria should also be specified.

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Clause 10 Employer's Taking Over

Sub-Clause 10.1 Taking-Over Certificate

If the Works are to be taken-over in stages, which is unusual under a turnkey contract, these stages should to be defined as Sections, in Clause 1 of the Particular Conditions. Precise geographical definitions are advisable.

Clause 11 Defects Liability

Sub-Clause 11.10 Unfulfilled Obligations

It may be necessary to review this Sub-Clause in relation to the period of liability under the applicable law.

Clause 12 Tests after Completion

Sub-Clause 12.1 Procedure for Tests after Completion

In an EPC turnkey project, the Contractor is typically required to prove the reliability and performance of the Plant during the Tests on Completion, and the Works are only taken over after successful completion of these tests. Exceptionally, it may be considered necessary for Tests after Completion to be carried out, after the Employer has taken over and operated the Works, so that the guaranteed performance can be demonstrated under normal operating conditions: for example, after operational fouling of the plant.

The Employer's Requirements should describe the tests he requires, after taking-over, to verify that the Works fulfil the Performance Guarantees promised in the Tender. For some types of Works, these Tests may be the most difficult to specify well, although they are critical to a successful outcome. It may be appropriate for the Tender to include detailed arrangements, and/or to define any instrumentation required, in addition to that included in the Plant.

The provisions in the General Conditions are based upon the Tests after Completion being carried out by the Contractor, with the assistance of the Employer as regards personnel, consumables, etc. These details may need to be specified in the Employer's Requirements. If other arrangements are envisaged, they should be specified in the Employer's Requirements, and the Sub-Clause should be amended accordingly. For example, the provisions in FIDIC's Conditions of Contract for Plant and Design-Build are based upon these Tests being carried out by the Employer and his operating personnel, with guidance from the Contractor's staff.

Sub-Clause 12.4 Failure to Pass Tests after Completion

If the first part of this Sub-Clause is to apply, the method of calculating the non-performance damages (based on the extent of the failure) should be defined in the Particular Conditions or in the Employer's Requirements, and the minimum acceptable performance criteria should also be specified.

Clause 13 Variations and Adjustments

Variations can be initiated by any of three ways:

(a) the Employer may instruct the variation under Sub-Clause 13.1, without prior agreement as to feasibility or price;

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(b) the Contractor may initiate his own proposals under Sub-Clause 13.2, which are intended to benefit both Parties; or
(c) the Employer may request a proposal under Sub-Clause 13.3, seeking prior agreement so as to minimise dispute.

Sub-Clause 13.5 Provisional Sums

Although generally inappropriate for this type of contract, a Provisional Sum may be required for parts of the Works which are not required to be priced at the risk of the Contractor. For example, a Provisional Sum may be necessary to cover goods which the Employer wants to select. It is essential to define the scope of each Provisional Sum, since the defined scope will then be excluded from the other elements of the Contract Price. If a Provisional Sum is to be valued under Sub-Clause 13.5(b), the percentage should be quoted in the Tender.

Sub-Clause 13.8 Adjustments for Changes in Cost

Provisions for adjustments may be required if it would be unreasonable for the Contractor to bear the risk of escalating costs due to inflation. Wording for provisions based on cost indices have been published in FIDIC's Conditions of Contract for Plant and Design-Build, which may be considered appropriate. Particular care should be taken in the calculation of weightings/coefficients ("a", "b", "c", ..., the total of which must not exceed unity) and in the selection and verification of cost indices. Expert advice may be appropriate.

Clause 14 Contract Price and Payment

Sub-Clause 14.1 The Contract Price

When writing the Particular Conditions, consideration should be given to the amount and timing of payment(s) to the Contractor. A positive cash flow is clearly of benefit to the Contractor, and tenderers will take account of the interim payment procedures when preparing their tenders.

Normally, this type of contract is based on a lump sum price. The Contractor thus takes the risk of changes in cost arising from his design. The lump sum price may consist of two or more amounts, quoted in the currencies of payment (which may, but need not, include the Local Currency).

In order to value Variations, Tenders may be required to be accompanied by detailed price breakdowns, including quantities, unit rates and other pricing information. This information can also be useful for the assessment of interim payments. However, the information may not have been priced competitively. When the tender documents are being prepared, the Employer must therefore decide whether he will accept being bound by the tenderer's breakdowns. If not, he should have ensured that his representative has the necessary expertise to value any Variations which may be required.

Additional Sub-Clauses may be required to cover any exceptions to the options set out in Sub-Clause 14.1, and any other matters relating to payment.

If Sub-Clause 14.1(b) is not to apply, additional Sub-Clause(s) should be added.

EXAMPLE SUB-CLAUSE ON EXEMPTION FROM DUTIES

All Goods imported by the Contractor into the Country shall be exempt from customs and other import duties, if the Employer's prior written approval is obtained for import. The Employer shall endorse the necessary exemption documents prepared by the Contractor for presentation in order to clear the Goods through Customs, and shall also provide the following exemption documents:

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(describe the necessary documents, which the Contractor will be unable to prepare)

If exemption is not then granted, the customs duties payable and paid shall be reimbursed by the Employer.

All imported Goods, which are not incorporated in or expended in connection with the Works, shall be exported on completion of the Contract. If not exported, the Goods will be assessed for duties as applicable to the Goods involved in accordance with the Laws of the Country.

However, exemption may not available for:

(a) Goods which are similar to those locally produced, unless they are not available in sufficient quantities or are of a different standard to that which is necessary for the Works; and

(b) any element of duty or tax inherent in the price of goods or services procured in the Country, which shall be deemed to be included in the Contract Price.

Port dues, quay dues and, except as set out above, any element of tax or duty inherent in the price of goods or services shall be deemed to be included in the Contract Price.

EXAMPLE SUB-CLAUSE ON EXEMPTION FROM TAXES

Expatriate (foreign) personnel shall not be liable for income tax levied in the Country on earnings paid in any foreign currency, or for income tax levied on subsistence, rentals and similar services directly furnished by the Contractor to Contractor's Personnel, or for allowances in lieu. If any Contractor's Personnel have part of their earnings paid in the Country in a foreign currency, they may export (after the conclusion of their term of service on the Works) any balance remaining of their earnings paid in foreign currencies.

The Employer shall seek exemption for the purposes of this Sub-Clause. If it is not granted, the relevant taxes paid shall be reimbursed by the Employer.

Sub-Clause 14.2 Advance Payment

When writing the Particular Conditions, consideration should be given to the benefits of advance payment(s). Unless this Sub-Clause is not to apply, the matters described in sub-paragraphs (a) to (d) of this Sub-Clause should be specified in the Particular Conditions, and the acceptable form(s) of guarantee should be included in the tender documents, annexed to the Particular Conditions: an example form is annexed to this document, as Annex E.

If the Contractor is to provide major items of Plant, consideration should be given to the benefits of stage payments during manufacture. The Employer may consider it advisable to have some form of security, since these payments would not relate to anything in his possession. If the Contractor is to be entitled to stage payments prior to shipment, the tender documents may include:

(a) provisions in the Particular Conditions linking the timing of advance payment instalments (under this Sub-Clause) to the stages of manufacture; or

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(b) in the Schedule of Payments or other document to be used to determine the contract value under Sub-Clause 14.3(a), a price for each of these stages (the Schedule should refer to the Contractor providing the security specified in Sub-Clause 14.5).

Sub-Clause 14.3 Application for Interim Payments

The Particular Conditions should specify the percentage of retention for sub-paragraph (c), and may also specify a limit of Retention Money.

Sub-Clause 14.4 Schedule of Payments

The General Conditions contains provisions for interim payments to the Contractor, which may be based on a Schedule of Payments. If another basis is to be used for determining interim valuations, details should be added in the Particular Conditions. If payments are to be specified in a Schedule of Payments, it could be in one of the following forms:

(a) an amount (or percentage of the estimated final Contract Price) could be entered for each three-month (or other) period during the Time for Completion, which can prove unreasonable if the Contractor's progress differs significantly from the expectation on which the Schedule was based; or

(b) the Schedule could be based on actual progress achieved in executing the Works, which necessitates careful definition of the payment milestones. Disagreements may arise when the work required for a payment milestone is nearly achieved but the balance cannot be completed until some months later.

Sub-Clause 14.7 Timing of Payments

If a different period for payment is to apply, the Sub-Clause may be amended:

EXAMPLE	In sub-paragraph (b) of Sub-Clause 14.7, delete "56" and substitute "42".

If the country/countries of payment need to be specified, details may be included in the Tender.

Sub-Clause 14.8 Delayed Payment

If the discount rate of the central bank in the country of the currency of payment is not a reasonable basis for assessing the Contractor's financing costs, a new rate may have to be defined. Alternatively, the actual financing Costs could be paid, taking account of local financing arrangements.

Sub-Clause 14.9 Payment of Retention Money

If part of the Retention Money is to be released and substituted by an appropriate guarantee, an additional Sub-Clause may be added. The acceptable form(s) of guarantee should be included in the tender documents, annexed to the Particular Conditions: an example form is annexed to this document, as Annex F.

EXAMPLE SUB-CLAUSE FOR RELEASE OF RETENTION

When the Retention Money has reached _____, the Employer shall make payment of _____% of the Retention Money to the Contractor if he obtains a guarantee, in a form and provided by an entity approved by the Employer, in amounts and currencies equal to the payment.

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The Contractor shall ensure that the guarantee is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security in Sub-Clause 4.2, and shall be returned to the Contractor accordingly. This release of retention shall be in lieu of the release of the second half of the Retention Money under the second paragraph of Sub-Clause 14.9.

Sub-Clause 14.15 Currencies of Payment

If all payments are to be made in Local Currency, it must be named in the Contract Agreement, and only the first sentence of this Sub-Clause will apply. Alternatively, the Sub-Clause may then be replaced:

EXAMPLE SUB-CLAUSE FOR A SINGLE-CURRENCY CONTRACT

The currency of account shall be the Local Currency and all payments made in accordance with the Contract shall be in Local Currency. The Local Currency payments shall be fully convertible, except those for local costs. The percentage attributed to local costs shall be as stated in the Tender.

Financing Arrangements

For major contracts in some markets, there may be a need to secure finance from entities such as aid agencies, development banks, export credit agencies, or other international financing institutions. If financing is to be procured from any of these sources, the Particular Conditions may need to incorporate its special requirements. The exact wording will depend on the relevant institution, so reference will need to be made to them to ascertain their requirements, and to seek approval of the draft tender documents.

These requirements may include tendering procedures which need to be adopted in order to render the eventual contract eligible for financing, and/or special Sub-Clauses which may need to be incorporated into the Particular Conditions. The following examples indicate some of the topics which the institution's requirements may cover:

(a) prohibition from discrimination against the shipping companies of any one country;

(b) ensuring that the Contract is subject to a widely-accepted neutral law;

(c) provision for arbitration under recognised international rules and at a neutral location;

(d) giving the Contractor the right to suspend/terminate in the event of default under the financing arrangements;

(e) restricting the right to reject Plant;

(f) specifying the payments due in the event of termination;

(g) specifying that the Contract does not become effective until certain conditions precedent have been satisfied, including pre-disbursement conditions for the financing arrangements; and

(h) obliging the Employer to make payments from his own resources if, for any reason, the funds under the financing arrangements are insufficient to meet the payments due to the Contractor, whether due to a default under the financing arrangements or otherwise.

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In addition, the financing institution or bank may wish the Contract to include references to the financing arrangements, especially if funding from more than one source is to be arranged to finance different elements of supply. It is not unusual for the Particular Conditions to include special provisions identifying different categories of Plant and specifying the documents to be presented to the relevant financing institution to obtain payment. If the financing institution's requirements are not met, it may be difficult (or even impossible) to secure suitable financing for the project, and/or the institution may decline to provide finance for part or all of the Contract.

However, where the financing is not tied to the export of goods and services from any particular country but is simply provided by commercial banks lending to the Employer, those banks may be concerned to ensure that the Contractor's rights are very restricted. These banks may wish the Contract to exclude any reference to the financing arrangements, and/or to restrict the Contractor's rights under Clause 16.

FORM OF SUB-CLAUSE WHICH A FINANCING INSTITUTION MAY REQUIRE

The Contract Price is made up as follows:

(breakdown into items and/or into supply/delivery/etc)

and shall be payable by the Employer to the Contractor as set out below.

(a) _____% of the Contract Price shall be payable by a direct payment from the Employer to the Contractor within 28 days of receipt by the Employer of the following documents:

(i) commercial invoice addressed to the Employer specifying the amount of the payment now due,
(ii) advance payment security guarantee issued by _____ Bank in the form annexed,
(iii) performance security guarantee issued by _____ Bank in the form annexed, and
(iv) an interim payment certificate confirming the payment due and specifying the amount.

(b) _____% of the contract price for the supply of Plant shall be payable as follows:

(i) _____% of the estimated contract value of the Plant supplied, by direct payment from the Employer to the Contractor on shipment of each item, against the following documents:
(original) commercial invoice,
(original) shipping documents,
(original) certificate of origin,
(original) insurance certificate, and
(original) interim payment certificate confirming the payment due and specifying the amount.

(ii) _____% of the estimated contract value of the Plant supplied, by disbursement from the Loan Agreement to the Contractor on shipment of each item, on presentation of a Qualifying Certificate in the form annexed and copies of the documents listed in sub-paragraph (b)(i) above.

(c) the balance of the Contract Price shall be payable as follows:

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(i) _____% of the estimated contract value of the services rendered, by direct payment from the Employer to the Contractor on execution of the relevant service, against the following documents:
(original) commercial invoice, and
(original) interim payment certificate confirming the payment due and specifying the amount.

(ii) _____% of the estimated contract value of the services rendered, by disbursement from the Loan Agreement to the Contractor, on presentation of a Qualifying Certificate in the form annexed and copies of the documents listed in sub-paragraph (c)(i) above.

(d) The direct payments by the Employer specified in sub-paragraph (b) shall be made by an irrevocable letter of credit established by the Employer in favour of the Contractor and confirmed by a bank acceptable to the Contractor.

The above arrangements (involving financing institution(s), Employer and Contractor) may be initiated by the Employer; or by the Contractor, before submitting the Tender. Alternatively, the Contractor may be prepared to initiate financing arrangements and retain responsibility for them, although he would probably be unable or unwilling to provide finance from his own resources. His financing bank's requirements would then affect his attitude in contract negotiations. They might well require the Employer to make interim payments, although a large proportion of the Contract Price might be withheld until the Works are complete.

This payment arrangement can be achieved either by a high Percentage of Retention; or by a suitably completed Schedule of Payments, with the Instructions to Tenderers specifying the criteria with which the Tenderer should comply. Since the Contractor would then have to arrange his own financing to cover the shortfall between the payments and his outgoings, he (and his financing bank) would probably require some form of security, guaranteeing payment when due.

It may be appropriate for the Employer, when preparing the tender documents, to anticipate the latter requirement by undertaking to provide a guarantee for the element of payment which the Contractor is to receive when the Works are complete. The acceptable form(s) of guarantee should be included in the tender documents, annexed to the Particular Conditions: an example form is annexed to this document, as Annex G. The following Sub-Clause may be added.

EXAMPLE PROVISIONS FOR CONTRACTOR FINANCE

The Employer shall obtain (at his cost) a payment guarantee in the amount and currencies, and provided by an entity, as stated in _____. The Employer shall deliver the guarantee to the Contractor within 28 days after both Parties have signed the Contract Agreement. The guarantee shall be in the form annexed to these Particular Conditions, or in another form acceptable to the Contractor. Unless and until the Contractor receives the guarantee, the Employer shall not give the notice under Sub-Clause 8.1.

The guarantee shall be returned to the Employer at the earliest of the following dates:

a) when the Contractor has been paid the Contract Price stated in the Contract Agreement;

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(b) when obligations under the guarantee expire or have been discharged; or

(c) when the Employer has performed all obligations under the Contract.

Clause 15 Termination by Employer

Sub-Clause 15.2 Termination by Employer

Before inviting tenders, the Employer should verify that the wording of this Sub-Clause, and each anticipated ground for termination, is consistent with the law governing the Contract.

Sub-Clause 15.5 Employer's Entitlement to Termination

Unless inconsistent with the requirements of the Employer and/or financing institutions, a further sentence may be added.

EXAMPLE

Insert at the end of Sub-Clause 15.5:

The Employer shall also pay to the Contractor the amount of any other loss or damage resulting from this termination.

Clause 16 Suspension and Termination by Contractor

Sub-Clause 16.2 Termination by Contractor

Before inviting tenders, the Employer should verify that the wording of this Sub-Clause is consistent with the law governing the Contract. The Contractor should verify that each anticipated ground for termination is consistent with such law.

Clause 17 Risk and Responsability

Sub-Clause 17.6 Limitation of Liability

EXAMPLE

In Sub-Clause 17.6, the sum referred to in the penultimate sentence shall be _____

Additional Sub-Clause Use of Employer's Accommodation/Facilities

If the Contractor is to occupy the Employer's facilities temporarily, an additional sub-clause may be added:

EXAMPLE SUB-CLAUSE

The Contractor shall take full responsibility for the care of the items detailed below, from the respective dates of use or occupation by the Contractor, up to the respective dates of hand-over or cessation of occupation (where hand-over or cessation of occupation may take place after the date stated in the Taking-Over Certificate for the Works):

(insert details)

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If any loss or damage happens to any of the above items while the Contractor is responsible for their care, arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at his own cost, rectify the loss or damage to the satisfaction of the Employer.

Clause 18 Insurance

The wording in the General Conditions describes the insurances which are to be arranged by the "insuring Party", who is to be the Contractor unless otherwise stated in the Particular Conditions. Insurances so provided by the Contractor are to be consistent with the general terms agreed with the Employer. The Instructions to Tenderers may therefore require tenderers to provide details of the proposed terms. The Particular Conditions should specify the minimum amount of deductibles for sub-paragraph (d) of Sub-Clause 18.2 and the minimum amount of third party insurance for Sub-Clause 18.3.

If the Employer is to arrange any of the insurances under this Clause, the tender documents should include details as an annex to the Particular Conditions (so that tenderers can estimate what other insurances they wish to have for their own protection), including the conditions, limits, exceptions and deductibles; preferably in the form of a copy of each policy. The Employer may find it difficult to effect the insurances described in the third paragraph of Sub-Clause 18.2 (for Contractor's Equipment, which includes Sub-contractor's equipment), because the Employer may not know the amount or value of these items of equipment. The following sentence may be included in the Particular Conditions:

EXAMPLE

Delete the final paragraph of Sub-Clause 18.2 and substitute:

However, the insurances described in the first two paragraphs of Sub-Clause 18.2 shall be effected and maintained by the Employer as insuring Party, and not by the Contractor.

Clause 19 Force Majeure

Before inviting tenders, the Employer should verify that the wording of this Clause is compatible with the law governing the Contract.

Clause 20 Claims, Disputes and Arbitration

Sub-Clause 20.2 Appointment of the Dispute Adjudication Board

The Contract should include provisions which, whilst not discouraging the Parties from reaching agreement on disputes as the works proceed, allow them to refer contentious matters to an impartial dispute adjudication board ("DAB").

The adjudication procedure depends for its success on, amongst other things, the Parties' confidence in the agreed individual(s) who will serve on the DAB. Therefore, it is essential that candidates for this position are not imposed by either Party on the other Party; and that, if the individual is selected under Sub-Clause 20.3, the selection is made by a wholly impartial entity. FIDIC is prepared to perform this role, if this authority has been delegated in accordance with the example wording suggested below, for Sub-Clause 20.3.

Sub-Clause 20.2 envisages appointment of the DAB after a Party gives notice of its intention to

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refer a dispute to a DAB. However, for certain types of project, particularly those involving extensive work on Site, where it would be appropriate for the DAB to visit the Site on a regular basis, it may be decided to retain the services of a permanent DAB. In this case, Sub-Clause 20.2 and 20.4 together with the Appendix and Annex to the General Conditions, and the Dispute Adjudication Agreement, should be amended to comply with the corresponding wording contained in FIDIC's Conditions of Contract for Construction.

Sub-Clause 20.2 provides for two alternative arrangements for the DAB:

(a) one person, who acts as the sole member of the DAB, having entered into a tripartite agreement with both Parties; or
(b) a DAB of three persons, each of whom has entered into a tripartite agreement with both Parties.

The form of this tripartite agreement could be one of the two alternatives shown at the end of this publication, as appropriate to the arrangement adopted. Both of these forms incorporate (by reference) the General Conditions of Dispute Adjudication Agreement, which are included as the Appendix to the General Conditions because they are also referred to in Sub-Clause 20.2. Under either of these alternative forms of Dispute Adjudication Agreement, each individual person is referred to as a Member.

Before the Contract is entered into, consideration should be given as to whether a one-person or three-person DAB is preferable for a particular project, taking account of its size, duration and the fields of expertise which will be involved.

The appointment of the DAB may be facilitated by including an agreed list of potential members in the Contract.

Sub-Clause 20.3	**Failure to Agree Dispute Adjudication Board**
EXAMPLE	The appointing entity or official shall be the President of FIDIC or a person appointed by its President.

Sub-Clause 20.5 Amicable Settlement

The provisions of this Sub-Clause are intended to encourage the parties to settle a dispute amicably, without the need for arbitration: for example, by direct negotiation, conciliation, mediation or other forms of alternative dispute resolution. Amicable settlement procedures often depend, for their success, on confidentiality and on both Parties' acceptance of the procedure. Therefore, neither Party should seek to impose the procedure on the other Party.

Sub-Clause 20.6 Arbitration

The Contract should include provisions for the resolution by international arbitration of any disputes which are not resolved amicably. In international construction contracts, international commercial arbitration has numerous advantages over litigation in national courts, and may be more acceptable to the Parties.

Careful consideration should be given to ensuring that the international arbitration rules chosen are compatible with the provisions of Clause 20 and with the other elements to be specified in the Contract. The Rules of Arbitration of the International Chamber of Commerce (the "ICC", which is based at 38 Cours Albert 1er, 75008 Paris, France) are frequently included in international contracts. In the absence of specific stipulations as to the number of arbitrators and the place of arbitration, the International Court of Arbitration of the ICC will decide on the number of arbitrators (typically three in any substantial construction dispute) and on the place of arbitration.

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If the UNCITRAL (or other non-ICC) arbitration rules are preferred, it may be necessary to designate, in the Particular Conditions, an institution to appoint the arbitrators or to administer the arbitration, unless the institution is named (and their role specified) in the arbitration rules. It may also be necessary to ensure, before so designating an institution, that it is prepared to appoint or administer.

For major projects tendered internationally, it is desirable that the place of arbitration be situated in a country other than that of the Employer or Contractor. This country should have a modern and liberal arbitration law and should have ratified a bilateral or multilateral convention (such as the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards), or both, that would facilitate the enforcement of an arbitral award in the states of the Parties.

It may be considered desirable in some cases for other Parties to be joined into any arbitration between the Parties, thereby creating a multi-party arbitration. While this may be feasible, multi-party arbitration clauses require skilful drafting, and usually need to be prepared on a case-by-case basis. No satisfactory standard form of multi-party arbitration clause for international use has yet been developed.

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Annexes FORMS OF SECURITIES

Acceptable form(s) of security should be included in the tender documents: for Annex A and/or B, in the Instructions to Tenderers; and for Annexes C to G, annexed to the Particular Conditions. The following example forms, which (except for Annex A) incorporate Uniform Rules published by the International Chamber of Commerce (the "ICC", which is based at 38 Cours Albert 1er, 75008 Paris, France), may have to be amended to comply with the applicable law. Although the ICC publishes guides to these Uniform Rules, legal advice should be taken before the securities are written. Note that the guaranteed amounts should be quoted in all the currencies, as specified in the Contract, in which the guarantor pays the beneficiary.

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Annex A EXAMPLE FORM OF PARENT COMPANY GUARANTEE

[*See page 4, and the comments on Sub-Clause 1.14*]

Brief description of Contract _____

Name and address of Employer _____

_____ (together with successors and assigns).

We have been informed that _____ (hereinafter called the "Contractor") is submitting an offer for such Contract in response to your invitation, and that the conditions of your invitation require his offer to be supported by a parent company guarantee.

In consideration of you, the Employer, awarding the Contract to the Contractor, we (*name of parent company*) _____ irrevocably and unconditionally guarantee to you, as a primary obligation, the due performance of all the Contractor's obligations and liabilities under the Contract, including the Contractor's compliance with all its terms and conditions according to their true intent and meaning.

If the Contractor fails to so perform his obligations and liabilities and comply with the Contract, we will indemnify the Employer against and from all damages, losses and expenses (including legal fees and expenses) which arise from any such failure for which the Contractor is liable to the Employer under the Contract.

This guarantee shall come into full force and effect when the Contract comes into full force and effect. If the Contract does not come into full force and effect within a year of the date of this guarantee, or if you demonstrate that you do not intend to enter into the Contract with the Contractor, this guarantee shall be void and ineffective. This guarantee shall continue in full force and effect until all the Contractor's obligations and liabilities under the Contract have been discharged, when this guarantee shall expire and shall be returned to us, and our liability hereunder shall be discharged absolutely.

This guarantee shall apply and be supplemental to the Contract as amended or varied by the Employer and the Contractor from time to time. We hereby authorise them to agree any such amendment or variation, the due performance of which and compliance with which by the Contractor are likewise guaranteed hereunder. Our obligations and liabilities under this guarantee shall not be discharged by any allowance of time or other indulgence whatsoever by the Employer to the Contractor, or by any variation or suspension of the works to be executed under the Contract, or by any amendments to the Contract or to the constitution of the Contractor or the Employer, or by any other matters, whether with or without our knowledge or consent.

This guarantee shall be governed by the law of the same country (or other jurisdiction) as that which governs the Contract and any dispute under this guarantee shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with such Rules. We confirm that the benefit of this guarantee may be assigned subject only to the provisions for assignment of the Contract.

Date _____ Signature(s) _____

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Annex B EXAMPLE FORM OF TENDER SECURITY

[*See page 4*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the tender documents define as the Employer).

We have been informed that _____ (hereinafter called the "Principal") is submitting an offer for such Contract in response to your invitation, and that the conditions of your invitation (the "conditions of invitation", which are set out in a document entitled Instructions to Tenderers) require his offer to be supported by a tender security.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (say: _____) upon receipt by us of your demand in writing and your written statement (in the demand) stating that:

(a) the Principal has, without your agreement, withdrawn his offer after the latest time specified for its submission and before the expiry of its period of validity, or

(b) the Principal has refused to accept the correction of errors in his offer in accordance with such conditions of invitation, or

(c) you entered into the Contract with the Principal and he has failed to deliver a performance security complying with sub-clause 4.2 of the conditions of the Contract.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 35 days after the expiry of the validity of the Letter of Tender*) _____, when this guarantee shall expire and shall be returned to us.

This guarantee is subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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Annex C EXAMPLE FORM OF PERFORMANCE SECURITY - DEMAND GUARANTEE

[*See comments on Sub-Clause 4.2*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Employer)

We have been informed that _____ (hereinafter called the "Principal") is your contractor under such Contract, which requires him to obtain a performance security.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (the "guaranteed amount", say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that the Principal is in breach of his obligation(s) under the Contract, and

(a) the respect in which the Principal is in breach.

[Following the receipt by us of an authenticated copy of the taking-over certificate for the whole of the works under clause 10 of the conditions of the Contract, such guaranteed amount shall be reduced by _____ % and we shall promptly notify you that we have received such certificate and have reduced the guaranteed amount accordingly.] (1)

Any demand for payment must contain your [minister's/directors'] (1) signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 70 days after the expected expiry of the Defects Notification Period for the Works*) _____ (the "expiry date"), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the performance certificate under the Contract has not been issued by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written statement that the performance certificate has not been issued, for reasons attributable to the Principal, and that this guarantee has not been extended.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

When writing the tender documents, the writer should ascertain whether to include the optional text, shown in parentheses [ ]

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Annex D EXAMPLE FORM OF PERFORMANCE SECURITY - SURETY BOND

[*See comments on Sub-Clause 4.2*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (together with successors and assigns, all as defined in the Contract as the Employer).

By this Bond, (*name and address of contractor*) _____ (who is the contractor under such Contract) as Principal and (*name and address of guarantor*) _____ as Guarantor are irrevocably held and firmly bound to the Beneficiary in the total amount of _____ (the "Bond Amount", say: _____) for the due performance of all such Principal's obligations and liabilities under the Contract. [Such Bond Amount shall be reduced by _____ % upon the issue of the taking-over certificate for the whole of the works under clause 10 of the conditions of the Contract.][(1)]

This Bond shall become effective on the Commencement Date defined in the Contract.

Upon Default by the Principal to perform any Contractual Obligation, or upon the occurrence of any of the events and circumstances listed in sub-clause 15.2 of the conditions of the Contract, the Guarantor shall satisfy and discharge the damages sustained by the Beneficiary due to such Default, event or circumstances,[(2)] However, the total liability of the Guarantor shall not exceed the Bond Amount.

The obligations and liabilities of the Guarantor shall not be discharged by any allowance of time or other indulgence whatsoever by the Beneficiary to the Principal, or by any variation or suspension of the works to be executed under the Contract, or by any amendments to the Contract or to the constitution of the Principal or the Beneficiary, or by any other matters, whether with or without the knowledge or consent of the Guarantor.

Any claim under this Bond must be received by the Guarantor on or before (*the date six months after the expected expiry of the Defects Notification Period for the Works*) _____ (the "Expiry Date"), when this Bond shall expire and shall be returned to the Guarantor.

The benefit of this Bond may be assigned subject to the provisions for assignment of the Contract, and subject to the receipt by the Guarantor of evidence of full compliance with such provisions.

This Bond shall be governed by the law of the same country (or other jurisdiction) as that which governs the Contract. This Bond incorporates and shall be subject to the Uniform Rules for Contract Bonds, published as number 524 by the International Chamber of Commerce, and words used in this Bond shall bear the meanings set out in such Rules.

Wherefore this Bond has been issued by the Principal and the Guarantor on (*date*) _____

Signature(s) for and on behalf of the Principal _____

Signature(s) for and on behalf of the Guarantor _____

(1) *When writing the tender documents, the writer should ascertain whether to include the optional text, shown in parentheses* [ ]

(2) *Insert:* [and shall not be entitled to perform the Principal's obligations under the Contract.]
Or: [or at the option of the Guarantor (to be exercised in writing within 42 days of receiving the claim specifying such Default) perform the Principal's obligations under the Contract.]

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Annex E EXAMPLE FORM OF ADVANCE PAYMENT GUARANTEE

[*See comments on Sub-Clause 14.2*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Employer).

We have been informed that _____ (hereinafter called the "Principal") is your contractor under such Contract and wishes to receive an advance payment, for which the Contract requires him to obtain a guarantee.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (the "guaranteed amount", say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that the Principal has failed to repay the advance payment in accordance with the conditions of the Contract, and

(b) the amount which the Principal has failed to repay.

This guarantee shall become effective upon receipt [of the first instalment] of the advance payment by the Principal. Such guaranteed amount shall be reduced by the amounts of the advance payment repaid to you, as evidenced by your notices issued under sub-clause 14.6 of the conditions of the Contract. Following receipt (from the Principal) of a copy of each purported notice, we shall promptly notify you of the revised guaranteed amount accordingly.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 70 days after the expected expiry of the Time for Completion*) _____ (the "expiry date"), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the advance payment has not been repaid by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written statement that the advance payment has not been repaid and that this guarantee has not been extended.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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Annex F EXAMPLE FORM OF RETENTION MONEY GUARANTEE

[*See comments on Sub-Clause 14.9*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Employer).

We have been informed that _____ (hereinafter called the "Principal") is your contractor under such Contract and wishes to receive early payment of [part of] the retention money, for which the Contract requires him to obtain a guarantee.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ (the "guaranteed amount", say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that the Principal has failed to carry out his obligation(s) to rectify certain defect(s) for which he is responsible under the Contract, and

(b) the nature of such defect(s).

At any time, our liability under this guarantee shall not exceed the total amount of retention money released to the Principal by you, as evidenced by your notices issued under sub-clause 14.6 of the conditions of the Contract with a copy being passed to us.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date 70 days after the expected expiry of the Defects Notification Period for the Works*) _____ (the "expiry date"), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the performance certificate under the Contract has not been issued by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written statement that the performance certificate has not been issued, for reasons attributable to the Principal, and that this guarantee has not been extended.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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Annex G EXAMPLE FORM OF PAYMENT GUARANTEE BY EMPLOYER

[*See page 18: Contractor Finance*]

Brief description of Contract _____

Name and address of Beneficiary _____

_____ (whom the Contract defines as the Contractor).

We have been informed that _____ (whom the Contract defines as the Employer and who is hereinafter called the "Principal") is required to obtain a bank guarantee.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary/Contractor, any sum or sums not exceeding in total the amount of _____ (say: _____) upon receipt by us of your demand in writing and your written statement stating:

(a) that, in respect of a payment due under the Contract, the Principal has failed to make payment in full by the date fourteen days after the expiry of the period specified in the Contract as that within which such payment should have been made, and

(b) the amount(s) which the Principal has failed to pay.

Any demand for payment must be accompanied by a copy of [*list of documents evidencing entitlement to payment*] _____ , in respect of which the Principal has failed to make payment in full.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (*the date six months after the expected expiry of the Defects Notification Period for the Works*) _____, when this guarantee shall expire and shall be returned to us.

This guarantee shall be governed by the laws of _____ and shall be subject to the Uniform Rules for Demand Guarantees, published as number 458 by the International Chamber of Commerce, except as stated above.

Date _____ Signature(s) _____

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GENERAL CONDITIONS

GUIDANCE FOR THE PREPARATION OF PARTICULAR CONDITIONS

FORMS OF LETTER OF TENDER, CONTRACT AGREEMENT AND DISPUTE ADJUDICATION AGREEMENT

Conditions of Contract for **EPC/Turnkey Projects**

Forms of Letter of Tender, Contract Agreement and Dispute Adjudication Agreement

FOR EXCLUSIVE USE BY FICHTNER GMBH. & CO. KG, GERMANY UNTIL END MAY 2012

FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

LETTER OF TENDER

NAME OF CONTRACT:

TO:

We have examined the Conditions of Contract, Employer's Requirements and Addenda Nos _____ for the above-named Works. We have examined, understood and checked these documents and have ascertained that they contain no errors or other defects. We accordingly offer to design, execute and complete the Works and remedy any defects therein, in conformity with such documents and our enclosed Tender (including this letter) for the prices set out in our Tender.

We accept your suggestions for the appointment of the DAB, as set out in _____

[*We have included our suggestions for the other Member of the DAB in part _____ of our Tender, entitled List of Potential Members of the DAB.*]. *

We agree to abide by this Tender until _____ and it shall remain binding upon us and may be accepted at any time before that date.

If this offer is accepted, we will provide the specified Performance Security, commence the Works as soon as is reasonably practicable after the Commencement Date, and complete the Works in accordance with the above-named documents within the Time for Completion. We guarantee that the Works will then conform with the Performance Guarantees included in this Tender.

We understand that you are not bound to accept the lowest or any tender you may receive.

Signature _____ in the capacity of _____

duly authorised to sign tenders for and on behalf of _____

_____

Address: _____

_____

Date: _____

* If the Tenderer does not accept, this paragraph may be deleted and replaced by:

We do not accept your suggestions for the appointment of the DAB. We have included our suggestions in our Tender, in the list of potential members of the DAB. If these suggestions are not acceptable to you, we propose that the DAB be jointly appointed in accordance with Sub-Clause 20.2 of the Conditions of Contract, [*after a Party gives notice of its intention to refer a dispute to the DAB*]

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CONTRACT AGREEMENT

This Agreement made the _____ day of _____ 20 _____

Between _____ of _____ (hereinafter called "the Employer") of the one part, and _____ of _____ (hereinafter called "the Contractor") of the other part

Whereas the Employer desires that the Works known as _____ should be executed by the Contractor, and has accepted a Tender by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement:

   (a) The memoranda annexed hereto (which includes a breakdown of the Contract Price)
   (b) The Addenda nos _____
   (c) The Conditions of Contract
   (d) The Employer's Requirements, and
   (e) The Contractor's Tender.

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to design, execute and complete the Works and remedy any defects therein in conformity with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor, in consideration of the design, execution and completion of the Works and the remedying of defects therein, the final Contract Price at the times and in the manner prescribed by the Contract.

[5. The Contract shall come into full force and effect on the date when the following conditions are satisfied:
[List of pre-conditions]
The Employer shall promptly confirm to the Contractor the date on which all these conditions have been satisfied. If any of these conditions has not been satisfied within _____ days of the above-mentioned date on which this Agreement is made, this Agreement shall be void and ineffective and any securities issued in relation to the above Works shall be returned. *optional*]

[5. The Commencement Date shall be _____ *optional*]

In Witness whereof the parties hereto have caused this Agreement to be executed the day and year first before written in accordance with their respective laws.

SIGNED by: _____	SIGNED by: _____
for and on behalf of the Employer in the presence of	for and on behalf of the Contractor in the presence of
Witness: _____	Witness: _____
Name: _____	Name: _____
Address: _____	Address: _____
Date: _____	Date: _____

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DISPUTE ADJUDICATION AGREEMENT

[for a one-person DAB]

Name and details of Contract _____
Name and address of Employer _____
Name and address of Contractor _____
Name and address of Member _____

Whereas the Employer and the Contractor have entered into the Contract and desire jointly to appoint the Member to act as sole adjudicator who is also called the "DAB" to adjudicate a dispute which has arisen in relation to _____ *

The Employer, Contractor and Member jointly agree as follows:

1. The conditions of this Dispute Adjudication Agreement comprise the "General Conditions of Dispute Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for EPC/Turnkey Projects" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following provisions. In these provisions, which include amendments and additions to the General Conditions of Dispute Adjudication Agreement, words and expressions shall have the same meanings as are assigned to them in the General Conditions of Dispute Adjudication Agreement.

2. [*Details of amendments to the General Conditions of Dispute Adjudication Agreement, if any.]*

3. In accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member shall be paid a daily fee of _____ per day.

4. In consideration of these fees and other payments to be made by the Employer and the Contractor in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member undertakes to act as the DAB (as adjudicator) in accordance with this Dispute Adjudication Agreement.

5. The Employer and the Contractor jointly and severally undertake to pay the Member, in consideration of the carrying out of these services, in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement.

6. This Dispute Adjudication Agreement shall be governed by the law of _____

SIGNED by: _____	SIGNED by: _____	SIGNED by: _____
for and on behalf of the Employer in the presence of	for and on behalf of the Contractor in the presence of	the Member in the presence of:
Witness: _____	Witness: _____	Witness _____
Name: _____	Name: _____	Name: _____
Address: _____	Address: _____	Address: _____
Date: _____	Date: _____	Date: _____

[A brief description or name of dispute to be added*]

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DISPUTE ADJUDICATION AGREEMENT

[for each member of a three-person DAB]

Name and details of Contract _____
Name and address of Employer _____
Name and address of Contractor _____
Name and address of Member _____

Whereas the Employer and the Contractor have entered into the Contract and desire jointly to appoint the Member to act as one of the three persons who are jointly called the "DAB" [*and desire the Member to act as chairman of the DAB*] to adjudicate a dispute which has arisen in relation to _____*

The Employer, Contractor and Member jointly agree as follows:

1. The conditions of this Dispute Adjudication Agreement comprise the "General Conditions of Dispute Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for EPC/Turnkey Projects" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following provisions. In these provisions, which include amendments and additions to the General Conditions of Dispute Adjudication Agreement, words and expressions shall have the same meanings as are assigned to them in the General Conditions of Dispute Adjudication Agreement.

2. [*Details of amendments to the General Conditions of Dispute Adjudication Agreement, if any.]*

3. In accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member shall be paid a daily fee of _____ per day.

4. In consideration of these fees and other payments to be made by the Employer and the Contractor in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member undertakes to serve, as described in this Dispute Adjudication Agreement, as one of the three persons who are jointly to act as the DAB.

5. The Employer and the Contractor jointly and severally undertake to pay the Member, in consideration of the carrying out of these services, in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement.

6. This Dispute Adjudication Agreement shall be governed by the law of _____

SIGNED by: _____	SIGNED by: _____	SIGNED by: _____
for and on behalf of the Employer in the presence of	for and on behalf of the Contractor in the presence of	the Member in the presence of
Witness: _____	Witness: _____	Witness _____
Name: _____	Name: _____	Name: _____
Address: _____	Address: _____	Address: _____
Date: _____	Date: _____	Date: _____

*[*A brief description or name of dispute to be added.]*

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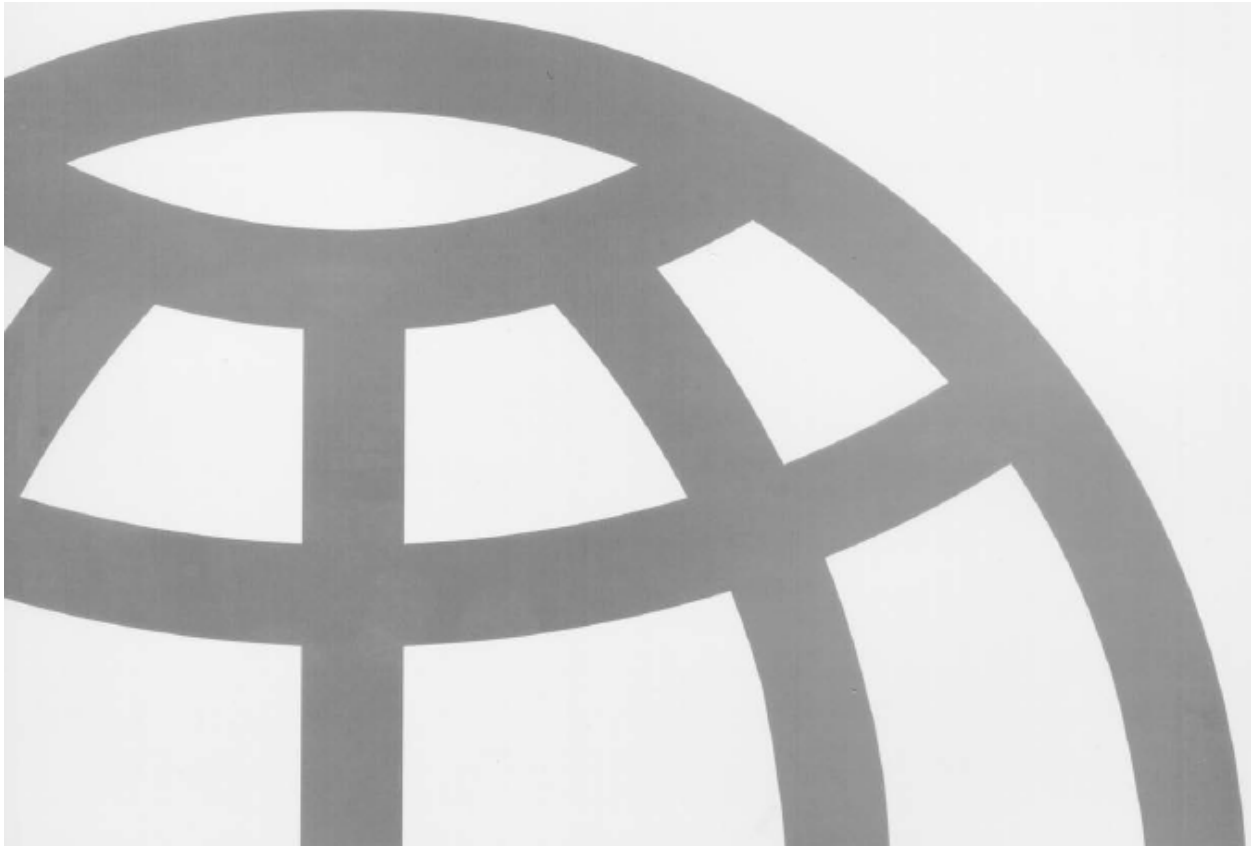
Međunarodna Federacija Konsalting Inženjera

Uslovi ugovaranja za PNI/ključ u ruke projekte

Opšti uslovi

Savjeti za pripremu posebnih uslova

Obrasci ponuda, ugovora i sporazuma o rješavanju sporova



ISBN 2-88432-021-0 **PRVO IZDANJE 1999**

Opšti uslovi

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Obrasci ponuda, ugovora i

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Prvo izdanje 1999

ISBN 2-88432-021-0

Međunarodna Federacija Konsalting Inženjera

GREŠKE u prvom izdanju, 1999.

Sledeće značajne greške su ispravljenje u Prvom izdanju PNI/Ključ u ruke projekte, koje je ponovno štampano. Nekoliko manjih grešaka u kucanju i nepravilnosti u izgledu dokumenta su takođe ispravljene.

OPŠTE ODREDBE

Strana 36.

U naslovu podklauzule 14.2, izbrisati "Avans" i zamijeniti sa "Avansno"

Strana 54.

U petom redu, petog stava, poslije "Klauzule 20.4", dodati u kurzivu naslov "Donošenje odluke Komisije za rješavanje sporova". Podklauzula 20.4; peti red, izbrisati skraćenicu "KRS" koja je napisana u kurzivu i zamijeniti je sa "Komisija za rješavanje sporova" u kurzivu.

Strana 55.

U trećem stavu: drugi red, izbrisati riječ "the" u rečenici ("Opšti uslovi sporazuma o rješavanju sporova"-"General Conditions of the Dispute Adjudication Agreement"); i u šestom redu, izbrisati "Član" i zamijeniti sa "član"

Strana 59.

U podstavu (ii), drugi red, izbrisati riječ "dana" i zamijeniti sa "dani", a u trećem redu izbrisati "drugi" i zamijeniti sa "još jedan".

Na sredini stranice, izbrisati "Sporazum dok svi članovi ne budu isplaćeni" i zamijeniti sa "Sporazum dok svako od članova ne bude plaćen"

Na kraju sledećeg stava, nakon "odluka", dodati "treba da"

U posljednoj rečenici klauzule 6, izbrisati zarez nakon rečenice "svako takvo obavještenje"

Strana 68.

U trećem redu Klauzule 6., izbrisati riječ "obavještenje"

Uputstvo za izradu posebnih uslova

Aneksi - izbrisati "FIDIC"

UVODNA NAPOMENA U PRVOM IZDANJU

Crvene i žute knjige Međunarodne federacije inžinjera konsultanata (FIDIC) (tj, standardni oblici ugovora za radove u oblasti građevinskih i elektro ili mašinskih radova) se u širokoj upotrebi nekoliko decenija i prepoznati su, između ostalog, zbog njihovih principa uravnoteženog rizika, koji dijele investitor i izvođač. Ovi principi koji podrazumijevaju podjelu rizika su bili dobri za obije strane, za investitora koji potpisuje ugovor po nižoj cijeni i koji ima dodatne troškove kada se određeni rizici postanu stvarnost i izvođač, koji izbjegava određivanje cijene takvih rizika, koji nisu jednostavni za procjenu. Principi dijeljenja uravnoteženog rizika su nastavljeni u novim knjigama ""Građevina" i "Postrojenje i projektovanje-izgradnja".

Tokom posljednjih godina je uočeno da je značajnom dijelu građevinskog tržišta potreban obrazac ugovora, gdje postoji izvjesnost kada je u pitanju završna cijena i često i datum završetka od izuzetnog značaja. Investitori u takvim projektima po principu "ključ u ruke", su spremni da plate više, ponekad i značajno više, za njihov projekat, ukoliko mogu biti sigurniji da se dogovorena završna cijena, neće povećavati. Među takvim projektima se mogu naći mnogi projekti, koji su finansirani iz privatnih fondova, gdje zajmodavci traže od investitora veću sigurnost, kada je riječ o troškovima projekta, nego što je to dozvoljeno u pogledu raspodjele rizika koji su predviđeni tradicionalnim obrascima ugovora FIDIC-a. Često građevinski projekat (PNI) je samo jedan dio komplikovane komercijalnog poduhvata i finansijski ili drugi neuspjeh ovog građevinskog projekta će ugroziti cijeli poduhvat.

Kada je riječ o ovakvim projektima, potrebno je da izvođač preuzme odgovornost za širi dijapazon rizika, nago u okviru tradicionalnih crvenih i žutih knjiga. Kako bi dobio povećanu sigurnost završne cijene, od izvođača se često traži da pokrije te rizike zbog loših ili neočekivanih uslova na terenu i da je ono što je definisano u zahtjevima, a što je pripremljeno od strane investitora, dovesti do željenog cilja. Ukoliko izvođač treba da se nosi sa takvim rizicima, investitor mora da mu da vrijeme i mogućnost da dobijei razmotri sve relevantne informacije, prije nego što je izvođač upitan da potpiše fiksnu ugovornu cijenu. Investitor mora, takođe, da shvati da će doći do rasta troškova izgradnje ukoliko odgovorni izvođači budu određivali cijenu rizika, što će dovesti da neki projekti ne budu komercijalno održivi.

Čak i u okviru takvih ugovora, investitor snosi određene rizike, kao što su rizik rata, terorizam i sl. i drugi rizici koji spadaju u višu silu i uvijek je moguće, a ponekad is advisable, za strane da razgovaraju o drugim načinima na koje će dijeliti rizik, prije potpisivanja ugovora. Kada je riječ o projektima *Build-Operate-Transfer*, oko kojih se obično pregovara u paketu, raspodjela rizika predviđena u ugovoru o izgradnji po principu "ključ u ruke", o čemu se u početku pregovaralo između sponzora i PNI (nadzorni organ, nabavka, izgradnja-ugovor) izvođača, će možda biti prilagođen, kako bi uzeo u obzir završnu raspodjelu svih rizika između raznih ugovora koji čine cijeli paket.

Osim nedavnog i ubrzanog razvoja projekata koji se finansiraju iz privatnih iyvora, koji zahtijevaju uslove u ugovoru, koji obezbjeđuju povećanu sigurnost u pogledu cijene, roka i karakteristika,već duže vrrijeme je očigledno da mnogi investitori naročito u javnom sektoru, u velikom broju zemalja, tražili slične uslove u ugovoru, makar kada je riječ o projektima ključ u ruke. Oni su često, bez poštovanja, uzimali FIDIC crvene i žute knjige i mijenjali su uslove, tako da rizici koje je snosio investitor u knjigama FIDIC-a, su sada bili premješteni na izvođača i na taj način su izbrisali tradicionalne principe FIDIC-a koji podrazumijevaju uravnoteženu podjelu

rizika. Ova potreba investitora nije prošla neopaženo i FIDIC je smatrao da je najbolje za sve strane da se ovako nešto prepozna i reguliše. Obezbjeđivanjem standardnog FIDIC obrasca koji se koristi u takvim ugovorima, zahtjevi investitora za preuzimanje više rizika od strane izvođača su jasno navedeni. Shodno tome, investitor ne mora da pokušava da mijenja standardni obrazac, koji je namijenjen za drugačiji podjelu rizika i izvođač je u potpunosti svjestan povećanog rizika koji će preuzeti. Jasno je da će izvođač s pravom povećati njegovu cijenu u ponudi zbog dodatnih rizika.

Ovaj obrazac PNI/Projekti ključ u ruke je namijenjen da odgovara, ne samo PNI ugovorima u okviru BOT ili kompaniji sličnog tipa, već i za veliki broj projekata, kako malih tako i velikih, naročito one koji uključuju elektro ili mašinske radove i druge projekte sa postrojenjima, koji se izvode širom svijeta od strane svih vrsta investitora, veoma često u sredini gdje vladina odjeljenja ili privatnici žele da implementiraju njihov projekat po principu "ključ u ruke", sa fiksnom cijenom i sa učešćem dvije strane.

Investitori koji koriste ovaj obrazac treba da shvate da "Zahtjevi investitora" koje oni pripremaju treba da opišu princip i osnovni projekat postrojenja na funkcionalnoj osnovi. Ponuđaču treba biti dozvoljeno i on će morati da provjeri sve relevantne informacije i podatke i da napravi neophodne izmjene. On treba da izradi projekat i da obezbijedi detaljne informacije određene opreme i postrojenja koje on nudi i na taj način mu se omogućava da ponudi rješenja koja odgovaraju njjegovoj opremi i iskustvu. Shodno tome, tenderska procedura treba da omogući razgovore između ponuđača i investitora o tehničkim pitanjima i komercijalnim uslovima. Sva ta pitanja, nakon dogovora treba da čine dio potpisanog ugovora.

Nakon toga, izvođaču treba dati slobodu da izvrši posao na način koji on izabere, pod uslovom da se krajnji rezultat poklapa sa kriterijumima koje je naveo investitor. Investitor treba da vrši samo ograničen nadzor, uopšteno govoreći, ne treba da se miješa u rad izvođača. Svakako će investitor htjeti da zna da je kvalitet radova onakav kako je on naveo, da se treće strane ne ometaju, da su urađena ispitivanja o učinku. i da se postupa po "Zahtjevima investitora".

Karakteristika ovakve vrste ugovora je da izvođač treba da dokaže pouzdanost i učinak njegovog postrojenja i opreme. Shodno tome, posebna pažnja je posvećena "Ispitivanjima po završetku", koji obično traju duži vremenski period i prijem će se izvršiti tek nakon uspješnog završetka ovih ispitivanja.

F9IDIC uočava da projekti koji se finansiraju iz privatnih sredstava su predmet više pregovora od onih koji se finansiraju iz javih izvora i da zbog toga potrebno napraviti izmjene u svakom obrascu ugovora, koji je predložen za projekte u okviru BOT ili kompanije sličnog tipa. Između ostalog, takav obrazac bi možda trebalo prilagoditi, kako bi se uzele u obzir, ako ne jedinstvene, onda posebne karakteristike svakog projekta, kao i zahtjeve zajmodavaca i ostalih koji obezbjeđuju novac. Međutim, takve promjene ne umanju potrebu za standardnim obrascem

Ovi uslovi ugovora za PNI/Projekte ključ u ruke nisu pogodni za korišćenje u sledećim okolnostima:

- Ukoliko nema dovoljno vremena ili informacija za za ponuđače da prouče i provjere zahtjeve investitora ili da izrade projekte, studije o procjeni rizika i procjenu (naročito imajući u vidu podklauzulu 4.12 i 5.1)

- Ukoliko će građevina podrazumijevati i značajan rad ispod zemlje ili u oblastima, koje ponuđači ne mogu da ispitaju.
- Ukoliko investitor namjerava da vrši detaljniji monitoring ili da kontroliše rad izvođača ili da pregleda većinu građevinskih crteža.
- Ukoliko iznos svakog privremenog plaćanja treba da definiše zvaničnik ili drugi posrednik.

FIDIC preporučuje da se uslovi ugovora za postrojenje i projektovanje-izgradnju koriste u gore navedenim situacijama za radove koje je izradio izvođač (ili u ime izvođača).

PRIZNANJA

Međunarodna federacija inžinjera konsultanata (FIDIC) izražava posebnu zahvalnost sledećim članovima: Christopher Wade (Group Leader), SWECO-VBB, Sweden; Peter L Booen (Principal Drafter), GIBB Ltd, UK; Hermann Bayerlein, Fichter, Germany; Christopher R Seppala (Legal Adviser), White & Case, France; and José F Speziale, IATASA, Argentina.

Priprema je izvedena pod rukovodstvom FIDIC-ovog Komiteta za Ugovore koji čine John B Bowcock, Consulting Engineer, UK (Chairman); Michael Mortimer-Hawkins, SwedPower, Sweden; and Axel-Volkmar Jaeger, Schmidt Reuter Partner, Germany; together with K B (Tony) Norris as Special Adviser.

Nactri su pregledani od strane mnogih lica i organizacija, uključujući dolje navedene. Njihovi komentari su pažljivo prostudirani od strane Radne grupe, i uticali su na formulisanje klauzula, kada su ocijenjeni adekvatnim. Mushtaq Ahmad, NESPAK, Pakistan; Peter Batty, Post Buckley International, USA; Roeland Bertrams, Clifford Chance, Netherlands; Charles G Borthwick, SwedPower, Sweden; Manfred Breege, Lahmeyer International, Germany; Pablo Bueno, TYPSA, Spain; Nael G Bunni, Consulting Engineer, Ireland; Ian Fraser, Beca Carter Hollings & Ferner, New Zealand; Roy Goode, Oxford University, UK; Geoffrey F Hawker, Consulting Engineer, UK; Tonny Jensen (Chairman of FIDIC Quality Management Committee), COWI, Denmark; Martin Klapper, Hopgood and Ganim, Australia; Philip Loots & Associates, South Africa; Neil McCole, Merz and McLellan, UK; Matthew Needham-Laing, Victoria Russell & Paul J Taylor, Berrymans Lace Mawer, UK; J Gordon Rees, Binnie Black & Veatch, UK; Tim Reynolds, Constant & Constant, UK; David R Wightman & Gerlando Butera, Nabbarro Nathanson, UK; the Association of Japanese Consluting Engineers; the Construction Industry Authority of the Philippines; the Dutch Vereniging voor Bouwercht; the European International Contractors (EIC); ORGAnisme de Liaison Industries Métalliques Européennes (ORGALIME); the International Association of Dredging Contractors; the International Bar Association; the Asian Development Bank; and the World Bank.

Priznavanje sugestija ne znači da su osobe ili organizacije odobrile formulaciju svih klauzula. Konkretno, EIC i ORGALIME su izrazili određene reserve u odnosu na neke klauzule EPC Ugovora.

FIDIC želi da naglasi svoju zahvalnost na vremenu i trudu svim navedenim.

Konačnu odluku o obliku i sadržaju dokumenta donosi FIDIC.

PREDGOVOR

Međunarodna federacija inžinjera konsultanata (FIDIC) objavila je 1999. godine prva izdanja četri nova standardna obrasca Ugovora.

Uslovi ugovaranja za građevinske radove, koji se preporučuju za građevinske i tehničke radove po projektu Investitora, ili njegovog predstavnika, Nadzornog organa (Enigeer). Po uobičajenim aranžmanima za ovakvu vrstu ugovora, Izvođač izvodi radove u skladu sa projektima obezbijeđenim od plana Investitora. Međutim, u radovima se mogu naći i neki elementi iz oblasti niskogradnje, mašinstva, elektrotehnike i/ili visokogradnje po projektima Izvođača.

Uslovi ugovaranja za postrojenja i projektovanje-izgradnju, koji se preporučuju za obezbjeđenje elektrotehničkih i/ili mašinskih postrojenja i za projektovanje i izvođenje građevinskih ili tehničkih radova. Po uobičajenim aranžmanima za ovakvu vrstu ugovora Izvođač projektuje i obezbjeđuje, u skladu sa uslovima Investitora, postrojenje i/ili druge radove koji mogu predstavljati kombinaciju radova iz oblasti niskogradnje, mašinstva, elektrotehnike i/ili visokogradjnje.

Uslovi ugovaranja za PNI/ključ u ruke projekte, koji mogu biti prikladni za obezbjeđenje tehnoloških postrojenja ili elektrana, fabrika ili sličnih objekata ili infrastrukturnih objekata ili nekih drugih postrojenja, gdje (i) je potrebna veća izvjesnost u pogledu konačne cijene i potrebnog vremena, i (ii) Izvođač preuzima obavezu projektovanja i izvođenja radova uz malo učešće investitora. Po uobičajenim aranžmanima za projekte ključ u ruke, Izvođač na sebe preuzima u cjelini projektovanje, nabavke i izgradnju (PNI) i obezbjeđuje potpuno opremljeni objekat koji je spreman za pogon (po predaji "ključa u ruke").

Kratka forma ugovora, koja se preporučuje za građevinske ili tehničke radove relativno male kapitalne vrijednosti. Zavisno od vrste radova i okolnosti, ova forma takođe može da bude prikladna i za ugovore većih vrijednosti, naročito u slučaju relativno jednostavnih i ponavljajućih radova ili kratkotrajnih radova. Po uobičajenim aranžmanima za ovu vrstu ugovora, Izvođač izvodi radove po projektima Investitora ili njegovog predstavnika (eventualnog), s tim što ova forma takođe može da bude prikladna za ugovor koji obuhvata djelimično ili u cjelini radove iz oblasti niskogradnje, mašinstva, elektrotehnike i/ili visokogradnje.

Ove forme se preporučuju za opštu primjenu u ponudama na međunarodnoj osnovi. Izmjene mogu biti potrebne u nekim jurisdikcijama, i to naročito ako se uslovi primjenjuju na domaće ugovore. FIDIC smatra zvaničnim i autentičnim tekstove napisane na engleskom jeziku.

U pripremi ovih uslova Ugovora za postrojenja i projektovanje-izgradnju, autori su imali u vidu činjenicu da pored mnogih opšte primjenjivih klauzula, postoje neke koje iziskuju izmjene radi usklađivanja sa okolnostima relevantnim za dotični ugovor. Klauzule koje se smatraju primjenjivim na mnoge (ali ne i na sve) ugovore unijete su u Opšte uslove da bi se olakšalo njihovo unošenje u svaki ugovor.

Opšti uslovi i Posebni uslovi skupa sačinjavaju Ugovorne uslove koji regulišu prava i obaveze ugovornih strana. Potrebno je da se pripreme Posebni uslovi za svaki ugovor pojedinačno i da se uzmu u obzir klauzule iz Opštih uslova u kojima se poziva na Posebne uslove.

Za potrebe ove publikacije Opšti uslovi su pripremljeni na bazi sledećeg:

(i) privremena plaćanja u odnosu na paušalnu ugovornu cijenu vrše se napredovanjem radova i to obično u ratama predviđenim cjenovnikom;

(ii) ako tekst Opštih uslova iziskuje dalje podatke, koji će biti propisani od strane Investitora, tada se u klauzuli navodi da se ovi podaci nalaze u Posebnim uslovima ili u Zahtjevima Investitora;

(iii) kada podklauzula Opštih uslova reguliše neko pitanje na koje se vjerovatno mogu primijeniti različite odredbe kod različitih ugovora, principi kojim su se autori rukovodili pri sastavljanju te podklauzule bili su:

(a) za korisnike bi bilo pogodnije ako bi se neke odredbe koje ne žele da primijene mogle jednostavno izbrisati ili ne primijeniti, nego da se piše dodatni tekst (u Posebnim uslovima), jer Opšti uslovi nisu predvidjeli njihove zahtjeve; ili

(b) u ostalim slučajevima kada se primjena (a) smatra neprikladnom, podklauzula sadrži odredbe koje se smatraju primjenjivim na većinu ugovora.

Na primjer, podklauzula 14.2 (Avansno plaćanje) uključena je zbog pogodnosti, a ne zbog politike FIDIC-a, u vezi avansnog plaćanja. Ova podklauzula je neprimjenjiva (ako nije izbrisana) ako bude zanemarena time što nije preciziran iznos avansnog plaćanja. S toga bi valjalo voditi računa o tome da neke odredbe Opštih uslova možda nisu prikladne za naizgled tipične ugovore.

Dalji podaci o ovim aspektima, primjer teksta za ostale aranžmane, ostala objašnjenja i primjer teksta za pomoć u pripremi Posebnih uslova, kao i ostala dokumentacija ponuda, dati su u ovoj publikaciji u Savjetima za pripremu Posebnih uslova. Prije unošenja bilo kakvog uzornog teksta, potrebno je da se on provjeri da bi se utvrdilo da li je on u cjelini prikladan pod konkretnim okolnostima. Ako nije, onda se moraju vršiti izmjene.

U slučaju izmjena uzornog teksta i u svim slučajevima vršenja drugih izmjena i dopuna, mora se voditi računa o tome da ne dođe do bilo kakve dvosmislenosti, kako u Opštim uslovima, tako i između klauzula Posebnih uslova. Neophodno je da se svi ovi zadaci vezani za pripremu i cjelokupna priprema dokumentacije ponude, povjere licima koja su stručno osposobljenja sa aspekta ugovaranja, tehnike i nabavke.

Ova publikacija se završava uzornim obrascima ponuda, priloga ponude, ugovora i alternative sporazuma o rješavanju sporova. Ovaj sporazum o rješavanju sporova daje formulaciju teksta sporazumima između Investitora, Izvođača i lica koje je imenovano za isključivog arbitra ili za člana tročlanog arbitražnog vijeća, i sadrži poziv na odredbe Priloga Opštih uslova.

FIDIC namjerava da objavi Vodič za primjenu uslova ugovora za izgradnju, postrojenja i projektovanje-izgradnju i projekte ključ u ruke.

Radi razjašnjenja redosleda ugovornih aktivnosti korisnike upućujemo na grafikone na sledeće stranice i na niže navedene podklauzule (neki brojevi podklauzula navedeni su i na grafikonima). Grafikoni su ilustrativni i ne mogu se uzimati u obzir pri tumačenju ugovornih uslova.

1.1.3.1 & 13.7 Osnovni datum

1.1.3.2 & 8.1 Datum početka

1.1.6.6 & 4.2 Garancija za dobro izvršenje posla

1.1.4.7 & 8. Rok za završetka (sa produženjem iz 8.4)

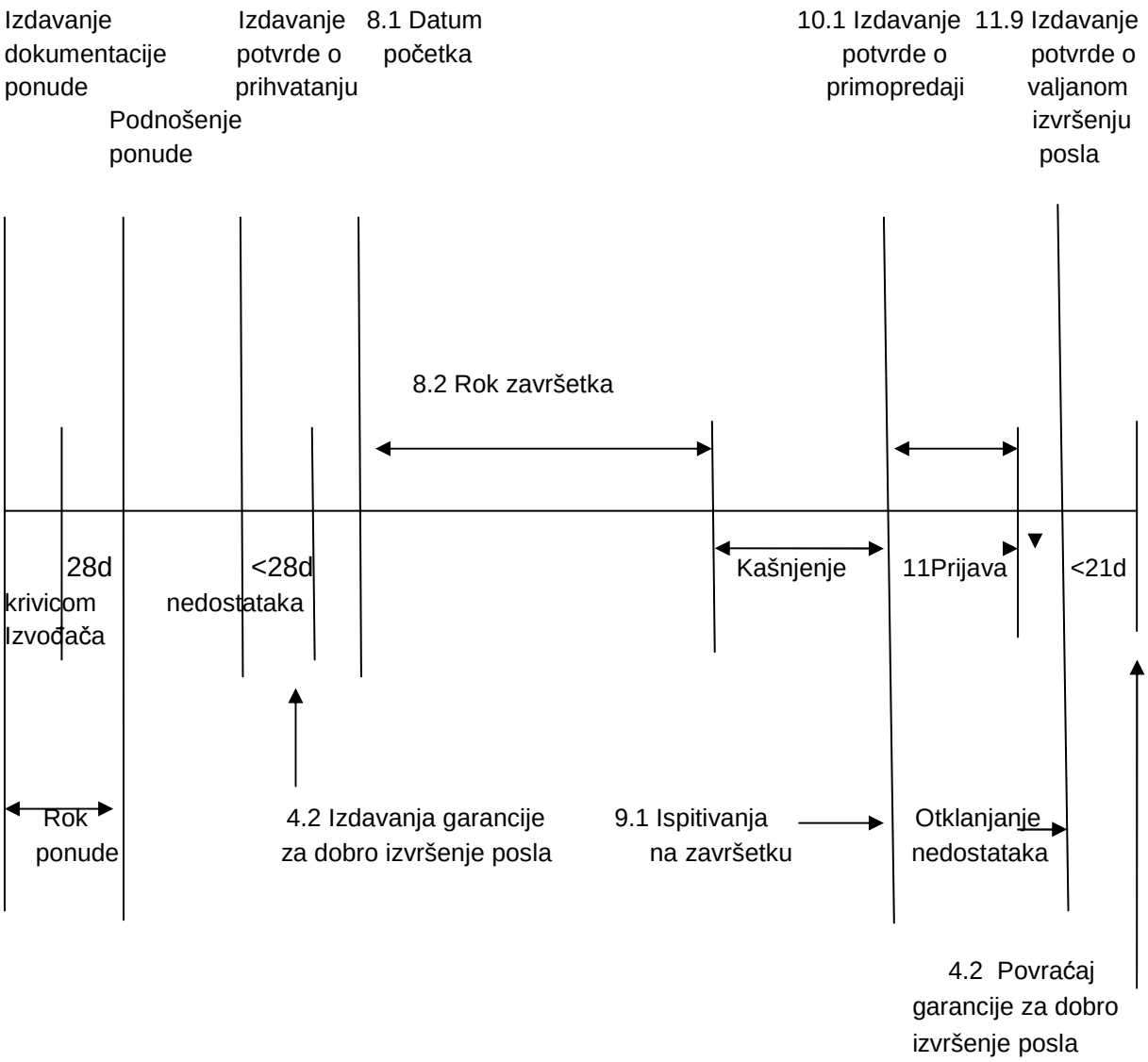
1.1.3.4 & 9.1 Ispitivanje na završetku

1.1.3.5 & 10.1 Potvrda o primopredaji

1.1.3.6 & 12.1 Ispitivanje posle završetka (eventualno)

1.1.3.7 & 11.1 Rok za prijavu nedostataka (sa produženjem iz 11.3)

1.1.3.8 & 11.9 Potvrda o valjano izvršenom poslu



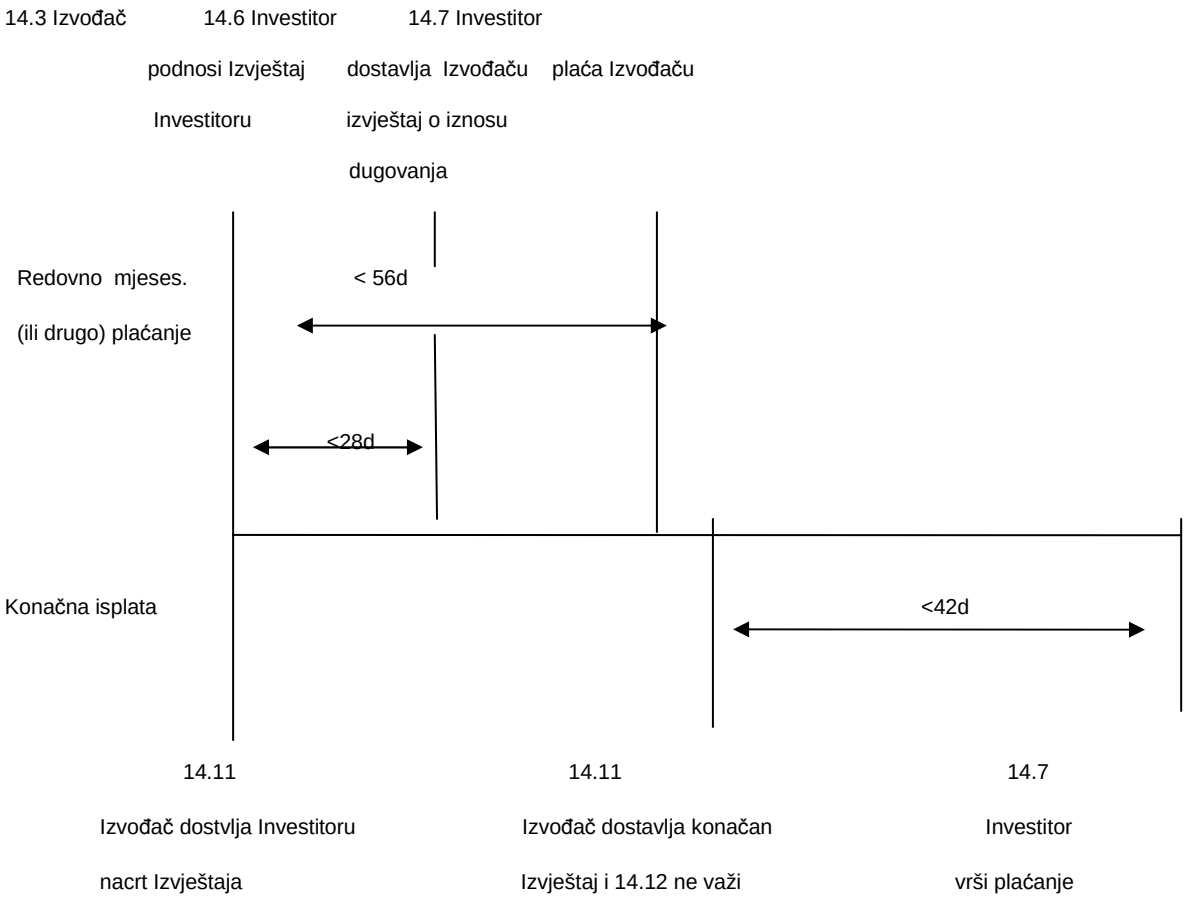
Tipični redosled glavnih događaja u vezi Ugovora za postrojenje i projektovanje-izgradnju

1. Rok završetka navodi se (u Posebnim uslovima) kao broj dana, kojem se dodaju eventualni produžeci u skladu sa podklauzulom 8.4.

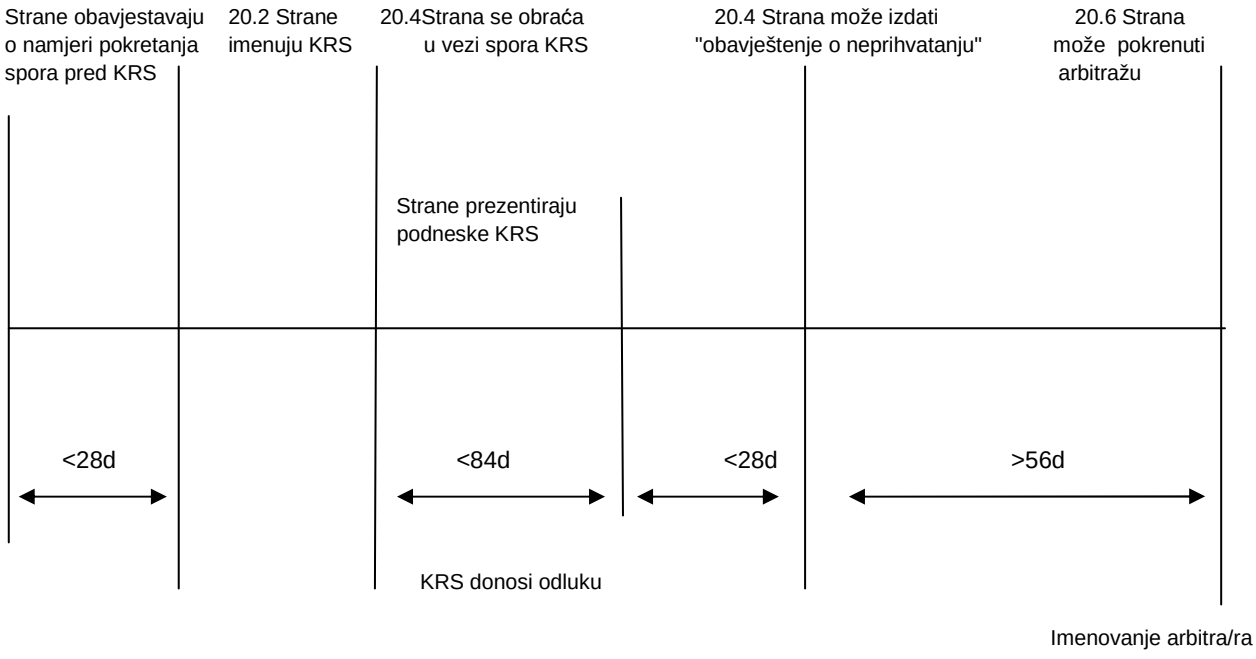
2. Radi isticanja redosleda događaja grafikon je zasnovan na primjeru Izvođača koji ne postupa u skladu sa podklauzulom 8.2.

3. Rok za prijavu nedostataka navodi se (u Prilogu ponude), kao broj dana, kojem se dodaju eventualni produžeci u skladu sa podklauzulom 11.3.

4. Zavisno od vrste radova, mogu takođe biti potrebne i probe posle završetka.



Tipična dinamika plaćanja predviđena klauzulom 14.



Tipičan redoslijed događaja u slučaju spora u skladu sa klauzulom 20

Opšti uslovi

Savjeti za pripremu

posebnih uslova

Uslovi ugovaranja za PNI/ključ u ruke projekte

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

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Međunarodna Federacija Konsalting Inženjera

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OPŠTI USLOVI

1. Opšte odredbe

1.1 Definicije

U Uslovima ugovora (“ovim uslovima”), koji obuhvataju Posebne uslove i Opšte uslove, sledeće riječi imaju datu značenje. Rijeci koje ukazuju na lica ili strane obuhvataju privredna društva i ostala pravna lica, ukoliko kontekst ne ukazuje na nešto drugo.

1.1.1 Ugovor

1.1.1.1 “Ugovor” predstavlja Ugovorni sporazum, ove uslove, zahtjeve Investitora, tender i ostala dokumenta (ukoliko postoje), koji su navedeni u Ugovoru.

1.1.1.2 “Ugovorni sporazum” prestavlja Ugovorni sporazum koji se pominje u podklauzoli 1.6 *(Ugovorni sporazum).*

1.1.1.3 “Zahtjevi investitora” predstavljaju dokument koji je naslovljen kao Zahtjevi investitora, kako stoji u Ugovoru, i sadrži sve dopune i izmjene takvog dokumenta u skladu sa ugovorom. Takav dokument precizira svrhu, obim i/ili projektne i/ili ostale tehničke kriterijume za radove.

1.1.1.4 “Tender” predstavlja potpisanu ponudu Izvođaca za izvođenje radova i sva ostala dokumenta koja Izvođač podnosi sa njima (osim ovih uslova i zahtjeva Investitora, ukoliko ih je podnio), koja su dio Ugovora.

1.1.1.5 “Činidbene garancije” i “Spisak plaćanja” predstavljaju dokumente koji su tako naslovljeni (ako postoje), koja su dio Ugovora.

1.1.2 Strane i lica

1.1.2.1 “Strana” predstavlja Investitora ili Izvođača, zavisno od konteksta.

1.1.2.2 “Investitora” predstavlja lice koje je naslovljeno kao Investitor u Ugovoru i njegove pravne sledbenike.

1.1.2.3 “Izvođač” predstavlja lice(a) koje je naslovljeno kao Izvođač u ugovoru i njegove pravne sledbenike.

1.1.2.4 “Predstavnik Investitora” predstavlja lice imenovano od strane Investitora u Ugovoru, ili angažovanog po potrebi od strane Investitora u podklauzoli 3.1 (*Predstavnik Investitora)*, koji djeluje u ime Investitora.

1.1.2.5 “Predstavnik Izvođača” predstavlja lice koje je Izvođač imenovao u Ugovoru ili koje on bude odredio s vremena na vrijeme u skladu sa podklauzolom 4.3 *(Predstavnik Izvođača*), i koje djeluje u ime Izvođača.

1.1.2.6 “Personal Investitora” predstavlja predstavnik Investitora, asistent iz podklauzole 3.2 (*Ostali personal Investitora*) i svo ostalo osoblje, radnici i ostali zaposleni od strane Investitora ili Predstavnika Investitora; kao i svo ostalo osoblje predočeno Izvođaču od strane Investotra ili predstavnika Investora, kao personala Investitora.

1.1.2.7 “Personal Izvođača” predstavlja predstavnika Izvođača i svo osoblje koje Izvođač koristi na gradilištu, koje uključuje osoblje, radnike i ostale zaposlene Izvođača i svih podizvođaca, kao i svo ostalo osoblje koje pomaže Izvođaču u izvođenu radova.

1.1.2.8 “Podizvođač” predstavlja lice koje je u Ugovoru imenovano kao Podizvođač za dio radova i njegove pravne sledbenike.

1.1.2.9 “Komisija za rješavaje sporova” predstavlja lice ili tri lica koja su tako naimenovana u Ugovoru ili neko drugo lice ili lica koja su imenovana u skladu sa podklauzolom 20.2 (*Imenovanje Komisije za rješavanje sporo*va) ili podklauzolom 20.3 (*Nesaglasnost oko imenovanja Komisije za rješavanje sporova*).

1.1.2.10 “FIDIC” predstavlja Međunarodnu federaciju inženjera konsultanata.

1.1.3 Datumi, ispitivanja, rokovi i završetak

1.1.3.1 “Osnovni datum” predstavlja 28 dana prije poslednjeg datuma za podnošenje ponude.

1.1.3.2 “Datum početka” predstavlja datum koji je saopšten u skladu sa podklauzolom 8.1 (*Početak radova*), osim ukoliko nije drugačije definisan u Ugovoru.

1.1.3.3 “Rok završetka” predstavlja rok za završetak radova ili neke sekcije (zavisno od slučaja) u skladu sa podklauzolom 8.2 (*Rok završetka radova*), kao je navedeno u Posebnim uslovima (sa eventualnim produženjima u skladu sa podklauzolom 8.4 (*Produžetak roka za završetak radova*)), računato od datuma početka.

1.1.3.4 “Ispitivanja na završetku” predstavljaju ispitivanja predviđena Ugovorom ili koja su dogovorena između strana ili naložena kao izmjena, a koja se vrše u skladu sa klauzulom 9 (*Ispitivanja na završetku radova*) prije preuzimanja radova ili sekcije (zavisno od slučaja) od strane Investitora.

1.1.3.5 “Potvrda o prijemu” predstavlja potvrdu koja se izdaje u skladu sa klauzulom 10 (*Prijem od strane Investitora*).

1.1.3.6 “Provjere nakon završetka” predstavljaju (eventualna) ispitivanja predviđena ugovorom koja se vrše u skladu sa klauzulom 12 (*Provjera nakon završetka*) posle prijema radova ili selekcije (zavisno od slučaja) od strane Investitora.

1.1.3.7 “Period obavještenja o nedostacima” predstavlja rok za prijavu nedostataka radova ili neke sekcije (zavisno od slučaja) u skladu sa podklauzulom 11.1 (*Završetak tekućih radova i otklanjanje nedostataka)*, kako je navedeno u posebnim uslovima (sa eventualnom produženjem u skladu sa podklauzulom 11.3 (*Produženje perioda za obavještenja o nedostacima*)), računato od datuma završetka radova ili sekcije sa ovjerom u skladu sa podklauzulom 10.1 (*Preuzimanje Radova i sekcija*). Ukoliko taj period nije predviđen u posebnim uslovima, period treba biti u trajanju je godinu dana.

1.1.3.8 “Potvrda o dobrom izvršenju posla” predstavlja potvrdu izdatu u skladu sa podklauzulom 11.9 (*Potvrda o dobrom izvršenju posla*).

1.1.3.9 “Dan” predstavlja kalendarski dan, a “godina” predstavlja 365 dana.

1.1.4 Novac i plaćanja

1.1.4.1 “Ugovorena cijena” predstavlja dogovoreni iznos iskazan u ugovoru za projektovanje, izvođenje i završetak radova i otklanjanje svih nedostataka, što uključuje i podešavanje (ukoliko ih ima) u skladu sa ugovorom.

1.1.4.2 “Troškovi” predstavljaju sve troškove koje je Izvođač opravdano imao (ili ce imati), bilo na ili van gradilišta, uključujući i režije i slične troškove, ali ne uključuju i dobit.

1.1.4.3 “Završni izvještaj” predstavlja izvještaj definisan podklauzolom 14.11 (*Zahtjev za izdavanje okončane situacije*).

1.1.4.4 “Strana valuta” predstavlja valutu koja nije lokalna, a u kojoj se plaća dio ugovorene cijene (ili u cjelini).

1.1.4.5 “Lokalna valuta” predstavlja valutu zemlje.

1.1.4.6 “Provizorni iznos” prestavlja (eventualni) iznos koji je ugovorom predviđen kao provizorni iznos za izvođenje bilo kod dijela radova ili za isporuku opreme, materijala ili usluga u skladu sa podklauzolom 13.5 (*Provizorni iznos*).

1.1.4.7 “Garantni depozit” predstavlja kumulativne iznose koje Investitor zadržava u skladu sa podklauzolom 14.3 (*Zahtjev za izdavanje privremenih situacija*) I isplaćuje u skladu sa podklauzolom 14.9 (*Plaćanje garantnog depozita*).

1.1.4.8 “Izvještaj” prestavlja izvještaj koji Izvođac podnosi kao dio zahtjeva u skladu sa klauzulom 14 (*Ugovorena cijena I plaćanje*).

1.1.5 Radovi i dobra

1.1.5.1 “Oprema Izvođača predstavlja sve aparate, mašine, vozila i ostale stvari koje su potrebne za izvođenje i završetak radova i otklanjanje nedostataka. Međutim, oprema Izvođača ne obuhvata privremene radove, opremu investitora (ako postoji), postrojenja, materijalne i bilo koje druge stvari koje su predviđene da budu ili već jesu sastavni djelovi osnovnih radova.

1.1.5.2 “Dobra” predstavljaju opremu Izvođača, materijale, postrojenja i privremene radove ili svaki od ovih pojmova pojedinačno, po potrebi.

1.1.5.3 “Materijali” predstavljaju predmete svih vrsta (isključujući postrojenja) koji su previđeni da budu ili već jesu sastavni djelovi trajnih radova, uključujući i potrošne materijale (ako ih ima) koje isporučuje Izvođač po ugovoru.

1.1.5.4 “Trajni radovi” predstavljaju trajne radove koje Izvođač izvodi u skladu sa ugovorom.

1.1.5.5 “Postrojenje” predstavlja aparate, masine i vozila koji su predviđeni da budu dio trajnih radova.

1.1.5.6 “Sekcija” predstavlja dio radova koji je naveden kao takav u prilogu ponude (ukoliko ih ima).

1.1.5.7 “Privremeni radovi” predstavljaju privremene radove bilo koje vrste (osim opreme Izvođača) koji su potrebni na gradilištu radi izvođenja i završavanja trajnih radova i otklanjanje eventualnih nedostataka.

1.1.5.8 “Radovi” predstavljaju trajne radove i privremene radove ili svaki od ovih radova pojedinačno, po potrebi.

1.1.6 Ostale definicije

1.1.6.1 “Dokumentacija izvođača” predstavlja proračune, računarske programe i ostali softver, crteže, priručnike i ostalu dokumentaciju tehničke prirode, koju Izvođač obezbeđuje po ugovoru, po opisu iz podklauzole 5.2 (*Dokumentacija Izvođača*).

1.1.6.2 “Država” predstavlja državu u kojoj se gradilište odnosno njegov dio nalazi i na kome se izvode trajni radovi.

1.1.6.3 “Oprema investitora” predstavlja aparate, mašne ivozila (ako postoje) koja Investitor stavlja izvođaču na raspolaganje radi korišćenja u Izvođenju radova, kako je navedeno u zahtjevima investitora, ali bez postrojenja koje investitor nije primio.

1.1.6.4 “Viša sila” je definisana u klauzuli 19 (*Viša sila*).

1.1.6.5 “Zakoni” predstavljaju sve nacionalne (ili državne) zakone, statute, uredbe i ostale zakone i propise i podzakonska akta organa vlasti.

1.1.6.6 “Garancija za dobro izvršenje posla” predstavlja garanciju (ili garancije) iz podklauzule 4.2 (*Garancije za dobro izvršenje posla*).

1.1.6.7 “Gradilište” predstavlja mjesto na kojem se izvode radovi i na kojem se isporučuju postrojenje i materijali ili bilo koje drugo mjesto koje na osnovu ugovora predstavlja dio gradilišta.

1.1.6.8 “Izmjena” predstavlja bilo kakvu izmjenu zahtjeva Investitora ili Radova, koja je naložena ili odobrena kao izmjena iz klauzule 13 (*Izmjene i korekcije).*

1.2 Tumačenja

Ukoliko kontekst ne upućuje na nešto drugo, u ovom ugovoru:

a) Riječi koje ukazuju na jedan rod obuhvataju sve rodove;
b) Riječi koje ukazuju na jedninu takodje obuhvataju množinu, a riječi koje ukazuju na množinu takodje obuhvataju jedninu;
c) Odredbe koje sadrže riječi “dogovoriti”, “dogovoreno” i “dogovor” iziskuju da dogovor bude u pisanoj formi, i
d) “U pisanoj formi” znaci rukom napisano, otkucano, odštampano ili elektronskim putem sačinjeno tako da predstavlja trajni dokument.

Riječi na marginama i ostali naslovi ne uzimaju se u obzir prilikom tumačenja ovih uslova.

1.3 Komunikacije

Gdje god ovi uslovi iziskuju davanje ili izdavanje odobrenja, potvrda, saglasnosti, rješenja, saopštenja i zahtjeva, takve komunikacije:

a) su pisanoj formi i dostavljaju se na ruke (sa potvrdom prijema), šalju se poštom ili po kuriru ili se prenose pomoću dogovorenih sistema elektronskog prenosa, kako je navedeno u posebnim uslovima; i
b) se dostavljaju, šalju ili prenose na adresu primaoca navedenu u ugovoru. Međutim,

    a. ako primalac saopšti neku drugu adresu, dalje komunikacije se upućuju na tu adresu; i

b. ukoliko primalac nije drukčije naznačio u zahtjevu za izdavanje odobrenja ili saglasnosti, odobrenje ili saglasnost se može poslati na adresu sa koje je poslat zahtjev.

Odobrenja, potvrde, saglasnosti i rješenja ne mogu se neopravdano uskratiti ili odugovlačiti.

1.4 Mjerodavno pravo i jezik

Na ugovor se primjenjuje pravo zemlje koja je navedena u posebnim uslovima.

Ako postoje verzije bilo kog dijela ugovora na nekoliko jezika, prednost se daje verziji koja je napisana na mjerodavnom jeziku, definisanom u posebnim uslovima.

Jezik za komunikacije navodi se u posebnim uslovima. Ako tamo nije naveden nikakav jezik, jezik za komunikacije je onaj na kojem je ugovor (ili većim dijelom) napisan.

1.5 Prioritet dokumenata

Dokumenta koja sačinjavanju Ugovor smatraju se uzajamno objašnjivim. Za potrebe tumačenja, prioritet dokumenata je kako slijedi:

a) Ugovorni sporazum,
b) Posebni uslovi,
c) Opšti uslovi,
d) Zahtjevi Investitora,
e) Tenderska dokumentacija ili bilo koja druga dokumentacija koja predstavlja dio Ugovora.

1.6 Ugovorni sporazum

Ugovor stupa na snagu na dan naveden u Ugovoru. Troškovi taksi i slični troškovi (ukoliko ih ima) koje nameće zakon, a u vezi stupanja na snagu Ugovora, snosi Investitor.

1.7 Prenos

Nijedna strana nema pravo da izvrši prenos Ugovora u cjelini ili nekog njegovog dijela ili neku korist ili interes koji proizilazi iz Ugovora. Međutim, bilo koja strana može:

a) da izvrši prenos ugovora u cjelini ili nekog njegovog dijela uz prethodnu saglasnost druge strane, i
b) da kao obezbjeđenje prenese u korist neke banke ili finansijske institucije bilo koji iznos novca koji mu je plativ ili ce biti plativ na osnovu Ugovora.

1.8 Čuvanje dokumentacije i njeno obezbjeđivanje

Izvođač drži u svom posjedu svu svoju dokumentaciju i vodi računa o njoj sve do njenog preuzimanja od strane Investitora. Ukoliko Ugovor nije drugačije predviđeno, Izvođač se obavezuje da Investitoru podnese svaki svoj dokument u šest primjeraka.

Izvođac se obavezuje da na gradilištu drži jedan primjerak Ugovora, publikacije navedene u zahtjevima Investitora, dokumentaciju Izvođača i izmjene i druge komunikacije izdane na osnovu Ugovora. Osoblje Investitora ima pravo pristupa ovoj dokumentaciji u svako razumno doba.

Ukoliko strana postane svjesna greške ili nedostatka tehničke prirode u dokumentu koji je pripremljen kako bi se iskoristio prilikom vršenja radova, strana odmah obavijestiti drugu stranu o toj grešci ili nedostatku.

1.9 Povjerljivost

Obije strane trebaju da tretiraju detalje Ugovora kao privatne i povjerljive, osim u mjeri koja je neophodna kako bi se izvršile obaveze iz njega ili kako bi se postupalo u skladu sa relevantnim zakonima. Izvođač ne smije da objavljuje, da dozvoli da bude objavljen, ili da otkrije bilo kakve pojedinosti radova u bilo kom obliku ili tehnikom radu ili bilo gdje drugo, bez prethodne saglasnosti od strane Investitora.

1.10 Korišćenje dokumentacije Izvođača od strane Investitora

Izvođač zadržava autorska i ostala prava intelektualne svojine na dokumentaciju izvođača i na ostalu projektnu dokumentaciju pripremljenu od strane izvođača (ili u njegovo ime).

Smatra se da je (potpisivanjem Ugovora) Izvođač dao Investitoru vremenski neograničenu, prenosivu, neekskluzivnu i besplatnu dozvolu da umnožava, koristi i prenosi dokumentaciju izvođača, kao i da je modifikuje I koristi u tom obliku. Ta dozvola:

a) Važi tokom stvarnog ili predviđenog radnog vijeka (zavisno od toga koji je duži) relevantnih djelova radova,

b) Daje pravo bilo kom licu koje drži relevantni dio radova u zakonitom posjedu na umnožavanje, korišćenje i prenošenje dokumentacije izvođača radi završavanja, eksploatisanja, održavanja, mijenjanja, podešavanja, popravke i rušenja radova, i

c) U slučaju dokumentacije izvođača u obliku računarskog programa i ostalog softvera, dopusta njihovu upotrebu u bilo kom računaru na gradilištu i drugim mjestima predviđenim ugovorom, uključujući zamjenu bilo kog računara isporučenog od strane izvođača.

Dokumentacija Izvođača i ostala projektna dokumentacija koja je pripremljena od strane Izvođača (ili za njegov račun) ne može da bude korišćena, umnožavana ili prenijeta trećim

licima od strane Investitora (ili u njegovo ime) u svrhe koje su rizične od onih koje su previđene ovom podklauzulom.

1.11 Korišćenje dokumentacije investitora od strane Izvođača

Investitor zadržava autorska i ostala prava intelektualne svojine u zahtjevima Investitora i u ostaloj dokumentaciji pripremljenoj od strane Investitora (ili za njegov račun). Izvođač ima pravo da o sopstvenom trošku umnožava, koristi i prenosi ove dokumente za potrebe izvršavanja Ugovora. Izvođač nema pravo da ih umnožava, koristi ili prenosi trećim licima bez saglasnosti Investitora, osim u mjeri potrebnoj za Izvršavanje Ugovora.

1.12 Povjerljivi podaci

Izvođač nije dužan za otkrije Investitoru bilo kakvu informaciju koju je Izvođač u tenderskoj dokumentaciji naveo kao povjerljivu. Izvođač mora otkriti druge informacije koje Investitor može opravdano da zahtjeva kako bi utvrdio usaglašenost radova Izvođača sa onim što je navedeno u ugovoru.

1.13 Postupanje u skladu sa zakonima

Izvođač se obavezuje da u izvršavanju ugovora postupa u skladu sa primjenljivim zakonima. Ako drugačije nije predviđeno posebnim uslovima:

a) Investitor se obavezuje da pribavi dozvolu za planiranje, zoniranje i slično za osnovne radove i sve ostale dozvole navedene u zahtjevima Investitora. Investitor se obavezuje da izvođača obešteti i zaštiti od posledica svog propusta da to učini; i

b) Izvođač se obavezuje da izdaje sva saopštenja, placa sve poreze, carine i takse i da pribavi sve dozvole, licence i odobrenja koja su predviđena zakonima u vezi projektovanja, izvođenja i završetka radova i otklanjanja nedostataka. Izvođač se obavezuje da investitora obešteti i zaštiti od posledica svog propusta da to učini.

1.14 Solidarna odgovornost

Ako Izvođač pristupi (u skladu sa primjenljivim zakonima) zajedničkom ulaganju, konzorcijum ili nekoj drugoj nestatutarnoj grupi od sva ili više lica:

a) ta se lica smatraju solidarno i pojedinačno odgovornim Investitoru za izvršavanje Ugovora;

b) ta su lica obavezna da Investitoru predoče svog rukovodioca koji je ovlašćen da preuzima obaveze u ime Izvođača i svakog drugog lica pojedinačno; i

c) Izvođač ne može da mijenja svoj sastav ili pravni status bez prethodne saglasnosti Investitora.

2. Investitor

2.1 Pravo pristupa na gradilište

Investitor se obavezuje da Izvođaču da pravo pristupa i držanja u posjedu svih djelova gradilišta u trajanju navedenom u posebnim uslovima. Pravo prilaza i posjeda gradilišta ne daje se isključivo izvođaču. Ako je ugovorom predviđeno da investirao preda (izvođaču) u posjed neke temelje, objekte, postrojenja ili sredstva pristupa, investitor se obavezuje da to učini u vrijeme i na način koji su navedeni u zahtjevima investitora. Međutim, investitor može uskratiti pravo posjeda do prijema garancije o dobrom izvršenju posla.

Ukoliko takvo vrijeme nije navedeno u posebnim uslovima, investitor se obavezuje da izvođaču da to pravo prilaza i posjeda gradilištu počevši od dana početka radova.

Ako izvođač kasni i/ili bude izložen troškovima zbog propusta investitora da mu da takva prava u tom roku, Izvođač to prijavljuje investitoru, pri čemu shodno podklauzuli 20.1 (*Potraživanja Izvođača*) ima pravo na:

a) produženje roka zbog takvog kašnjenja, iako je rok završetka već probijen ili će biti probijen, u skladu sa podklauzulom 8.4 *(Produženje roka završetka*), i

b) naknadu takvih troškova uvećanu za primjernu dobit, sto se uključuje u ugovorenu cijenu.

Po prijemu ove prijave, Investitor postupa u skladu da podklauzulum 3.5 (*Utvrđivanja*) da bi se saglasio ili utvrdio ova pitanja.

Međutim, ako je propust Investitora bio uslovljen nekom greškom ili kašnjenjem od strane Izvođača, uključujući grešku ili kašnjenje u podnošenju bilo kog dokumenta Izvođača, Izvođač nema pravo na produženje roka, naknadu ili dobit.

2.2 Dozvole, licence ili odobrenja

Investitor se obavezuje da izvođaču na njegov zahtjev pruzi pomoć (ako je u mogućnosti da to učini):

a) pribavljanjem primjeraka zakona zemlje koji se odnose na ugovor, a koji se ne mogu lako dobiti, i

b) u vezi zahtjeva izvođača za izdavanje dozvola, licenci ili odobrenja predviđenih zakonima zemlje, i to:

    a. Onih koji su izvođaču potrebni u skladu sa podklauzulom 1.13 (*Postupanje u skladu sa zakonima*),

b. Za isporuku robe, carinjenjem, i
c. Za izvoz opreme izvođača po njenom iznošenju sa gradilišta.

2.3 Osoblje Investitora

Investitor se obavezuje da se postara o tome da osoblje Investitora i njegovih ostalih izvođača na gradilištu:

a) sarađuje sa izvođačem u skladu sa podklauzulom 4.6 (saradnja), i

b) preduzima mjere istovjetne onim koje je Izvođač obavezan da preduzima u skladu sa tačkama (a), (b) i (c) podklauzule 4.8 (*Bezbjedonosne procedure*) I podklauzulom 4.18 (*Zaštita životne sredine*).

2.4 Finansijski aranžmani investitora

Investitor se obavezuje da u roku od 28 dana od prijema zahtjeva Izvođača, podnese odgovarajući dokaz o tome da su zaključeni i odrzavaju finansijski aranžmani koji će investitoru omogućiti da isplati ugovorenu cijenu (u to vrijeme procijenjenu) u skladu sa klauzulom 14 (*Ugovorena cijena i plaćanje*). Ako Investitor namjerava da izvrši bilo kakve materijalne izmjene u svojim finansijskim aranžmanima, on se obavezuje da o tome podrobno obavijesti Izvođača.

2.5 Potraživanja investitora

Ako Investitor bude smatrao da ima pravo na bilo kakvu isplatu na osnovu bilo koje klauzule ovih uslova ili po nekom drugom osnovu, i/ili na produženje perioda za obavještenje o nedostacima, investitor može da obavijesti izvođača sa svim pojedinostima. Međutim, ovo obavještenje nije potrebno za plaćanja iz podklauzule 4.19 (*Električna energija, voda i gas*) i podklauzule 4.20 (*Oprema investitora i besplatni materijal*) i za ostale usluge zahtijevane od strane Izvođača.

Obavještenje se daje u najkraćem mogućem roku po investitorovom saznanju postojanje događaja ili okolnosti koje mu daju pravo na potraživanje. Obavještenje koje se odnosi na produženje roka za prijavu nedostataka daje se prije isteka tog roka.

U obavještenju se navodi klauzula ili neka druga osnova potraživanja sa potvrdom iznosa i/ili produženja roka na koji investitor smatra da ima pravo u vezi Ugovora. Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi davanja saglasnosti ili utrvrdjivanja (i) iznosa (eventualnog) na koji Investitor ima pravo da primi od Izvođača i/ili (ii) produženja (eventualnog) perioda za obavještavanje o nedostacima u skladu sa podklauzulom 11.3 (*Produženje perioda za obavještavanje o nedostacima*).

Investitor može odbiti taj iznos od bilog kog preostalog iznosa, ili iznosa koji će preostati u budućnosti, Izvođaču. Izvođač će samo imati pravo da umanji iznos koji bi se trebao uplatiti izvođaču, ili da na drugi način tuzi izvođača radova, u skladu sa ovom podklauzulom ili u skladu sa podstavovima (a) i/ili (b) subklauzule 14.6 (*Privremena plaćanja*).

3. Administracija investitora

3.1 Predstavnik investitora

Investitor može imenovati svog predstavnika da djeluje u njegovo ime prema Ugovoru. U tom slučaju, on je dužan da obavijesti Izvođača o imenu, adresi, obavezama i ovlašćenjima svog predstavnika.

Predstavnik Investitora vrši poslove koje su mu predate, pa će vršiti ovlašćenja koja su mu povjerena, od strane investitora. Osim ukoliko i sve dok investitor ne obavijesti izvođača o drugačijem, smatra se da predstavnik Investitora ima puno ovlašćenje Investitora prema Ugovoru, osim u pogledu klauzule 15 (*Otkaz od strane Investitora*).

Ukoliko Investitor poželi da zamijeni bilo koje lice koje je imenovano kao predstavnik investitora, investitor daje izvođaču obavještenje koje neće trajati duže od 14 dana o imenu, adresi, obavezama i ovlašćenjima, kao i o datumu imenovanja.

3.2 Ostalo osoblje Investitora

Investitor ili predstavnik investitora može s vremena na vrijeme odrediti dužnosti i ustupiti nadležnosti asistentima, a može i da opozove takav prenos i delegiranje. Ovi asistenti mogu podrazumijevati rezidentnog inženjera i/ili nezavisne inspektore postavljeni da vrše inspekciju i/ili da testiraju djelove postrojenja i/ili materijala. Zadatak, delegacija ili opoziv ne može stupiti na snagu dok kopiju istog ne primi Izvođač.

Asistenti moraju biti odgovarajuća i kvalifikovana lica, koja su kompetentna za obavljanje ovih poslova i obavljanje ovih odgovornosti, i koji su dobro poznaju jezik komunikacije kako je to definisano u podklauzuli 1.4 (*Zakon i jezik*).

3.3 Povjerena lica

Svim ovim licima, uključujući i predstavnika investitora i asistente, kojima su dodijeljene određene dužnosti ili data ovlašćenja, se mogu dati ovlašćenja za izdavanje uputstava Izvođaču u već definisanoj mjeri. Bilo koje odobrenje, provjera, sertifikat, saglasnost, ispitivanje, inspekcija, uputstvo, obavještenja, predlog, zahtjev, test ili sličan akt delegiranog lica, u skladu sa delegacijom, imaju isti efekat kao da je to uradio investitor. Međutim:

a) osim ukoliko nije drugačije naznačeno u komunikaciji povjerenih osoba koja se odnosi na taj čin, to ne oslobađa izvojaca od bilo kod odgovornosti koju ima prema ugovoru, uključujući i odgovornost za greške, propuste, razlike i neslaganja;
b) svaki neuspjeh da se ne odobri bilo kakav posao, postrojenje ili materijali ne zahtijevaju odobrenje, i prema tome ne utiču na pravo poslodavca da odbije rad, postrojenja ili materijali; i
c) ukoliko Izvođac preispituje bilo koje određenje ili instrukcije od strane delegiranog lica, izvođač može uputiti predmet investitoru, koji mora u kratkom vremenskom roku potvrditi, preokrenuti ili izmijeniti odluku ili instrukciju.

3.4 Instrukcije

Poslodavac može izdati Izvođaču uputstva, koje mogu biti neophodne za Izvođača da izvrši svoje obaveze prema ugovoru. Svaka instrukcija se daje u pitanoj formi i mora da sadrži obaveze na koje se odnosi i na subklauzule (ili na drugi član u ugovoru) u kome se navode obaveze. Ako bilo koja instrukcija predstavlja varijaciju, klauzula 13 (*Varijacije i prilagođavanja*) se primjenjuju.

Izvođač uzima uputstva od strane poslodavca, ili od strane predstavnika poslodavca ili od asistenta kome je odgovarajuća nadležnost delegirana na osnovu ovog člana.

3.5 Odluke

Kada god ovi uslovi predvide da ce investitor postupiti u skladu sa subklauzulom 3.5 da se saglasi ili utvrdi bilo koje pitanje, Investitor će konsultovati Izvođača radova u nastojanju da se postigne dogovor. Ukoliko se ne postigne sporazum, Investitor je dužan da donese pravičnu odluku u skladu sa ugovorom, uzimajući u obzir sve relevantne okolnosti.

Investitor je dužan da obavijesti Izvođača o svakom sporazumu i rješenju, uz dodatne pojedinosti. Svaka strana će dati ovlašćenje svakom sporazumu ili rješenju, osim ukoliko Izvođač ne da obavještenje Investitoru, o njegovom nezadovoljstvu vezanom za oluku u roku od 14 dana od kada je primi. Svaka strana u tom slučaju moze dostaviti spor komisiji za rješavanje sporova u skladu sa podklauzulom 20.4 (*Dobijanjem odluke o rješavanju sporova)*.

4. Izvođač

4.1 Opšte obaveze Izvođača

Izvođač se obavezuje da projektuje, izvede i završi radove u skladu sa ugovorom, kao i da otkloni sve nedostatke u radovima. Po završetku, radovi moraju da budu pogodni za korišćenje u svrhe predviđene Ugovorom.

Izvođač se obavezuje da obezbijedi ugovorom predviđenu opremu i dokumentaciju izvođača, kao i svo osoblje Izvođača, robu, potrošni materijal i sve ostale stvari i usluge, bilo privremen ili trajne prirode, koje su potrebne za projektovanje, izvođenje, završetak i otklanjanje nedostataka.

Radovi obuhvataju sav rad koji je potreban da bi se udovoljilo zahtjevima Investitora ili koji se iz ugovora podrazumijeva, kao i sav rad koji je potreban (mada nije predviđen ugovorom) za stabilnost ili završetak, ili bezbjedno i propisno korišćenje radova.

Izvođač će biti odgovoran za adekvatnost, stabilnost i bezbijednosti svih radnji na gradilištu i za sve metode izvođenja radova.

Izvođač se obavezuje da na zahtev nadzornog organa podnese pojedinosti aranžmana i metoda koja izvođač namjerava da usvoji za potrebe izvođenja radova. Nikakve bitne izmene u

tim aranžmanima i metodama ne mogu se vršiti prije nego sto one budu saopštene nadzornom organu.

4.2 Garancija za dobro izvršenje posla

Izvođač se obavezuje da pribavi (o sopstvenom trošku) garanciju za dobro izvršenje posla, i to u iznosu u valuti koja je navedena u posebnim uslovima. Ako iznos nije naveden u posebnim uslovima, ova podklauzula ne važi.

Izvođač se obavezuje da investitoru uruči garanciju za dobro izvršenje posla u roku od 28 dana nakon sto obije strane potpisu Ugovor. Izdavač garancije za dobro izvršenje posla i zemlja izdavanja te garancije podliježu odobrenju investitora, i ona se izdaje u formi priloženoj u posebnim uslovima ili u nekoj drugoj formi odobrenoj od strane investitora.

Izvođač se obavezuje da se postara o tome da garancije za dobro izvršenje posla bude vazeća i primjenjiva sve dok izvođač ne izvede i završi radove i otkloni nedostatke. Ukoliko je uslovima garancije predviđen datum njenog prestanka, a izvođač ne stenke pravo na povraćaj garancije 28 dana prije datuma prestanka garancije, izvođač se obavezuje da produži važnost garancije sve do završetka radova i otklanjanja nedostataka.

Investitor nema pravo na potraživanja po osnovu garancije za dobro izvršavanje posla u iznosima većim od onih na koje ima pravo po ugovoru u slučaju:

a) Propusta izvođača da produži važnost garancije u skladu sa prethodnim stavom, u kom slučaju investitor ima pravo da potražuje cio iznos garancije,
b) Propusta izvođača da investitoru isplati dospjeli iznos, sa kojim se izvođač saglasio ili koji je utvrđen u skladu sa podklauzulom 2.5 (potraživanja investitora) ili klauzulom 20 (potraživanja, sporovi i arbitraža) u roku od 42 dana od datuma davanja sigurnosti ili utvrđivanja,
c) Propusta izvođača da otkloni nekakav nedostatak u roku od 42 dana od prijema obavještenja investitora o potrebi da se nedostatak otkloni, ili
d) Nastanka okolnosti koje investitoru daju pravo na raskid ugovora u skladu sa podklauzulom 15.2 (raskid ugovora od strane investitora), nezavisno od toga da li je otkaz podnijet.

Investitor se obavezuje da izvođača obešteti i zaštiti od šteta, gubitaka i troškova (uključujući i sudske takse i troškove) nastalih u vezi potraživanja na osnovu garancije za dobro izvršenje posla u mjeri u kojoj investitor nije imao pravo na potraživanje.

Investitor se obavezuje da Izvođaču vrati garancije za dobro izvršenje posla u roku od 21 dana po prijemu primjeraka potvrde o dobro izvršenom poslu.

4.3 Predstavnik Izvođača

Izvođač određuje predstavnika izvođača i daje mu sva ovlašćenja koja su mu potrebna za djelovanje u ime izvođaca u skladu sa ugovorom.

Ukoliko predstavnik Izvođača nije imenovan u Ugovoru, Izvođač se obavezuje da prije datuma početka nadzornom organu podnese na saglasnost ime i podatke o licu koje namjerava da postavi kao predstavnika izvođača. Ako saglasnost bude uskraćena ili kasnije povučena, ili ako postavljeno lice ne djeluje kao predstavnik izvođača, izvođač se obavezuje da na sličan način predoči ime i podatke o nekom drugom licu pogodnom za takvo postavljanje.

Izvođač ne može bez prethodne saglasnosti nadzornog organa da smijeni predstavnika Izvođača ili da postavi novog.

Predstavnik Izvođača prima u ime Izvođača naloge iz podklauzule 3.4 (*Nalozi*).

Predstavnik Izvođača ima pravo da ovlašćenja i funkcije prenese na bilo koje kompetentno lice, kao i da u svako doba povuče takva ovlašćenja i funkcije. Nikakav prenos ili povlašćenje ne može da stupi na snagu prije nego sto investitor ne primi prethodno obavještenje potpisano od strane predstavnika izvođača sa imenom dotičnog lica i naznakom ovlašćenja i funkcija koje se prenose ili povlače.

Predstavnik Izvođača i sva pomenuta lica moraju da tečno govore jezik za komunikacije koji je naveden u podklauzuli 1.4 (*Zakon i jezik*).

4.4 Podizvođači

Izvođač nema pravo da radove u cjelini ustupi podizvođačima.

Izvođač je odgovoran za postupke i neizvršavanje obaveza bilo kojeg podizvođača, njegovih zastupnika ili radnika isto kao da su to postupci i neizvršavanja obaveza od strane izvođača. Kada je navedeno u posebni uslovima, izvođač mora dati investitoru obavještenje najmanje 28 dana prije za:

a) Planirano imenovanje podizvođaša, sa detaljnim pojedinostima koje uključuju I njegovo odgovarajuće radno iskustvo,
b) Planiran početak radova podizvođača,
c) Planiran početak radova podizvođača na gradilištu.

4.5 Imenovani podizvođači

U smislu ove podklauzule, “imenovani podizvođač” predstavlja podizvođača čije je angažovanje naloženo izvođaču od strane investitora u skladu sa klauzulom 13 (*Izmjene i korekcije*). Izvođač nije obavezan da angažuje nekog imenovanog podizvođača na čiji račun izvođač ima zamjerke, ako u sto je moguće kraćem roku o tome obavijesti investitora sa obrazloženjem.

4.6 Saradnja

Izvođač se obavezuje da pruži priliku za izvođenje radova, koji su predviđeni Ugovorom ili naloženi od strane rukovodioca izgradnje:

a) Osoblju Investitora,
b) Bilo kojim drugim izvođačima angažovanih od strane Investitora, i
c) Osoblju zakonski konstituisanih javnih organa,

koji se mogu angažovati na izvođenju radova, na gradilištu ili u njegovoj blizini, koji nisu predviđeni ugovorom.

Svaki takav nalog sačinjava izmjenu, ukoliko se Izvođač izlaze troškovima u iznosu koji nije mogao biti predviđen od strane iskusnog izvođača do datuma predaje tenderske dokumentacije. Usluge pružene takvom osoblju mogu da se odnose na korišćenje opreme izvođača, privremene radove ili aranžmane za pristup za koje je odgovoran izvođač.

Izvođač je odgovoran za svoje graditeljske aktivnosti na gradilištu i obavezan je da usaglašava svoje aktivnosti sa aktivnostima ostalih izvođača u mjeri (eventualno) predviđenoj zahtjevima investitora.

Ukoliko je Investitor po ugovoru obavezan da Izvođaču preda u posjed bilo koji temelj, objekat ili postrojenje ili sredstvo pristupa u skladu sa dokumentacijom izvođača, izvođač se obavezuje da takvu dokumentaciju podnese investitoru u roku i na način naveden u zahtjevima investitora.

4.7 Obilježavanje

Izvođač se obavezuje da obilježi radove u odnosu na prvobitne tačke, linije ili kote predviđene ugovorom. Izvođač je odgovoran za tačnost rasporeda svih djelova radova i obavezan je da ispravi svaku grešku u položajima, kotama, dimenzijama ili pravcima radova.

4.8 Bezbjedonosni postupci

Izvođač se obavezuje:

a) Da postupa u skladu sa svim odgovarajućim propisima o bezbjednosti,
b) Da vodi računa o bezbjednosti svih lica koja imaju pravo da budu na gradlištu,
c) Da se stara o tome da na gradilištu i radovima ne postoje nepotrebne prepreke kako se ta lica ne bi izlagala opasnostima,
d) Da obezbijedi ogradu, rasvjetu, čuvare i nadzor radova sve do preuzimanja u skladu sa klauzulom 10 (prijem od strane investitora), i
e) Da obezbijedi sve privremen radove (uključujući put, pješačke staze, čuvare i ogradu), koji su potrebni u izvođenju radova radi korišćenja i zaštite prolaznika i vlasnika ili korisnika okolnog zemljišta.

4.9 Garancija kvaliteta

Izvođač se obavezuje da uspostavi system garantovanja kvaliteta da bi se vidjelo da posputa u skladu sa uslovima ugovora. Taj sistem mora da bude u skladu sa detaljima iz Ugovora. Investitor ima pravo da vrši kontrolu bilo kog aspekta sistema.

Pojedinosti svih procedura i postupanja u skladu sa dokumentacijom podnose se Investitoru na uvid prije početka svake faze projektovanja i izvođenja. Na svakom dokumentu tehničke prirode koji se podnion Investitoru mora da se vidi dokaz o tome da ga je Izvođac prethodno odobrio.

Postupanje u skladu sa sistemom garantovanja kvaliteta ne oslobađa Izvođača od bilo koje svoje ugovorene obaveze ili odgovornosti.

4.10 Podaci o gradilištu

Investitor se obavezuje da prije osnovnog datuma izvođaču dostavi sve relevantne podatke koje ima u vezi podzemnih I hidroloških uslova na gradilištu, uključujući i ekološke aspekte. Investitor se isto tako obavezuje da izvođaču predoči sve takve podatke koje bude saznao posle osnovnog datuma.

Izvođač je odgovoran za tumačenje tih podataka. Investitor nije odgovor za tačnost, dovoljnost ili ispravnost tih podataka, osim onoga što je navedeno u podklauzuli 5.1 (*Projektne odgovornosti*).

4.11 Dovoljnost prihvaćenog ugovornog iznosa

Smatra se da je Izvođač uvjeren u ispravnost i dovoljnost prihvaćenog ugovornog iznosa.

Ukoliko nije drukčije predviđeno ugovorom, prihvaćeni ugovorni iznos pokriva sve obaveze izvođača (uključujući i one pod okvirnim sumama, ako su predviđene) i sve ostalo sto je potrebno za dobro projektovanje, izvođenje i završetak radova i otklanjanje eventualnih nedostataka.

4.12 Nepredviđene poteškoće

Osim ukoliko nije drugačije navedeno u ugovoru:

a) Izvođač će se smatrati odgovorim da je dobio sve informacije o rizicima, potencijalnim komplikacijama ili drugim okolnostima koje mogu uticati ili imati efekat na rad;
b) Potpisivanjem ugovora, Izvođač prihvata potpunu odgovornost da je predvidio sve teškoće i troškove koji su potrebni za uspješno izvršenje radova;
c) Ugovorna cijena se neće prilagođavati uzimajući u obzir bilo koje nepredviđene teškoće ili troškove.

4.13 Pravo prolaza i pogodnosti

Izvođač se obavezuje da snosi sve troškove i dažbine vezane za dobijanje posebnog i/ili privremenog prava prolaza za njegove potrebe, uključujući i prilaz gradilištu. Izvođač se takodje obavezuje da na sopstveni rizik i o sopstvenog trošku obezbijedi sve ostale pogodnosti van gradilišta koje su mu potrebne radi izvođenja radova.

4.14 Izbjegavanje ometanja

Izvođač ne smije da nepotrebno ili nepropisno ometa:

a) Građane, ili
b) Prilaz, korišćenje i zauzimanje svih puteva i pješačkih staza, kako javnih tako i onih u posjedu investitora ili drugih lica.

Izvođač se obavezuje da Investitora obešteti i zaštiti od štete, gubitka i troškova (uključujući i sudske troškove) nastalih zbog nepotrebnog ili nepropisnog ometanja.

4.15 Prilazni put

Smatra se da se Izvođač uvjerio u podobnost i raspoloživost prilaznih puteva za gradilište. Izvođač se obavezuje da se postara o tome da ne dođe do oštećenja bilo kog puta ili mosta od strane vozila ili osoblja izvođača. Obaveza se odnosi i na pravilno korišćenje odgovarajućih vozila I pravaca.

Ukoliko drukčije nije predviđeno ovim Ugovorom:

a) Izvođač je odgovoran za svo potrebno održavanje svojih prilaznih puteva;
b) Izvođač se obavezuje da obezbijedi svu potrebnu signalizaciju ili putokaze duž prilaznih puteva i da prihvati dozvolu nadležnih organa za korišćenje puteva, signalizacije i putokaza;
c) Investitor ne odgovara za bilo kakva potraživanja koja proizilaze iz korišćenja prilaznog puta;
d) Investitor ne garantuje podobnost ili raspoloživost posebnih prilaznih puteva, i
e) Izvođač snosi troškove nastale zbog nepodobnosti ili neraspoloživosti prilaznih puteva za potrebe Izvođača.

4.16 Prevoz robe

Ukoliko nije drugačije predvđeno Posebnim uslovima:

a) Izvođač se obavezuje da investitora obavijesti najmanje 21 dan unaprijed o prispjeću bilo koje opreme ili glavnih pozicija robe na gradilištu;
b) Izvođač je odgovoran za pakovanje, utovar, prevoz, prijem, istovar, skladištenje i zaštitu robe i ostalih stvari potrebnih za izvođenje radova; i
c) Izvođač se obavezuje da bešteti i zaštiti Investitora od svih šteta, gubitaka i troškova

(uključujući i sudske troškove) nastalih u prevozu robe i da pregovara i plati sva potrživanja vezana za njen prevoz.

4.17 Oprema izvođača

Izvođač je dogovoran za svu opremu Izvođača. Po dopremi na gradilište, oprema Izvođača se smatra namijenjenom isključivo izvođenju radova.

4.18 Zaštita životne sredine

Izvođač se obavezuje da u razumnim granicama primijeni mjere zaštite životne sredine (kako na gradilištu, tako i van njega), kako bi sveo na minimum štetu i neprijatnosti nanijete ljudima, odnosno imovini usled zagađenja, buke ili nekih drugih njegovih radnji.

Izvođač se obavezuje da se postara o tome da izduvni gasovi, površinska pražnjenja i otpadne vode nastale usled njegovih aktivnosti ne pređu vrijednosti navedene u zahtjevima investitora, niti vrijednosti propisane odgovarajućim zakonima.

4.19 Električna energija, voda i gas

Osim u nize navedenim slučajevima, izvođač je odgovoran za obezbjedjivanje električne energije, vode i ostalih usluga koje mu budu potrebne.

Izvođač ima pravo da za potrebe izvođenja radova koristi električnu energiju, vodu, gas i ostale usluge postojećih priključaka na gradilištu, u vezi kojih su pojedinosti i cijene dati u zahtjevima investitora. Izvođač se obavezuje da na sopstveni rizik i o sopstvenom trošku obezbijedi svu aparaturu koja mu je potrebna za korišćenje tih usluga i mjerenje utrošenih količina.

Investitor odobrava ili određuje utrošene količine i plative iznose (po tim cijenama) u skladu sa podkauzulom 2.5 (*Potraživanja investitora*) i podklauzulom 3.5 (*Utvrđivanja*). Izvođač se obavezuje da te iznose plati Investitoru.

4.20 Oprema investitora i besplatni materijal

Investitor se obavezuje da Izvođaču stavi na raspolagalanje svoju opremu (ako postoji) radi izvođenja radova u skladu sa detaljima, aranžmanima i cijenama navedenim u zahtjevima investitora. Ukoliko nije drugačije predviđeno zahtjevima investitora:

a) Investitor je odgovoran za opremu investitora, s tim sto je
b) Izvođač odgovoran za svaki dio opreme investitora kojim osoblje izvođača rukuje, vozi, upravlja, drži u posjedu ili kontroliše.

Odgovarajuće količine i iznosi koji slijede (po tako navedenim cijenama) za korišćenje opreme investitora odobrava ili utvrđuje investitor u skladu sa podklauzulom 2.5 (*Potraživanja*

investitora) i podklauzulom 3.5 (*Utvrđivanja*). Izvođač se obavezuje da te iznose isplaćuje Investitoru.

Investitor se obavezuje da izvođača snadbije sa (eventualnim) “besplatnim materijalima” u skladu sa pojedinostima navedenim u zahtjevima izvođača. Investitor se obavezuje da na sopstveni rizik o sopstvenom trošku obezbijedi te materijale u vrijeme i na mjestu predviđenim ugovorom. Nakon vizuelnog pregleda, izvođač odmah obavještava investitora o eventualnom manjku, nedostacima ili manjkavostima tih materijala. Ukoliko se stranke nijesu drugačije sporazumjele, investitor se obavezuje da odmah ispravi prijavljeni manjak, nedostatak ili manjkavost.

Nakon tog vizuelnog pregleda, besplatni materijali se predaju izvođaču na staranje, u posjed i na kontrolu. Obaveze Izvođača u pogledu staranja, posjedovanja i kontrole ne oslobađaju Investitora od odgovornosti za bilo koji manjak, nedostatak ili manjkavost koja nije utvrđena pri vizuelnom pregledu.

4.21 Izvještaj o napredovanju radova

Ukoliko nije drugačije predviđeno posebnim uslovima, Izvođač se obavezuje da Investitoru podnosi mjesečne izvještaje o napredovanju radova u šest primjeraka. Prvi izvještaj pokriva period do kraja prvog kalendarskog mjeseca poslije datuma početka. Izvještaji se nakon toga podnose mjesečno, i to u roku od 7dana od poslednjeg dana perioda na koji se odnose.

Izvještavanje se vrši sve dok Izvođač ne završi sve radove koji su bili nezavršeni na dan završetka koji je naveden u potvrdi o preuzimanju radova.

Svaki izvještaj sadrži:

a) Grafikone i detaljni opis napredovanja, uključujući svaku fazu projektovanja, dokumentaciju izvođača, nabavku, izradu, dopremu na gradilište, izgradnju, montažu, ispitivanje, puštanje u pogon i probni pogon;
b) Fotografije koje prikazuju stanje izgrade i napredovanje na gradilištu;
c) Za izradu svakog dijela postrojenja i materijala, naziv proizvođača, mjesto izgrade, procenat napredovanja I stvarni ili očekivani datum:
    a. Nakon izrade
    b. Kontrole od strane izvođača
    c. Ispitivanja, i
    d. Otpreme I prispijeća na gradilište.
d) Pojedinosti predviđene podklauzulom 6.10 (*Evidencija osoblja i opreme Izvođača);*
e) Primjerke garancije kvaliteta, rezultate ispitivanja i ateste za materijale;
f) Spisak izmjena, obavjestenja podnijetih u skladu sa podklauzulom 2.5 (*Potraživanja investitora*) i obaveštenja podnijetih u skladu sa podklauzulom 20.1 (*Potraživanja izvođača*);
g) Statističke podatke o bezbjednosti, uključujući pojedinosti opasnih incidenata i aktivnosti vezanih za ekološke aspekte i odnose sa javnošću; i
h) Poređenja između stvarnog i planiranog napredovanja, sa pojedinostima okolnosti koje bi mogle da uslove probijanje ugovornog roka za završetak i mjerama koje su usvojene

(ili će biti usvojene) radi sprečavanja kašnjenja.

4.22 Obezbjeđenje gradilišta

Ukoliko nije drugačije predviđeno posebnim uslovima:

a) Izvođač je odgovoran za sprečavanje ulaska neovlašćenih lica na gradilište, i
b) Ovlašćena lica su osoblje Izvođača i Investitora, kao i svako drugo lice za koje je izvođač obaviješten od strane investitora da je ovlašćeno lice drugih investitorovih izvođača.

4.23 Radnje Izvođača na gradilištu

Izvođač se obavezuje da svoje radnje ograniči na gradilište i da dodatne prostore koje Izvođač obezbijedi i koje investitor odobri kao radne prostore. Izvođač se obavezuje da preduzme sve potrebne mjere kako bi se oprema i osoblje Izvođača zadržavali na gradilištu i dodatnim prostorima bez prelaženja na susjedno zemljište.

Izvođač se obavezuje da se postara o tome da tokom izvođenja radova gradilište bude bez nepotrebnih prepreka i da uskladisti ili odstrani opremu Izvođača i suvisan materijal, Izvođač se obavezuje da raščisti i odstrani sa gradilišta sve ruševina, smeće i privremene radove koji vise nisu potrebni.

Izvođač se obavezuje da po izdavanju potvrde o preuzimanju raščisti I odstrani svu opremu Izvođača, visak materijala, ruševine, smeće ili privremene radove. Izvođač se obavezuje da taj dio gradilišta ili radova ostavi u cistom i bezbijednom stanju. Međutim, Izvođač ima pravo da do isteka roka za prijavljivanje nedostataka na gradilištu zadrži robu koja je izvođaču potrebna za izvršavanje svojih ugovornih obaveza.

4. 24 Fosili

Svi fosilni ostaci, novčići, vrijedne stvari ili antikviteti, strukture i ostali ostaci ili stvari od geološkog i arheološkog interesa koji budu pronađeni na gradilištu predaju se investitiru na staranje i raspolaganju. Izvođač se obavezuje da preduzme razumje mjere za sprečavanje odnošenja ili oštećenja tih nalaza odstrane osoblja izvođača ili nekih drugih lica.

Izvođač se obavezuje da po pronalaženju takvih stvari o tome odmah obavijesti investitora, koji ce nazoliti dalji postupak o njima. Ako izvođac bude kasnio ili bude izložen troškovima zbog postupanja u skladu sa takvim nalogom, po obavjestenju investitora u tom smislu, Izvođač ima pravo, shodno podklauzuli 20.1 (*Potraživanja Izvođača*) na:

a) Produženje roka srazmjerno takvom kašnjenju, ako je rok završetka probijen ili će biti probijen, shodno podklauzuli 8.4 (produženje roka za završetak), i
b) Naknadu takvih troškova, sto se uključuje u ugovornu cijenu.

Po prijemu daljeg obavjestenja, Investitor postupa u skladu sa podklauzulom 3.5 (utvrđivanja) da bi se saglasio ili utvrdio te stvari.

5. Projektovanje

5.1 Opšte obaveze u projektovanju

Izvođač će se smatrati da je nadzorom, prije baznog datuma, kada su u pitanju zahtjevi investitora (uključujući projektne kriterijume i kalkulacije, ukoliko ih ima). Izvođač je odgovoran za projektovanje radova i za tačnost prema zahtjevima Investitora (uključujući i projektne kriterijume i kalkulacije), osim dolje navedenog.

Investitor nije odgovoran za bilo koje greške, netačnosti ili propuste bilo koje vrste kada su u pitanju zahtjevi investitora koji su prvobitno uključeni u ugovor i ne može se smatrati da je dao bilo kakve izjave o tačnosti ili kompletnosti bilo kojih podataka ili informacija, osim dolje navedenog. Sve podatke ili informacije koje primi Izvođač, od strane investitora ili na drugi način, ne oslobađa Izvođača od njegove odgovornosti za projektovanje I izvođenje radova.

Međutim, Investitor mora biti odgovoran za tačnost sledećih djelova zahtjeva poslodavca, kao i sledećih podataka i informacija koje pruža (ili u ime) investitor:

a) Djelovi, podaci i informacije koje su navedene u ugovoru koje su nepromjenjive ili su odgovornost investitora,
b) Definicije namijenjene planiranim radovima ili pojedinim djelovima tih radova,
c) Kriterijumi za testiranje i obavljanje završenih radova, i
d) Djelovi, podaci i informacije koje ne mogu biti ovjerene od strane investitora, osim ukoliko to nije drugačije naznačeno u ugovoru.

5.2 Dokumentacija izvođača

Dokumentaciju Izvođača sačinjavaju tehnička dokumentacija predivđena zahtjevima investitora, dokumenti koji su potrebni za dobijanje odobrenja I dokumenti iz podklauzule 5.6 (dokumentacija izvedenog stanja) i podklauzule 5.7 (*Priručnik za eksploataciju i održavanje*). Ukoliko drugačije nije predviđeno zahtjevima investitora, dokumentacija izvođača piše se na jeziku za komunikacije na koju je izveden u podklauzuli 1.4 (*Pravo i jezik).*

Izvođač se obavezuje da pripremi dokumentaciju izvođača, kao i ostale dokumente koji su potrebni za davanje uputstava osoblju izvođača.

Ako je u zahtjevima investitora precizirana dokumentacija izvođača koje se podnosi investitoru na pregled, ona se podnosi skupa sa nize opisanom bilješkom. U sledećim odredbama ove podklauzule, (i) “period pregleda” znaci vrijeme koje je potrebno Investitoru za pregled, I (ii) “dokumentacija izvođača” ne obuhvata bilo koje documente koji nisu predviđeni za podnošenje radi pregleda.

Ukoliko nije drugačije navedeno u zahtjevima investitora, period drugačije navedeno u zahtjevima investitora, period pregleda ne može da bude od 21 dana, računao od dana prijema dokumentacije i obavještenja Izvođača od strane Investitora. U obavjestenju se navodi da se dokumentacija izvođača smatra spremnom kako za pregled u skladu sa ovom podklauzulom, tako i za korišćenje. U obavjestenju se takodje navodi da je dokumentacija izvođača u skladu sa ugovorom ili mjera u kojoj ona nije u skladu sa ugovorom.

Tokom perioda pregleda, investitor može da saopšti izvođaču da neki njegov dokument nije u skladu sa ugovorom (navodeći mjeru odstupanja). Takav se dokument ispravlja, ponovo podnosi I pregleda u skladu sa ovom podklauzulm, i to o trošku izvođača.

Za svaki dio radova, osim ukoliko se strane drugačije ne dogovore:

a) Izvršenje takvih djelova radova neće početi prije isteka perioda za razmatranje svih dokumenta Izvođača koji su vezani za projektovanje i izvođenje;
b) Izvršenje takvih dijelova radova moraju biti u skladu sa ovim dokumentima Izvođača, kao predate na razmatranje; i
c) Ukoliko Izvođač želi da izmijeni bilo koji projekat ili dokument koji je prethodno poslat na pregled, Izvođač o tome mora odmah obavijestiti investitora. Nakon toga, Izvođač dostavlja izmijenjene dokumente investitoru u skladu sa navedenom procedurom.

Svaki sporazum tog tipa (iz prethodnog stave) ili bilo koji pregled (pod ovom subklauzulom ili na neki drugi način) ne oslobađa Izvođaca od bilo koje obaveze ili odgovornosti.

5.3 Garancija Izvođača

Izvođač garantuje da će projekat, dokumentacija Izvođača, izvođenje i završeni radovi biti u skladu sa:

a) zakonima zemlje, i
b) dokumentacijom koja sačinjava ugovor, sa odobrenim izmjenama.

5.4 Tehnički standardi i propisi

Projekat, dokumentacija Izvođača, izvođenje i završeni radovi moraju da budu u skladu sa tehničkim standardima, zakonima o izgradnji i zaštiti životne sredine, zakonima koji se primjenjuju na proizvode koji se od radova proizvode i ostalim standardima preciziranim u zahtjevima investitora, a koji se odnose na radove ili su predviđeni odgovarajućim zakonima, koji su na snazi u zemlji.

Što se radova i svake sekcije pojedinačno tiče, svi ovi za koji su oni koji su bili na snazi kada su radovi ili sekcije bili primljeni od strane investitora u skladu sa klauzulom 10 (*Prijem radova od strane Investitora*). Pozivanja u ugovoru na objavljene standard podrzumijevaju pozive na izdanja koja su bila primjenjiva osnovnog datuma, ukoliko nije dugačije predviđeno.

U slučaju da u zemlji stupe na snagu izmijenjeni ili novi standardi posle osnovnog datuma, Izvođač se obavezuje da o tome obavijesti investitora i (po potrebi) podnese predloge za usaglašavanje. U slučaju da:

a) Investitor utvrdi da je potrebno usaglašavanje, i
b) Predlozi sa usaglašavanje sačinjavaju izmjenu

Investitor inicira vršenje izmjene u skladu sa klauzulom 13 (*Izmjene i korekcije*).

5.5 Obuka

Izvođač se obavezuje da izvrši obuku osoblja investitora za eksploataciju i održavanje radova u obimu navedenom u zahtjevima investitora. Ukoliko Ugovor predviđa da se obuka izvrši prije primopredaje, radovi se neće smatrati završenim za potrebe prijema u skladu sa klauzulom 10.1 (*Prijem radova i sekcija*) sve dok se obuka ne završi.

5.6 Dokumentacija izvedenog stanja

Izvođač se obavezuje da priprema i ažurno vodi kompletan set evidencije “izvedenog stanja” radova, sa prikazom tačnih kolacija izvedenog stanja, dimenzija i detalja izvedenog rada. Takva evidencija se drži na gradilištu i koristi se isključivo u svrhe predviđene ovom podklauzulom. Dva primjerka se podnose nadzornom organu pre početka ispitivanja na završetku.

Pored toga, Izvođač se obavezuje da nadzornom organu podnese grafičku dokumentaciju u izvedenom stanju radova koja prikazuje sve izvedene radove radi pregleda u skladu sa pokdlauzulum 5.2 (*Dokumentacija Izvođača*). Izvođač se obavezuje da trazi saglasnost nadzornog organa u vezi njihovih dimenzija, referentnog sistema i ostalih bitnih podataka.

Prije izdavanja potvrde o prijemu, Izvođač se obavezuje da nadzornom organu podnese određeni broj primjeraka grafičke dokumentacije u izvedenom stanju, u skladu sa zahtjevima Investitora. Radovi se ne mogu smatrati završenim za potrebe prijema u skladu sa podklauzulom 10.1 (*Prijem radova i sekcija*) prije nego sto Investitor primi tu dokumentaciju.

5.7 Priručnici za eksploataciju i održavanje

Prije nego sto pristupi ispitivanju na završetku, Izvođač se obavezuje da Investitoru dostavi privrmene priručnike za eksploataciju i održavanje koji su detaljni u mjeri potrebnoj da se investitoru omogući da eksploatiše, održava, razmontira, montira, podesi i popravi postrojenje.

Radovi se ne mogu smatrati završenim za potrebe prijema u skladu sa podklauzulom 10.1 (*Prijem radova i sekcija*) sve dok Investitor ne primi konačne priručnike za eksploataciju i održavanje sa potrebnim detaljima i neke druge priručnike predviđene zahtjevima investitora u te svrhe.

5.8 Greške u projektima

Ukoliko se u dokumentaciji Izvođača utvrde greške, propusti, dvosmislenosti, neadekvatnosti i ostale manjkavosti, onda i radovi podliježu korekcije o trošku Izvođača, bez obzira na bilo koju saglasnost ili odobrenje koje je bilo datu u skladu sa ovom klauzulom.

6. Osoblje i radna snaga

6.1 Angažovanje osoblja i radne snage

Ukoliko drugačije nije navedeno u Zahtjevima Investitora, Izvođač se stara i angažovanju cjelokupnog osoblja i radne snage, lokalne ili neke druge, i njihovim platama, smještaju, ishrani i prevozu.

6.2 Plate i radne uslovi

Izvođač se obavezuje da isplaćuje plate i obezbijedi radne uslove i to tako da plate ne budu niže i uslovi da ne budu lošiji od onih koji su utvrđeni za takve djelatnosti u mjestu gdje se izvode Radovi. Ako plate i radni uslovi nisu utvrđeni, Izvođač se obavezuje da isplaćuje plate i obezbijedi radne uslove koji nisu niži od onog koji praktikuju lokalni poslodavci čija je djelatnost slična.

6.3 Lica zaposlena kod drugih

Izvođač neće zaposliti, niti da pokuša da zaposli osoblje ili radnu snagu iz redova osoblja Investitora.

6.4 Radno zakonodavstvo

Izvođač se obavezuje da poštuje zakone o radu koji važe za osoblje Izvođača, uključujući i zakone koji regulišu njihove radne odnose, zdravstvenu zaštitu, bezbjednost, socijalno osiguranje, imigraciju i emigraciju i da im omogući da koriste svoja zakonska prava.

Izvođač se obavezuje da od svojih radnika zahtijeva da se pridržavaju odgovarajućih zakona, uključujući i one koji se odnose na zaštitu na radu.

6.5 Radno vrijeme

Nije dozvoljen nikakav rad na gradilištu u zvanične lokalne dane odmora ili van normalnog radnog vremena, osim ako:

(a) drugačije nije predviđeno Ugovorom;

(b) ako Investitor da svoju saglasnost za to; i

(c) ako je rad neizbježan ili je neophodan radi zaštite lica i imovine ili zbog bezbjednosi Radova, u kom slučaju se Izvođač obavezuje da to odmah saopšti Investitoru.

6.6 Pogodnosti za osoblje i radnu snagu

Ukoliko nije drugačiije navedeno u Zahtjevima Investitora, Izvođač se obavezuje da obezbijedi i održava potrebni smještaj i ostale socijalne uslove za svoje radnike. Izvođač se takođe obavezuje da za radnike Investitora obezbijedi pogodnosti navedene u Zahtjevima Investitora.

Izvođač ne smije da dozvoli bilo kom svom radniku privremeni ili trajni smještaj u objektima koji sačinjavaju Osnovne radove.

6.7 Zdravlje i bezbjednost

Izvođač se obavezuje da stalno vodi računa o zdravlju i bezbjednosti svojih radnika u razumnim granicama. On se obavezuje da se u saradnji sa lokalnim zdravstvenim institucijama postara o tome da zdravstveni radnici, prva pomoć i ambulantne usluge budu stalno na raspolaganju radnicima Izvođača i Investitora na gradilištu i smještajnim objektima, kao i da se postara o higijenskoj zaštiti i zaštiti od epidemije.

Izvođač se obavezuje da na gradilištu angažuje referenta za zaštitu na radu, koji bi bio odgovoran za bezbjednost i zaštitu od nesreća. To lice mora da ima odgovarajuću kvalifikaciju i ovlašćenje da daje naloge i preduzima mjere za sprječavanje nesreća. Izvođač se obavezuje da tokom cijelog trajanja izvođenja Radova tom licu obezbijedi sve što mu je potrebno za izvršavanje svojih dužnosti.

Izvođač se obavezuje da Investitoru podnese detaljan izvještaj o svakoj nesreći u najkraćem mogućem roku poslije nastanka nesreće. Izvođač se obavezuje da vodi evidenciju i podnosi izvještaje u vezi zdravlja, bezbjednosti i šteti nanijetoj imovini, na zahtjev Investitora.

6.8 Nadzor Izvođača

Izvođač se obavezuje da tokom projektovanja i izvođenja radova u cjelini i nakon toga po potrebi, obezbijedi nadzornu službu za planiranje, uređivanje, usmjeravanje, upravljanje, kontrolu i ispitivanje radova.

Nadzorna služba mora da ima dovoljan broj radnika koji u dovoljnoj mjeri vladaju jezikom za komunikacije (u smislu podklauzule 1.4 (*Pravo i zakon*)) i poznaju poslove koji se obavljaju radi zadovoljavajućeg i bezbjednog izvođenja Radova**.**

6.9 Osoblje izvođača

Osoblje izvođača mora da ima odgovarajuće kvalifikacije i da bude stručno i iskusno. Investitor ima pravo da od Izvođača zahtijeva da sa gradilišta ili Radova odstrani (ili izdejstvuje odstranjenje) bilo kog lica, pa i predstavnika Izvođača, po potrebi, koje:

(a) se loše ponaša ili je nepažljivo;

(b) se bavi svojim poslom nekompetentno ili nemarno;

(c) se ne povinuje bilo kojoj odredbi Ugovora; i

(d) istrajava u ponašanju koje ugrožava bezbjednost, zdravlje ili zaštitu životne sredine.

Nakon toga, Izvođač može da odredi drugo odgovarajuće lice kao zamjenu, po potrebi.

6.10 Evidencija osoblja i opreme Izvođača

Izvođač se obavezuje da Investitoru podnese izvještaj o broju svojih radnika svih kategorija i svakoj vrsti opreme Izvođača na gradilištu. Izvještaj se podnosi svakog kalendarskog mjeseca u obliku koji je odobren od strane Investitora, sve do završetka Radova i izdavanja Potvrde o prijemu Radova**.**

6.11 Nekorektno ponašanje

Izvođač se obavezuje da stalno preduzima mjere za sprječavanje nezakonitog, buntovničkog ili nekorektnog ponašanja osoblja Izvođača, i čuvanja mira i zaštite lica i imovine na ili u blizini gradilišta.

7. Postrojenja, materijali i izrada

7.1 Način izvođenja

Izvođač se obavezuje da proizvede Postrojenje, proizvede i izradi materijal i izvede sve ostale Radove:

(a) na način predviđen Ugovorom (ako je predviđen),

(b) stručno i pažljivo, u skladu sa priznatom dobrom praksom, i

(c) koriseći propisnu opremu i bezopasne materijale, ukoliko nije drugačije predviđeno Ugovorom.

7.2 Uzorci

Izvođač se obavezuje da Investitoru podnese na pregled uzorke u skladu sa procedurama za dokumentaciju Izvođača iz podklauzule 5.2 *(Dokumentacija Izvođača).* Svi uzorci treba da imaju etiketu sa naznakom porijekla i predviđene primjene u Radovima.

7.3 Kontrola

Osoblje investitora ima pravo u svako razumno doba:

(a) na potpuni pristup svim djelovima gradilišta i mjestima na kojima se dobijaju prirodni materijali, i

(b) da tokom proizvodnje, izrade i izgradnje (na gradilištu ili nekom drugom mjestu) pregledaju, kontrolišu, mjere i ispitaju materijale i izradu, i da kontrolišu napredovanje izrade postrojenja i proizvodnju materijala.

Izvođač se obavezuje da Investitorovom personalu omogući da obavi te aktivnosti obezbjeđujući im pristup, pogodnosti, dozovle i zaštitnu opremu. Nijedna takva aktivnost ne oslobađa Izvođača bilo koje obaveze ili odgovornosti.

U vezi sa Radovima za koje Investitorov personal ima pravo da vrši pregled, kontrolu, mjerenje i/ili testiranje, Izvođač će obavijestiti Investitora kad god su radovi spremni ili prije nego što se oni pokriju, sklone ili upakuju za skladištenje ili transport. Investitor zatim vrši pregled, kontrolu, mjerenje ili ispitivanje bez nepotrebnog zastoja ili odmah saopštava Izvođaču da Investitor to ne zahtijeva. Ukoliko Izvođač ne obavijesti, on će, na zahtjev Investitora, otkriti radove i nakon toga ih vratiti u pređašnje stanje, o sopstvenom trošku.

7.4 Ispitivanje

Ova podklauzula važi za sva ispitivanja koja su predviđena Ugovorom, ali ne i za (eventualna) ispitivanja poslije završetka.

Izvođač se obavezuje da obezbijedi svu aparaturu, pomoć, dokumentaciju i ostale informacije, električnu energiju, opremu, gorivo, potrošni materijal, instrumente, radnu snagu, materijal i stručno i iskusno osoblje koji su potrebni za efikasno vršenje predviđenih ispitivanja. Izvođač se obavezuje da se sa Investitorom dogovori o terminu i mjestu predvidjenog ispitivanja svakog postrojenja, materijala i ostalih djelova Radova.

Investitor ima pravo, da u skladu sa klauzulom 13 *(Izmjene i korekcije)* mijenja mjesto i pojedinosti predvidjenih ispitivanja ili da naloži Izvođaču vršenje dodatnih ispitivanja. Ako se tako izmijenjenim ili dodatnim ispitivanjima utvrdi da ispitivano postrojenje, materijali ili izrada nisu u skladu sa Ugovorom, troškove izmjene snosi Izvođač, bez obzira na ostale odredbe Ugovora.

Investitor se obavezuje da Izvođača obavijesti najmanje 24 časa unarijed o svojoj namjeri da prisustvuje ispitivanjima. Ako Investitor ne bude prisutan u dogovoreno vrijeme na dogovorenom mjestu, Izvođač može da pristupi ispitivanjima, ukoliko mu Investitor nije nešto drugo nazložio, i tada će se smatrati da je ispitivanje izvršeno u prisustvu Investitora.

Ako Investitor kasni i/ili bude izložen troškovima zbog postupanja u skladu sa tim nalozima ili zastoja za koji je odgovoran Investitor, Izvođač o tome obavještava Investitora i shodno podklauzuli 20.1 *(Potraživanje Izvođača)* ima pravo na:

(a) produženje roka srazmjerno kašnjenju, ako završetak kasni ili će kasniti, u skladu sa podklauzulom 8.4 *(Produženje roka za završetak radova),* i

(b) naknadu troškova uvećanu za primjerenu dobit, što se uključuje u ugovornu cijenu.

Po prijemu tog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrdjivanja*) radi davanja saglasnosti ili utvrđivanja tih stvari.

Izvođač se obavezuje da Investitoru odmah proslijedi propisno ovjerene izvještaje o ispitivanjima. Kada se dobiju povoljni rezultati Investitor potvrđuje atest Izvođača ili mu izdaje potvrdu u tom smislu. Ako Investitor nije prisustvovao ispitivanju, smatraće se da je prihvatio rezultate kao tačne.

7.5 Odbijanje

Ako se pregledom, kotrolom, mjerenjem ili ispitivanjem postrojenja, materijala, projekta ili izrade utvrde njegovi nedostaci ili njihova nesaglasnost sa Ugovorom u nekom drugom smislu, Investitor ima pravo da odbije postrojenje, materijale, prjekt ili izradu i da to Izvođaču saopšti sa obrazloženjem. Izvođač se obavezuje da odmah potom otkloni nedostatke i da odbijenu stvar uskladi sa Ugovorom.

Ako Investitor zahtijeva ponovno ispitivanje tog postrojenja, materijala, projekta ili izrade, ispitivanje se ponavlja pod istim uslovima. Ako odbijanje i ponovno ispitivanje izlaže Investitora dodatnim troškovima, Izvođač se obavezuje da Investitoru nadoknadi te troškove u skladu sa podklauzulom 2.5 *(Potraživanja Investitora).*

7.6 Otklanjanje nedostataka

Bez obzira na bilo koja ranija ispitivanja ili potvrđivanja, Investitor ima pravo da Izvođaču naloži:

(a) odstranjivanje sa gradilišta i zamjenu bilo kog postrojenja ili materijala koji nije u skladu sa Ugovorom,

(b) odstranjivanje i ponovno izvođenje bilo kojih drugih radova koji nisu u skladu sa Ugovorom, i

(c) da izvede sve radove koji su hitno potrebni radi bezbjednosti Radova, sprečavanje nesreće, nepredviđenih događaja ili nešto drugo.

Ako Izvođač ne postupi po nalogu, u skladu sa podklauzulom 3.4 (*Instruction*), Investitor ima pravo da angažuje nego drugo lice za izvršenje posla uz naknadu. Osim u obimu u kojem bi Izvođač imao pravo na naknadu za obavljeni rad, Izvođač se obavezuje da u skladu s podklauzulom 2.5 (*Potraživanja Investitora)* Investitoru nadoknadi sve troškove nastale usled tog propusta.

7.7 Vlasništo postrojenja i materijala

Svaka pozicija postrojenja i materijala postaje vlasništvo Investora u mjeri predviđenoj zakonima Zemlje, bez ikakvih prava zadržavanja i ostalih tereta, zavisno od prvonastalog slučaja, i to:

(a) kada se isporuči na gradilištu;

(b) kada Izvođač stekne pravo na isplatu vrijednosti postrojenja i materijala u skladu sa podklauzulom 8.10 (*Plaćanje na postrojenja i materijale u slučaju obustave*).

7.8 Naknade

Ukoliko nije drugačije navedeno u Zahtjevima Investitora, Izvođač plaća sve naknade, zakupnine i ostala potraživanja u vezi:

(a) prirodnih materijala dobijenih van gradilišta, i

(b) odnošenje ruševina i materijala iz iskopa i ostalog nepotrebnog materijala (prirodnog ili vještačkog), ukoliko ugovorom nisu predviđena stovarišta na gradilištu.

8. Početak, zastoj i obustava

8.1 Početak radova

Ukoliko drugačije nije predviđeno Ugovornim Sporazumom:

(a) Investitor će Izvođaču dostaviti obavještenje o Datumu početka radova, najmanje 7 dana unaprijed; i

(b) Datum početka radova će biti u roku od 42 dana nakon dana stupanja na snagu Ugovora i efekata u skladu sa podklauzulom 1.6 (*Ugovorni sporazum).*

Izvođač se obavezuje da pristupi projektovanju i izvođenju Radova što je moguće prije poslije Datuma početka radova, nakon čega počinje da izvodi Radove ekspeditivno i bez zastoja.

8.2 Rok za završetak

Izvođač se obavezuje da izvrši cjelokupne Radove i sve sekcije (ako postoje), u roku za završetak Radova ili sekcija (zavisno od slučaja), uključujući:

(a) postizanje povoljnih rezultata ispitivanja na završetku, i

(b) završetak svih radova koji su po Ugovoru potrebni da bi se Radovi ili sekcije smatrali završenim za potrebe preuzimanja u skladu sa podklauzulom 10.1 (*Preuzimanje Radova i sekcija).*

8.3 Program radova

Izvođač se obavezuje da Investitoru podnese program radova u roku od 28 dana od Dana početka radova. Izvođač se takođe obavezuje da podnese izmijenjeni program radova ako predhodni program radova nije bio u skladu sa stvarnim napredovanjem ili obavezama Izvođača. Ukoliko drugačije nije predviđeno Ugovorom, svaki program radova sadrži:

(a) redosled po kojem Izvođač namjerava da izvodi Radove, uključujući očekivano vrijeme svake faze Radova.

(b) rokove za pregled u skladu sa podklauzulom 5.2 (*Dokumentacija Izvođača).*

(c) redosled i vremenski raspored kontrola i ispitivanja predvidjenih Ugovorom, i

(d) prateći izvještaj koji sadrži:

(i) opšti opis metoda koje Izvođač namjerava da usvoji za svaku glavnu fazu izvođenja Radova, i

(ii) okvirni broj osoblja Izovđača po vrstama i svake vrste opreme Izvođača za sve glave faze.

Ukoliko Investitor, u roku od 21 dan od prijema programa radova, ne obavijesti Izvođača o mjeri u kojoj on nije u saglasnosti sa Ugovorom, Izvođač može da postupa u skladu sa tim programom radova, pod uslovom da izvršava svoje ostale obaveze iz Ugovora. Osoblje Investitora može da se osloni na ovaj program radova u planiranju svojih aktivnosti.

Izvođač se obavezuje da odmah obavijesti Investitora o specifičnim mogućim događajima ili okolnostima koje mogu da nepovoljno utiču ili odlože izvršenje Radova. U ovom slučaju, ili ako Investitor bilo kad saopšti Izvođaču da program radova nije u skladu sa ugovorom i stvarnim napredovanjem i izraženim namjerama Izvođača, Izvođač se obavezuje da Investitoru podnese izmijenjeni program radova u skladu sa ovom podklauzulom.

8.4 Produženje roka za završetak

Izvođač ima pravo na produženje roka za završetak u skladu sa podklauzulom 20.1 (*Potraživanja Izvođača*), u slučaju da je došlo ili će doći do kašnjenja završetka u smislu podklauzule 10.1 (*Preuzimanje radova i sekcija*), zbog:

(a) izmjene (ako nije bilo dogovoreno usklađivanje sa rokom završetka u skladu sa podklauzulom 13.3 (*Postupak izmjene*)),

(b) nekog uzroka zastoja koji daje pravo na produženje roka u skladu sa nekom podklauzulom ovih Uslova, ili

(c) zastoja, smetnji ili spriječenosti izazvanih od strane Investitora, osoblja Investitora, ili ostalih Investitorovih Izvođača na gradilištu.

Ako Izvođač smatra da ima pravo na produženje roka za završetak, on o tome obavještava Investitora u skladu sa podklauzulom 20.1 (*Potraživanja Izvođača*). Pri određivanju produžetka roka u skladu sa podklauzulom 20.1, Investitor razmatra ranije utvrđivanja i može da produži, ali ne i da skrati, ukupnu dužinu produžetka.

8.5 Zakašnjenja izazvana od strane organa vlasti

Ako se radi o sledećim slučajevima:

(a) Izvođač se u svemu pridržavao postupaka propisanih od strane relevantnih organa vlasti Zemlje,

(b) ti organi usporavaju ili ometaju radove Izvođača, ili

(c) usporavanje ili ometanje nije bilo predvidljvo od strane iskusnog izvođača u vrijeme podnošenja ponude.

tada se takvo usporavanje ili ometanje smatra uzrokom kašnjenja u skladu sa podklauzulom 8.4 *(Produženje roka za završetak).*

8.6 Dinamika napredovanja

Ako bilo kada:

(a) stvarno napredovanje bude isuviše sporo za ispunjavanje roka za završetak, i/ili

(b) napradovanje zaostane (ili će zaostati) za tekućim Programom radova iz podklauzule 8.3 (*Program radova*),

a ne proizilazi iz uzoroka koji su navedeni u podklauzuli 8.4 (*Produženje roka za završetak*), Investitor ima pravo da Izvođaču naloži da podnese u skladu sa sa podklauzulom 8.3 (*Program radova*) izmijenjeni program radova sa pratećim izvještajem o izmijenjenim metodama koje Izvođač predlaže za usvajanje radi ubrzanja napredovanja i završavanj radova u predviđenom roku.

Ako Investitor ne odredi nešto drugo, Izvođač usvaja te izmjene metode, koji možda iziskuju produženje radnog vremena i/ili povećanje broja radnika Izvođača i/ili robe, na rizik i o trošku Izvođača. Ako takve izmjene metode izlažu Investitora dodatnim troškovima, Izvođač se obavezuje da u skladu sa podklauzulom 2.5 (*Potraživanje Investitora*) Investitoru nadoknadi te troškove i plati (eventualno) obeštećenje za kašnjenje u skladu sa podklauzulom 8.7.

8.7 Obeštećenje za kašnjenje

Ako Izvođač ne izvrši svoju obavezu iz podklauzule 8.2 (*Rok za završetak*), on se obavezuje da u skladu sa podklauzulom 2.5 (*Potraživanje Investitora*) Investitoru plati obeštećenje za kašnjenje. Iznos obeštećenaj za kašnjenje naveden je u Posebnim uslovima, i on se plaća za svaki dan koji protekne između relevantnog roka za završetak i datuma navedenog u Potvrdi o preuzimanju. Međutim, ukupni iznos koji je plativ u skladu sa ovom podklauzulom ne može da bude veći od maksimalnog iznosa obeštećenja za kašnjenje koji je naveden u Posebnim uslovima.

To obeštećenje je jedino obeštećenje koje je plativo od strane Izvođača za takvo ne izvršavanje obaveza, osim u slučaju raskida u skladu sa podklauzulom 15.2 (*Raskid od strane Investitora*) prije završetka Radova. Tako obeštećenje ne oslobađa Izvođača svoje obaveze da završi Radove ili bilo koji ugovornih obaveza ili odgovornosti.

8.8 Obustava radova

Investitor ima pravo da u svako doba Izvođaču izda nalog za obustavu Radova u cjelini ili djelimično. Izvođač se obavezuje da tokom takve obustave štiti, uskladišti i obezbijedi takav dio ili Radove u cjelini od propadanja, gubljenja ili oštećenja.

Investitor takođe može da saopšti uzrok obustave. Ako je uzrok saopšten i predstavlja odgovornost Izvođača, podklauzule 8.9, 8.10 i 8.11 ne važe.

8.9. Posledice obustave

Ukoliko Izvođač kasni i/ili bude izložen troškovima zbog postupanja u skladu sa nalogom Investitora iz podklauzule 8.8 (*Obustava radova*) i/ili nastavljanje radova, Izvođač obavještava Investitora u tom smislu i shodno podklauzuli 20.1 (*Potraživanja Izvođača*) ima pravo na:

(a) produženje roka zbog takvog kašnjenja, ako završetak kasni ili će kasniti shodno podklauzuli 8.4 (*Produženje roka za završetak*), i

(b) naknadu takvih troškova, što se uključuje u ugovornu cijenu.

Nakon prijema takvog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi saglašavanja ili utvrđivanja tih stvari.

Izvođač nema pravo na produženje roka zbog vremena utrošenog na saniranje posledica manjkavog projekta, izrade ili materijala Izvođača i nadoknadu troškova kojim je pri tom bio izložen, ili zbog propusta Izvođača da zaštiti, uskladišti ili obezbijedi u skladu sa podklauzulom 8.8 (*Obustava radova*).

8.10 Plaćanje za postrojenje i materijale u slučaju obustave

Izvođač ima pravo na naknadu vrijednosti (na dan obustave) postrojenja i/ili materijala koji nisu isporučeni na gradilištu,ukoliko je:

(a) rad na postrojenju ili isporuci postrojenja i/ili materijala bio obustavljen u trajanju dužem od 28 dana, i

(b) Izvođač označio postrojenje i/ili materijale kao vlasništvo Investitora u skladu sa nalogom Investitora.

8.11 Produžena obustava

Ukoliko obustava iz podklauzule 8.8 (*Obustava radova*) traje duže od 84 dana, Izvođač ima pravo da od Investitora zahtijeva dozvolu za nastavak Radova. Ukoliko Investitor ne izda dozvolu u roku od 28 dana od podnošenja zahtjeva, Izvođač ima pravo da obustavu smatra izostavljanjem dotičnog dijela Radova shodno klauzuli 13 (*Izmjene i korekcije*) i o tome obavijesti Investitora. Ukoliko obustava utiče na Radove u cjelini, Izvođač ima pravo da otkaže Ugovor u skladu sa podklauzulom 16.2 (*Raskid od strane Izvođača*).

8.12 Nastavak radova

Po izdavanju dozvole ili naloga za nastavak, Strane vrše zajedniči pregled Radova, postrojenja i materijala na koje se obustava odnosila. Izvođač se obavezuje da sanira eventualne kvarove, nedostatke ili gubitke u radu, postrojenjima i materijalima, koji su nastali tokom obustave.

9. Ispitivanja na završetku

9.1 Obaveze Izvođača

Izvođač se obavezuje da izvrši ispitivanje u skladu sa ovom klauzulom i podklauzulom 7.4 (*Ispitivanje*) nakon obezbjeđenja dokumentacije iz podklauzule 5.6 (D*okumentacija izvedenog stanja)* i 5.7 *(Priručnici za eksploataciju i održavanje*).

Izvođač se obavezuje da Investitoru saopšti najmanje 21 dan unaprijed datum poslije kojeg će Izvođač biti spreman da izvrši svako ispitivanje na završetku pojedinačno. Ukoliko nije drukčije dogovoreno, ispitivanja na završetku vrše se u roku od 14 dana od tog datuma ili na dan, ili u dane koje Investitor bude odredio.

Ukoliko drukčije nije predvidjeno Posebnim uslovima, ispitivanja na završetku vrše se po sledećem redosledu:

(a) ispitivanja prije puštanja u pogon, koja obuhvataju odgovarajuće kontrole i funkcionalne probe (na "suvo" i "hladno") radi utvrđivanja da li se svaki dio postrojenja može bezbjedno podvrgnuti narednoj fazi, (b);

(b) ispitivanja pri puštanju u pogon koja obuhvataju predvidjena operativna ispitivanja radi utvrđivanja da li se Radovi ili sekcije mogu eksplatisati bezbjedno i na predviđeni način, pod postojećim radnim uslovima; i

(c) probni pogon kojim se utvrđuje da li radovi ili sekcije funkcionišu pouzdano i u skladu sa Ugovorom.

Tokom probnog pogona, kada se Radovi eksploatišu pod stabilnim uslovima, Izvođač se obavezuje da Investitora obavijesti o spremnosti Radova za bilo koja druga ispitivanja na završetku, uključujući i ispitivanja performansi radi utvrđivanja da li su Radovi u skladu sa kriterijumima navedenim u Zahtjevima Izvođača i garancijama.

Probni pogon ne podrazumijeva prijem u skladu sa klauzulom 10 (*Prijem radova od strane Investitora).* Ukoliko drukčije nije predviđeno Posebnim uslovima, svi proizvodi Radova koji nastanu tokom probnog pogona predstavljaju vlasništvo Investitora.

Pri razmatranju rezultata ispitivanja na završetku, uzeće se u obzir uticaj korišćenja radova od strane Investitora na performanse i ostale karakteristike radova. Kada se dobiju povoljni rezultati ispitivanja Radova ili sekcije na završetku predviđenih u pod (a), (b) ili (c), Izvođač podnosi Investitoru ovjereni izvještaj o rezultatima tih ispitivanja.

9.2 Kašnjenje ispitivanja

Ukoliko dođe do neopravdanog kašnjenja ispitivanja na završetku krivicom Investitora, primjenjuje se podklazula 7.4 *(Ispitivanje*) (stav pet) i/ili podklauzula 10.3 (*Ometanje ispitivanja na završetku)*.

Ukoliko dođe do neopravdanog kašnjenja ispitivanja na završetku krivicom Izvođača, Investitor ima pravo da zahtijeva od Izvođača da izvrši ispitivanje u roku od 21 dan od prijema zahtjeva. Izvođač se obavezuje da ispitivanje izvrši na dan ili u dane koje Investitor bude odredio i saopštio izvođaču.

Ukoliko Izvođač ne izvrši ispitivanja na završetku u roku od 21 dan, osoblje Investitora može da pristupi ispitivanju na rizik i o trošku Izvođača. U tom slučaju će se smatrati da su ispitivanja izvršena u prisustvu Izvođača i rezultati ispitivanja se prihvataju kao tačni.

9.3 Ponovno ispitivanje

Ukoliko se dobiju nepovoljni rezultati ispitivanja Radova ili sekcija na završetku, važi podklauzula 7.5 (*Odbijanje*) i Investitor ili izvođač ima pravo da zahtijeva ponovna ispitivanja pod istim uslovima.

9.4 Nepovoljni rezultati ispitivanja na završetku

Ukoliko se dobiju nepovoljni rezultati ispitivanja Radova ili sekcije na završetku u skladu sa podklauzulom 9.3 (*Ponovno ispitivanje*), Investitor ima pravo da:

(a) naloži dalje ispitivanje na završetku u skladu sa podklauzulom 9.3;

(b) ako nepovoljni rezultat Investitoru bitno uskraćuju korist od radova ili sekcije, odbije radove ili sekciju (zavisno od slučaja), u kom slučaju Investitor ima puna prava koja su predviđena pod tačkom (c) podklauzule 11.4 (*Neotklanjanje nedostataka*); ili

(c) izda potvrdu o prijemu na zahtje Investitora.

U slučaju iz tačke (c), Izvođač nastavlja da postupa u skladu sa svim ostalim ugovornim obavezama, a ugovorna cijena se umanjuje za iznos koji odgovara umanjenju vrijednosti za Investitora zbog nepovoljnih rezultata ispitivanja. Ukoliko relevantno umanjenje zbog nepovoljnih rezultata nije navedeno (ili način njegovog obračuna nije definisan) u Ugovoru, Investitor može da zahtijeva da se umanjenje (i) sporazumno utvrdi i isplati prije izdavanja Potvrde o predaji, ili (ii) utvrdi i isplati u skladu sa podklauzulom 2.5 (Potraživanje Investitora) i podklauzulom 3.5 (*Utvrđivanja*).

10. Prijem od strane Investitora

10.1 Prijem radova i sekcija

Osim u slučajevima iz podklauzule 9.4(*Nepovoljni rezultati ispitivanja na završetku*), Investitor prima radove kada (i) radovi budu završeni u skladu sa ugovorom, uključujući stvari opisane u podklauzuli 8.2 (*Rok za završetak radova*) i osim onog što je dozvoljeno pod tačkom (a) u daljem tekstu, i (ii) izda Potvrdu o završetku Radova, ili se Potvrda smatra izdatom u skladu sa ovom podklauzulom.

Izvođač ima pravo da Investitoru podnese zahtjev za izdavanje Potvrde o prijemu najmanje 14 dana prije nego što će po mišljenju Izvođača Radovi biti završeni i spremni za prijem. Ako su Radovi podijeljeni na sekcije, Izvođač ima isto tako pravo da podnosi zahtjev za izdavanje Potvrde o prijemu za svaku sekciju pojedinačno.

Investitor se obavezuje da u roku od 28 dana od prijema zahtjeva Izvođača:

(a) izda Izvođaču Potvrdu o prijemu, sa naznakom datuma završetka Radova ili sekcije u skladu sa Ugovorom, bez sitnijih preostalih radova, i nedostataka koji neće bitno uticati na korišćenje Radova ili sekcije u predviđene svrhe (sve dok se takvi radovi ne obave ili nedostaci otklone); ili

(b) odbije zahtjev sa obrazloženjem i naznakom radova koje je Izvođač obavezan da izvrši da bi mu se izdala Potvrda o prijemu Radova.

Ukoliko Investitor ne izda Potvrdu o prijemu Radova ili odbije zahtjev Izvođača u roku od 28 dana, i ako su Radovi ili sekcije (zavisno od slučaja) bitno u skladu sa Ugovorom, Potvrda o prijemu smatra se izdatom poslednjeg dana tog roka.

10.2 Prijem dijelova Radova

Djelovi Radova (osim sekcija) neće biti preuzeti ili korišćeni od strane Investitora, osim ako to nije naglašeno u Ugovoru ili usaglašeno od obje Strane.

10.3 Ometanje ispitivanja na završetku

Ukoliko je izvođaču onemogućeno da nastavi sa ispitivanjima na završetku duže od 14 dana i to krivicom Investitora, Izvođač ima pravo da nastavi sa ispitivanjima što je prije izvodljivo.

Ako Izvođač bude kasnio i/ili izložen troškovima zbog takvog kašnjenja u vršenju ispitivanja na završetku, Izvođač o tome obavještava Investitora, pri čemu ima pravo u skladu sa podklauzulom 20.1 (*Potraživanja Izvođača*), na:

(a) produženje roka srazmjerno zakašnjenju, ako završetak kasni ili će kasniti, u skladu sa podklauzulom 8.4 (*Produženje roka za završetak*), i

(b) naknadu takvih troškova sa primjerenom dobiti, što se uključuje u ugovornu cijenu.

Po prijemu tog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) u cilju saglašavanja ili utvrđivanja tih stvari.

11. Odgovornost za nedostatke

11.1 Završetak preostalih radova i otklanjanje nedostataka

Da bi se Radovi i Dokumentacija Izvođača, kao i svaka sekcija, doveli u stanje predviđeno Ugovorom (uzevši u obzir normalno habanje) do isteka roka za prijavljivanje nedostataka ili što je moguće prije toga, Izvođač se obavezuje da:

(a) završi sve radove koji nisu bili završeni do dana navedenog u Potvrdi o prijemu u razumnom roku određenom od strane Investitora, i

(b) izvede sve radove koji su potrebni za otklanjanje nedostataka ili oštećenja prijavljenih od strane Investitora (ili u njegovo ime) prije ili na dan isteka roka za prijavljivanje nedostataka Radova ili sekcija (zavisno od slučaja).

Ako se pojavi nedostatak ili nastane oštećenje, Investitor obavještava Izvođača u tom smislu.

11.2 Troškovi otklanjanja nedostataka

Sav Rad predviđem pod tačkom (b) podklauzule 11.1 (*Završetak preostalih radova i otklanjanje nedostataka*) izvodi se na rizik i o trošku Izvođača ako je potreban zbog:

(a) projekata Radova,

(b) postrojenja, materijala ili izrade koji nisu u skladu sa Ugovorom,

(c) nepravilne eksploatacije ili održavanja zbog stvari za koje je Izvođač odgovoran (na osnovu podklauzule 5.5 do 5.7 ili po nekom drugom osnovu), ili

(d) neizvršavanja bilo koje obaveze Izvođača.

Ako se potreba za takvim radom može pripisati nekom drugom uzroku, Investitor se obavezuje da o tome Izvođača odmah obavijesti i primjenjuje se podklauzula 13.3(*Postupak izmjene*).

11.3 Produženje roka za prijavljivanje nedostataka

Investitor ima pravo u skladu sa podklauzlom 2.5 (*Potraživanja Investitora*) na produženje roka za prijavljivanje nedostataka Radova ili sekcija, ako se poslije prijema ustanovi da se Radovi, neke sekcije ili bitan dio postrojenja (zavisno od slučaja) ne može koristiti u predviđene svrhe zbog nedostatka ili oštećenja. Međutim, rok za prijavu nedostataka ne može da se produži za više od dvije godine.

Ako je isporuka i/ili izgradnja nekog postrojenja i/ili materijala obustavljena u skladu sa podklauzulom 8.8 (*Obustava Radova*) ili podklauzulom 16.1 (*Pravo Izvođača na obustavu Radova)*, obaveze Izvođača predviđene ovom klauzulom ne važe za nedostatke ili oštećenja

koja nastanu više od dvije godine po isteku roka za prijavljivanje nedostataka postrojenja i/ili materijala.

11.4 Neotklanjanje nedostataka

Ako Izvođač ne otkloni bilo koji nedostatak ili oštećenje u razumnom roku, Investitor ima pravo da odredi (ili da to neko drugi učini u njegovo ime), rok za otklanjanje tog nedostatka ili oštećenja.

Ako Izvođač ne otkloni nedostatak ili oštećenje u novopostavljenom roku, a što je trebalo da se uradi o trošku izvođača u skladu sa podklauzulom 11.2 (*Troškovi otklanjanja nedostataka*), Invesitor ima prava (po sopstvenom nahođenju) da:

(a) sam otkloni nedostatak ili oštećenje ili da to neko drugi učini na odgovarajući način i o trošku Izvođača, s tim što Izvođač ne snosi nikakvu odgovornost za takav rad, a Izvođač se obavezuje u skladu sa podklauzilom 2.5 (*Potraživanja Investitora*) da Investitoru nadoknadi u razumnoj mjeri troškove koje je imao u vezi otklanjanja nedostataka ili oštećenja;

(b) potvrđuje ili određuje primjeren odbitak od ugovorene cijene u skladu sa podklauzulom 3.5 (*Utvrđivanja*); ili

(c) ukoliko ubog nedostataka ili oštećenja Investitoru bude uskraćena puna korist od Radova ili bitnog dijela Radova, raskine ugovor u cjelini ili u dijelu koji se odnosi na pomenuti bitan dio koji se ne može privesti svojoj namjeni. Investitor pri tom ima pravo na povraćaj iznosa plaćenih za Radove ili dio istih (zavisno od slučaja), sa zateznom kamatom i troškova demontaže, raščišćavanja gradilišta i vraćanja postrojenja i materijala Izvođaču, bez uticaja na njegova sva ostala prava po Ugovoru ili po nekom drugom osnovu.

11.5 Odstranjivanje Radova sa nedostacima

Ako ekspeditivno otklanjanje nedostataka ili oštećenja nije moguće na gradilištu, Izvođač može da uz saglasnost Investitora sa gradilišta odstrani djelove postrojenja koji imaju nedostatke ili su oštećeni. Kao uslov za izdavanje te saglasnosti, od Izvođača se može zahtijevati da poveća iznos garancije za dobro izvršenje posla za cijenu potpune zamjene ovih stvari ili da plati orgovarajuću kauciju.

11.6 Dalja ispitivanja

Ako rad na otklanjanju bilo kakvog nedostatka ili oštećenja može da utilče na performanse Radova, Investitor ima pravo da zahtijeva da se ponovi bilo koje ispitivanje koje je Ugovorom predviđeno, uključujući i ispitivanja na završetku i/ili ispitivanja poslije završetka. Zahtjev se podnosi u roku od 28 dana od otklanjanja nedostataka ili oštećenja.

Ova isitivanja se vrše pod istim uslovima kao i predhodna ispitivanja, s tom razlikom što se vrše na rizik i o trošku odgovorne strane u skladu sa podklauzilom 11.2 (*Troškovi otklanjanja nedostataka).*

11.7 Pravo pristupa

Sve do izdavanja Potvrde o dobrom izvršenju posla, Izvođač ima pravo pristupa svim djelovima Radova i evidenciji o eksploataciji i performansama Radova, uz ograničenje koje iziskuju Investitorove mjere bezbjednosti.

11.8. Obaveza Izvođača da istražuje

Na zahtjev Investitora, Izvođač se obavezuje da istraži uzroke bilo kog nedostatka po uputstvima Investitora. Ukoliko troškovi otklanjanja nedostataka ne idu na teret Izvođača u skladu sa podklauzulom 11.2 (*Troškovi otklanjanja nedostataka*), troškovi istraživanja sa primjerenom dobiti potvrđuje ili utvrđuje Invesitor u skladu sa podklauzulom 3.5 (*Utvrđivanja*) i oni se uključuju u ugovornu cijenu.

11.9 Potvrda o dobrom izvršenju posla

Izvršavanje obaveza Izvođača ne može se smatrati završenim sve dok Investitor ne izda Izvođaču Potvrdu o dobrom izvršenju posla, naznačavajući datum kada je Izvođač izvršio svoje ugovorne obaveze.

Invesitor se obavezuje da izda Potvrdu o dobrom izvršenju posla u roku od 28 dana od isteka poslednjeg roka za prijavljivanje nedostataka ili nakon toga, kada Izvođač podnese dokumentaciju Izvođača i završi i ispita sve Radove, uz otklanjanje eventualnih nedostataka. Ukoliko Investitor ne izda Potvrdu o dobrom izvršenju posla:

(a) smatraće se da je Potvrda o dobrom izvršenju posla izdata na dan nakon 28 dana od dana kada je trebala da bude izdata, u skladu sa ovom podklauzulom, i

(b) podklauzula 11.11 (*Raščišćavanje gradilišta*) i podparagraf (a) podklauzule 14.1 (*Prestanak odgovornosti Investitora*) neće važiti.

Isključivo se Potvrda o dobrom izvršenju posla smatra dokazom prihvatanja Radova.

11.10 Neizvršene obaveze

Po izdavanju Potvrde o dobrom izvršenju posla, svaka strana ostaje odgovorna za izvršavanje svake do tada neizvršene obaveze. Za potrebe utvrđivanja prirode i obima neizvršenih obaveza Ugovor se još uvijek smatra pravosnažnim.

11.11 Raščišćavanje gradilišta

Izvođač se obavezuje da po prijemu Potvrde o dobrom izvršenju posla sa gradilišta odstrani svu preostalu opremu izvođača, višak materijala, ruševine, smeće i privremene radove.

Ukoliko se pomenute stvari ne odstrane u roku od 28 dana od prijema primjerka Potvrde o dobrom izvršenju posla od strane Investitora, Investitor ima pravo da proda ili na drugi način odstrani sve preostale stvari. Investitor ima pravo na naknadu troškova kojima je bio izložen u vezi prodaje ili odstranjivanja tih stvari i vraćanje gradilišta u pređašnje stanje.

Eventualna razlika od prodaje isplaćuje se izvođaču. Ako je takav iznos manji od troškova Investitora, Izvođač se obavezuje da razliku isplati Investitoru.

12. Ispitivanje poslije završetka

12.1. Postupak ispitivanja poslije završetka

Ukoliko su ispitivanja poslije završetka predviđena Ugovorom, važi ova klauzula. Ukoliko drugačije nije predviđeno posebnim uslovima:

a.) Investitor se obavezuje da obezbijedi električnu energiju, gorivo i materijale i stavi na raspolaganje osoblje i postrojenje;

b.) Izvođač se obavezuje da obezbijedi ostala postrojenja, opremu i stručno i iskusno osoblje za efikasno vršenje ispitivanja poslije završetka; i

c.) Izvođač se obavezuje da ispitivanje poslije završetka izvrši u prisustvu osoblja Investitora i/ili Izvođača koje bude tražila bilo koja strana.

Ispitivanje poslije završetka vrši se što je moguće prije po prijemu Radova ili sekcije od strane Investitora. Insvestitor obavještava Izvođača najmanje 21 dan unaprijed o datumu poslije kojeg će se vršiti ispitivanje poslije završetka. Ukoliko ne bude drugačije dogovoreno, ispitivanje se vrši u roku od 14 dana od pomenutog datuma, i to na dan ili u dane koje Investitor bude odredio. Obje strane vrše kompilaciju i procjenu rezultata ispitivanja poslije završetka i pripremaju detaljan izvještaj. U obzir se uzima uticaj prethodnog korišćenja Radova od strane Investitora.

12.2. Kašnjenje ispitivanja

Ukoliko Izvođač bude izložen troškovima zbog toga što je Investitor neopravdano prouzrokovao kašnjenje ispitivanja po završetku, Izvođač (i) obavještava Investitora i (ii) ima pravo shodno podklauzuli 20.1 (*Potraživanje Izvodjača*) na naknadu tih troškova sa primjerenom dobiti, što se uključuje u ugovornu cijenu.

Po primjemu pomenutog obavještenja Investitor postupa u skladu da podklauzulom 3.5. (*Utvrđivanja*) radi potvrđivanja ili utvrđivanja tih troškova i dobiti.

Ako bez krivice Izvođača ne bude moguće izvršavanje nekog ispitivanja po završetku na Radovima ili nekoj sekciji u roku za prijavljavanje nedostataka (ili u nekom drugom dogovorenom roku), smatraće se da su dobijeni povoljni rezultati ispitivanja Radova ili sekcija.

12.3. Ponovno ispitivanje

Ako se ne dobiju povoljni rezultati ispitivanja posle završetka Radova ili neke sekcije

a.) primjenjuje se tačka (b) podklauzule 11.1. (završetak preostalih radova i otklanjanje nedostataka), i

b.) svaka strana ima pravo da traži ponovno ispitivanje i ispitivanje nakon završetka, pod isptim uslovima

Ako se nepovoljni rezultati i ponovno ispitivanje mogu pripisati bilo kojoj stvari navedenoj pod tačkama (a) do (d) podklauzule 11.2. (*Troškovi otklanjanja nedostataka*) i izlože Investitora dodatnim troškovima, Izvođač se obavezuje da u skladu sa podklauzulom 2.5. (*Potraživanje Investitora)* Investitoru nadoknadi te troškove.

12.4. Nepovoljni rezultati ispitivanja poslije završetka

U slučaju da:

a.) se dobiju nepovoljni rezultati ispitivanja poslije završetka Radova ili neke sekcije,

b.) je navedeno u Ugovoru relevantan iznos koji je plativ kao obeštećenje za nepovoljne rezultate (ili je način njegovog obračuna definisan) i

c.) Izvođač isplati takav relevantan Iznos investitoru u roku za prijavljivanje nedostataka,

Smatra se da su dobijeni povoljni rezultati tih ispitivanja poslije završetka Radova ili sekcija.

Ako se dobiju nepovoljni rezultati ispitivanja Radova ili neke sekcije i Izvođač predloži korekcije ili izmjene Radova ili sekcije, Investitor može (ili neko drugi u njegovo ime) da saopšti Izvođaču da mu se ne može dati pravo pristupa Radovima ili sekciji sve dok to ne bude odgovaralo Investitoru. Izvođač zatim ostaje u obavezi da izvrši korekcije ili izmjene u cilju postizanja povoljnih rezultata, i to u razumnom roku od prijema obavještenja od Investitora (ili u njegovo ime) o vremenu koje odgovara Investitoru. Međutim, ako Izvođač ne primi to obavještenje u relevantnom roku za prijavljivanje nedostataka, Izvođač se oslobađa te obaveze i smatraće se da su ispitivanja Radova ili sekcija (zavisno os slučaja) dala povoljne rezultate ispitivanja poslije završetka.

Ako Izvođač bude izložen dodatnim troškovima zbog Investitorovog neopravdanog kašnjenja u davanju Izvođaču prava pristupa Radovima ili postrojenju, bilo radi istraživanja uzroka nepovoljnih rezultata ispitivanja poslije završetka ili radi vršenja korekcija ili izmjena, Izvođač (i) to saopštava Investitoru i (ii) ima pravo shodno podklauzuli 20.1. (*Potraživanje Izvođača*) na naknadu takvihh troškova i primjerenu dobit, što se uključuju u ugovornu cijenu.

Po prijemu takvog obavještenja, Investitor će postupiti u skladu sa podklauzulom 3.5. (*Utvrđivanja*) radi potvrđivivanja ili utvrđivanja tih troškova i dobiti.

13. Izmjene i korekcije

13.1. Pravo na izmjene

Investitor ima pravo da inicira izmjene bilo kada prije izdavanja Potvrde o prijemu Radova, bilo davanjem upustva ili nalaganja Izvođaču da podnese predlog. Izmjena ne podrazumijeva izuzeće bilo kakvih radova koje izvode druga lica.

Izvođač se obavezuje da izvrši svaku izmjenu i da se nje pridržava, ukoliko odmah ne saopšti Investitoru (sa obrazloženjem) da (i) Izvođač ne može brzo da nabavi robu potrebnu za vršenje izmjene, (ii) da će to umanjiti bezbijednost ili podobnost Radova, ili (iii) da će se to loše odraziti na garancije kvaliteta. Po prijemu takvog saopštenja, Investitor poništava, potvrđuje ili mijenja nalog.

13.2. Tehnika vrednovanja

Izvođač ima pravo da u svako doba Investitoru podnese predlog u pisanoj formi koji bi, po Izvođačevom mišljenju, ako bi bio usvojen, (i) ubrzao završetak, (ii) smanjio troškove investitora vezane za izvođenje, održavanje i eksplataviju Radova, (iii) povećao efikasnosti ili vrijednost završenih Radova u korist Investitora ili (iv) bio od koristi Investitoru na neki drugi način.

Predlog se priprema o trošku Izvođača i sadrži stavke navedene u podklauzuli 13.3 (*Postupak Izmjene*).

13.3 Postupak izmjene

Ako Investitora zahtijeva predlog prije davanja naloga za neku izmjenu, Izvođač se obavezuje da odgovori u što je moguće kraćem roku u pisanoj formi, navodeći razloge zbog kojih ne može da udovolji tom zahtjevu (ako je to slučaj) ili podnošenjem:

(a) opisa predloženog projekta i/ili radova koje ni trebalo izvesti i programa njihovog izvođenja,

(b) Izvođaćevog predloga u vezi potrebnih izmjena programa u skladu sa podklauzulom 8.3 (Termin plan) i rokom za završetak, i

(c) Izvođačevog predloga za korekciju ugovorene cijene.

Investitor se obavezuje da u što je moguće kraćem roku po prijemu takvog predloga odgovori u skladu sa podklauzulom 13.2 (*Tehnika vrednovanja*) u vidu odobrenja, odbijanja ili primjedbi. Izvođač ne može da odloži bilo kakav rad u očekivanju odgovora.

Investitor izdaje Izvođaču nalog za vršenje bilo koje izmjene sa uslovima za evidentiranje troškova, pri čemu je izvođač obavezan da potvrdi prijem.

Po nalaganju ili odobravanju neke izmjene, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi odobravanja ili utvrđivanja korekcija ugovorne cijene i cjenovnika. Korekcije uključujući primijenjenu dobit i uzimaju u obzir Izvođačeve eventualne podneske iz podklauzule.

13.4 Plaćanje u primjenljivim valutama

Ukoliko je Ugovorom predviđeno isplaćivanje ugovorne cijene u više valuta, kad god se korekcija dogovori, odobri ili utvrdi kako je ranije rečeno, preciziraju se iznosi plativi u svakoj primjenjivoj valuti pojedinačno. U te svrhe se navode stvarne ili očekivane valutne razmjerne cijene izmijenjenih radova i razmjere valuta predviđenih za isplaćivanje ugovorne cijene.

13.5 Okvirne sume

Svaka okvirna suma se koristi, u cjelini ili djelimično, u skladu sa nalozima Investitora i ugovorna cijena se koriguje shodno tome. Ukupan iznos koji se isplaćuje Izvođaču uključuje samo te iznose za rad, isporuke i usluge na koje se okvirna suma odnosi, a po nalogu Investitora. Investitor ima pravo da za svaku okvirnu sumu odredi:

(a) radove (sa postrojenjem, materijalima i uslugama) koje bi Izvođač trebalo da izvede i vrijednost u skladu sa podklauzulom 13.3 (*Postupak izmjene*); ili

(b) postrojenje, materijale i usluge koje kupuje Izvođač, a koji se uključuju u u ugovnu cijenu manje od prvobitne okvirne sume:

(i) stvarno plaćene iznose (ili plative) od strane Izvođača, i

(ii) iznos za režijske troškove i dobit koji je obračunat kao procenat tih stvarnih iznosa primjenom relevantne procentne stope (eventualne) navedene u Ugovoru.

Izvođač se obavezuje da na zahtjev Investitora podnese ponude, fakture, potvrde i obračune ili priznanice kao dokaz.

13.6 Dodatni radovi

U slučaju sitnijih ili sporednih radova, Investitor može da naloži izvođenje sa plaćanjem po satu. Rad se zatim obračunava u skladu sa cjenovnikom za dodatne radove koji je priložen uz Ugovor i postupa se kako slijedi. Ukoliko cjenovnik dodatnih radova nije priložen uz Ugovor ova podklauzula ne važi.

Izvođač se obavezuje da prije naručivanja robe Investitoru podnese ponude. Uz zahtjev za isplatu, Izvođač mora da podnese fakture, potvrde i obračune ili priznanice za svu robu.

Osim u slučaju stavki dodatih radova koje nisu dospjele za plaćanje, Izvođač se obavezuje da Investitoru svakodnevno podnosi tačne izvještaje u dva primjerka koji sadrže sledeće pojedinosti o resursima korišćenim u radovima prethodnog dana:

(a) imena, zanimanja vrijeme osoblja Izvođača,

(b) oznaku, vrstu i vrijeme opreme i privremenih radova Izvođača, i

(c) količine i vrste korišćenih postrojenja i materijala.

Investitor potpisuje jedan primjerak svakog izvještaja, ako je tačan ili odobren, i vraća ga Izvođaču. Izvođač zatim podnosi Investitoru iskalkulisane izvještaje o tim sredstvima prije njihovog uključivanja u naredni izvještaj u skladu sa podklauzulom 14.3 (*Zahtjev za izdavanje privremene situacije*).

13.7 Korekcije zbog izmjena u zakonskim propisima

Korekcija ugovorene cijene vrši se radi njenog usaglašavanja sa povećanjima ili smanjenjima troškova nastalih zbog izmneja u zakonskim propisima Zemlje (donošenje novih propisa ili ukidanje ili izmjene i dopune postojećih propisa) ili u zvaničnim tumačenjima takvih zakonskih propisa objavljenim poslije Osnovnog datuma, a koji utiču na izvršavanje ugovornih obaveza.

Ukoliko Izvođač bude kasnio (ili će kasniti) i/ili bude (ili će biti) izložen dodatnim troškovima zbog izmjena u zakonskim propisima ili takvim tumačenjima nastalih posle Osnovnog datuma, on o tome obavještava Investitora i ima pravo shodno podklauzuli 20.1 (*Potraživanja Izvođača*) na:

(a) produženje roka zbog takvog kašnjenja, ako se kasni sa završetkom ili će se kasniti, u skladu sa podklauzulom 8.4 (*Produženje roka za završetak*), i

(b) naknadu takvih troškova, što se uključuje u ugovornu cijenu.

Po prijemu takvog obavještenja, Investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) radi potvrđivanja ili utvrđivanja tih stvari.

13. 8 Korekcije zbog izmjene u troškovima

Ukoliko je ugovorna cijena korigovana za povećanje ili smanjenje cijena radne snage, robe i ostalih inputa za Radove, korekcija će biti računata u skladu sa odredbama Posebnih uslova.

14. Ugovorna cijena i plaćanje

14.1 Ugovorna cijena

Ako drugačije nije predviđeno Posebnim uslovima:

(a) plaćanje za Radove predstavlja ukupni prihvaćeni iznos koji podliježe korekcijama u skladu sa Ugovorom.

(b) Izvođač se obavezuje da plaća sve takse, carine i dažbine koje je po ugovoru obavezan da plaća, te se ugovorna cijena ne može korigovati zbog tih izdataka,

osim u slučaju koji je predviđen podklauzulom 13.7 (*Korekcije zbog izmjena propisa*).

14.2 Avansno plaćanje

Investitor se obavezuje da vrši avansno plaćanje u vidu beskamatnog zajma za pripremne radove i projektovanje kada Izvođač podnese garanciju u skladu sa ovom podklauzulom. Uključujući detalje navede u Posebnim uslovima. Ukoliko Posebni uslovi ne predvidjaju:

(a) iznos avansa, ova podklauzula ne važi,

(b) broj i vrijeme isplate tranši, onda će postojati samo jedna,

(c) primjenljive valute and proportions, one će biti one u kojima je ugovorna cijena plativa, i/ili

(d) amortizaciona stopa povraćaja, će biti obračunata dijeljenjem ukupnog iznosa avansa sa ugovornom cijenom koja je navedena u Ugovoru i umanjena za okvirne sume.

Investitor se obavezuje da plati prvu tranšu nakon prijema (i) Izvještaja (u skladu sa podklauzulom 14.3 (*Zahtjev za izdavanje privremene situacija*)), (ii) Garancije za dobro izvršenje posla u skladu sa podklauzulom 4.2 (*Garancija za dobro izvršenje posla*) i (iii) garanciju u iznosima i valutama koje odgovaraju iznosu avansnog plaćanja. Ta se garancija izdaje uz saglasnost Investitora u pogledu izdavača i zemlje u kojoj se nalazi njegovo sjedište, i to u formi predviđenoj Posebnim uslovima ili nekoj drugoj formi sa kojom je Investitor saglasan.

Izvođač se obavezuje da se postara o tome da garancija bude na snazi i primjenljiva do povraćaja avansa, s tim što se njen iznos može progresivno smanjivati za iznose vraćene od strane Izvođača. Ako je uslovima garancije predviđen datum isteka njene važnosti, ii avans ne bude vraćen 28 dana prije tog datuma, izvođač se obavezuje da produži važnost garancije do povraćaja avansa.

Povraćaj avansa vrši se putem procentualnih odbijanja navedenih u situacijama. Odbici se vrše po amortizacionoj stopi koja je navedena u Posebnim uslovima (ili, ako nije navedena, u skladu sa gore navedenim podparagrafom (d)), koja će se primjenjivati i na preostali dospjeli iznos (bez avansa, odbitka i povraćaja garantnog depozita), sve do povraćaja avansa.

Ukoliko se povraćaj avansa ne izvrši do izdavanja Potvrde o prijemu Radova ili prije raskida u skladu sa klauzulom 15 (*Raskid od strane Investitora*), klauzulom 16 (*Obustava ili raskid od strane Izvođača*) ili klauzulom 19 (*Viša sila)* (zavisno od slučaja), cjelokupna neisplaćena razlika odmah dospijeva i biva plativa Investitoru od strane Izvođača.

14.3 Zahtjev za izdavanje privremenih situacija

Izvođač se obavezuje da Investitoru podnese Izvještaj u šest primjeraka po isteku ugovornog perioda plaćanja (ako taj period nije naveden, na kraju svakog mjeseca) u formi odobrenoj od strane Investitora, u kojoj su precizirani iznosi na koje Izvođač smatra da ima pravo, i sa

pratećom dokumentacijom, uključujući i relevantni izvještaj o napredovanju radova u skladu sa podklauzulom 4.21 (*Izvještaj o napredovanju radova*).

Izvještaj sadrži sledeće stavke, po potrebi, koje se izražavaju raznim valutama u kojim je ugovorena cijena plativa, po navedenom redosledu:

(a) procijenjena ugovorna vrijednost izvedenih Radova i Izvođačeva dokumentacija izrađena do kraja mjeseca (uključujući izmjene, ali bez stavki navedenih pod tačkama (b) do (g));

(b) iznosi koji se dodaju ili odbijaju zbog promjena propisa ili promjena u troškovima, u skladu sa podklauzulom 13.7 (*Korekcije zbog izmjene zakonskih propisa*) i podklauzulom 13.8 (*Korekcije zbog izmjene u troškovima*);

(c) iznos koji se odbija za garantni depozit, a koji se obračunava primjenom procenta garantnog depozita koji je naveden u Posebnim uslovima, sve dok tako zadržani iznosi od strane Investitora ne dostignu granicu (eventualnog) garantnog depozita iz Posebnih uslova;

(d) Iznosi koji se dodaju ili dobijaju za avansno plaćanje i povraćaje u skladu sa podklauzulom 14.2 (*Avansno plaćanje*);

(e) Ostali dodaci ili odbici koji dospijevaju po Ugovoru ili nečem drugom, uključujući i one iz klauzule 20 (*Potraživanja, Sporovi i Arbitraže*); i

(f) Odbitak iznosa potvrđenih u predhodnom Izvještaju.

14. 4 Vremenski raspored plaćanja

Ako Ugovor sadrži Vremenski raspored plaćanja u kojem se preciziraju tranše u kojima se ugovorna cijena plaća, ukoliko nije drukčije predviđeno Vremenskim rasporedom plaćanja:

(a) tranše navedene u Vremenskom rasporedu predstavljaju procjene ugovorne vrijednosti u smislu tačke (a) podklauzule 14.3.(*Zahtjev za izdavanje privremenih situacija*), i podklauzule 14.5 (*Oprema i materijali za radove*); i

(b) ako ove rate nisu definisane sa pozivom na stvarno napredovanje radova i ako se utvrdi da je stvarno napredovanje manje od onog na kojem je Vremenski raspored plaćanja zasnovan, Investitor ima pravo da postupi u skladu sa podklauzulom 3.5 (*Utvrđivanja)* da bi se saglasio ili odredio izmijenjene rate, uzimajući u obzir mjeru u kojoj je stvarno napredovanje manje od onog na kojem su ranije tranše bile zasnovane.

Ako Ugovor ne sadrži Vremenski raspored plaćanja, Izvođač podnosi ne obavezujuće procjene plaćanja koje, po njemu, dospijevaju tromjesečno. Prva procjena se podnosi u roku od 42 dana od Datuma početka. Izmijenjene procjene se podnose tromjesečno, sve dok ne bude izdata Potvrda o prijemu radova.

14.5 Oprema i materijali za radove

Iako Izvođač ima pravo, u skladu sa Ugovorom, na garantni depozit za postrojenja i materijale koji još nisu na gradilišu, Izvođač neće imati pravo na ova plaćanja osim ako:

(a) su relevanta postrojenja i materijali u Zemlji i označena su kao vlasništvo Investitora u skladu sa Investitorovim instrukcijama; ili

(b) je Izvođač dostavio Investitoru dokaz o osiguranju i bankarsku garanciju u formi i izdatu od organa koji je odobren od strane Investitora, u vrijednosti i valuti koje su jednake takvnom iznosu. Ova garancija mora biti u istoj formi kao što je forma navedena u podklauzuli 14.12 (*Avansno plaćanje*) i važiće dok su postrojenja i materijali propisno uskladišteni na gradilištu i zaštićeni od gubljenja, oštećenja ili propadanja.

14.6 Izdavanje privremenih situacija

Nikakav iznos se ne može isplatiti prije nego što Investitor primi i odobri Garanciju za dobro izvršenje posla. Investitor se nakon toga obavezuje da u roku od 28 dana od prijema Izvještaja i prateće dokumentacije, izda Izvođaču obavještenje o bilo kom pitanju iz Izvještaja sa kojim Investitor nije saglasan, sa pratećim podacima. Plaćanje ne može biti uskraćeno , osim ako:

(a) ako bilo koja isporuka ili rad izveden od strane Izvođača ne bude u skladu sa Ugovorom, naknada troškova ispravke ili zamjene može biti uskraćena sve do završetka ispravke ili zamjene, i/ili

(b) ako Izvođač nije obavio bilo kakav rad ili izvršio bilo koju svoju ugovornu obavezu i o tome bio upozoren od strane Investitora, isplata vrijednosti takvog rada ili obaveze može se uskratiti sve dok se takav rad ne obavi ili takva obaveza ne izvrši.

Investitor ima pravo da, do bilo kog plaćanja, izvrši korekciju ili izmjenu koja je trebalo da bude izvršena u predhodnoj situaciji. Plaćanje se ne može smatrati kao da odražava prihvatanje, odobravanje, saglasnost ili zadovoljstvo Investitora.

14.7 Vrijeme plaćanja

Ukoliko drugačije nije predviđeno podklauzulom 2.5 (*Potraživanja Investitora*), Investitor se obavezuje da isplati Izvođaču:

(a) prvu tranšu akontacije u roku od 42 dana od dana stupanja na snagu Ugovora ili 21 dan po prijemu dokumentacije u skladu sa podklauzulom 4.2 (*Garancija za dobro izvršenje posla*) i podklauzulom 14.2 (*Avansno plaćanje*), zavisno od poslednje nastalog slučaja;

(b) iznos dospio za svaki dio Izvještaja, osim Završnog Izvještaja, u roku od 56 dana po prijemu Izvještaja i prateće dokumentacije, i

(c) konačni dospjeli iznos, u roku od 42 dana po prijemu Završnog Izvještaja i pisanog razrješenja u skladu sa podklauzulom 14.11 (*Zahjev za okončanu situaciju*) i podklauzule 14.12 (*Razrješenje*).

Uplata dospjelog iznosa u svakoj valuti pojedinačno vrši se na Izvođačev račun u banci u Zemlji plaćanja (u toj valuti) navedenoj u Ugovoru.

14.8 Kašnjenje u plaćanju

Ako Izvođač ne primi uplatu u skladu sa podklauzulom 14.7 (*Vrijeme plaćanja*), izvođač ima pravo na zateznu kamatu na mjesečnom nivou za neisplaćeni iznos tokom perioda kašnjenja.

Ukoliko drugačije nije predviđeno u Posebnim uslovima, zatezna kamata se obračunava po godišnjoj stopi koja je za tri procentna poena viša od eskontne stope centralne banke zemlje u čijoj se valuti vrši isplata, i plaća se u toj valuti.

Izvođač ima pravo na ovu isplatu bez formalnog saopštenja o ovjeri i bez uticaja na bilo koje njegovo drugo pravo ili pravni lijek.

14.9 Isplata garantnog depozita

Kada se izda Potvrda o primopredaji Radova i predviđena ispitivanja (uključujući eventualna ispitivanja poslije završetka radova) daju povoljne rezultate, polovina garantnog depozita će biti isplaćen Izvođaču. Ako se Potvrda o prijemu izdaje za jednu sekciju, odgovarajući procenat prve polovine garantnog depozita se isplaćuje kada se dobiju povoljni rezultati ispitivanja za sekciju.

Odmah po isteku poslednjeg roka za prijavljivanje nedostataka, preostali dio garantnog depozita će biti isplaćen Izvođaču. Ako se Potvrda o prijemu izdaje za jednu sekciju, odgovarajući procenat ostatka garantnog depozita će biti isplaćen Izvođaču odmah po isteku roka za prijavljivanje nedostataka dotične sekcije.

Međutim, u slučaju da još uvijek postoje radovi za izvođenje shodno klauzuli 11 (*Odgovornost za nedostatke*) ili klauzuli 12 (*Ispitivanje poslije završetka radova*), Investitor ima pravo da uskrati potvrdu procijenjenih troškova tih radova do njihovog završetka.

Odgovarajući procenat za svaku sekciju predstavlja procenat vrijednosti sekcije koja je navedena u Ugovoru. Ako procenat vrijednosti sekcije nije naveden u Ugovoru, nikakav procenat bilo koje polovine garantnog depozita ne postaje plativ po ovoj klauzuli u vezi dotične sekcije.

14.10 Izvještaj o završetku

Izvođač se obavezuje da u roku od 84 dana od prijema Potrvde o prijemu Investitoru podnese u šest primjeraka Izvještaj o završetku sa pratećom dokumentacijom, u skladu sa podklauzulom 14.3 (*Zahtjev za izdavanje privremenih situacija*), koji sadrži:

(a) vrijednost radova izvedenih u skladu sa Ugovorom do datuma navedenog u Potvrdi o prijemu Radova;

(b) bilo koje druge iznose koje Izvođač smatra dospjelim;

(c) procjenu bilo kojih drugih iznosa koje Izvođač smatra sebi plativim po Ugovoru. Procijenjeni iznosi se prikazuju posebno u tom Izvještaju o završetku.

Investitor se obavezuje da obavijesti Izvođača u skladu sa podklauzulom 14.6 (*Izdavanje privremenih situacija*) i izvrši plaćanje u skladu sa klauzulom 14.7 (*Vrijeme plaćanja*).

14.11 Zahtjev za okončanu situaciju

Izvođač se obavezuje da u roku od 56 dana od prijema Potvrde o dobrom izvršenju posla, Investitoru podnese u šest primjeraka nacrt završnog izvještaja sa pratećom dokumentacijom u formi odobrenoj od strane Investitora, gdje se prikazuju:

(a) vrijednost svih izvedenih radova u skladu sa Ugovorom, i

(b) svi ostali iznosi na koje Izvođač pretenduje u skladu sa Ugovorom ili po nekom drugom osnovu.

Ako se Investitor ne salasi ili nije u mogućnnosti da ovjeri bilo koji dio nacrta završnog izvještaja, Izvođač podnosi Investitoru sve ostale podatke koje ovaj bude opravdano zatražio i da izvrši izmjene u nacrtu o kojima su se dogovorili. Izvođač zatim priprema i Investitoru dostavlja konačni izvještaj u dogovorenom obliku. Tako dogovoreni izvještaj se u ovim Uslovima pominje kao „Konačni izvještaj“.

Međutim ako se poslije razgovora između Strana i eventualno dogovorenih izmjena u nacrtu završnog izvještaja, utvrdi da postoji spor, Investitor se obavezuje da isplati dogovorene djelove nacrta završnog izvještaja u skladu sa podklauzulom 14.6 (*Izdavanje privremenih situacija*) i podklauzulom 14.7 (*Vrijeme plaćanja*). Nakon toga, ako spor bude konačno riješen u skladu sa podklauzulom 20.4 (*Dobijanje odluke Komisije za rješavanje sporova*) ili podklauzulom 20.5 (*Prijateljsko rješavanje sporova*), Izvođač priprema i Investitoru podnosi Konačni izvještaj.

14.12 Razrješenje

Pri podnošenju Završnog izvještaja, Izvođač se obavezuje da podnese razrješenje u pisanoj formi kojom se potvrđuje da ukupni iznos koji je naveden u Završnom izvještaju pokriva sva potraživanja Izvođača po Ugovoru ili u vezi Ugovora. U razrješenju može da se navede da ono postaje pravosnažno kada Izvođač primi garanciju za dobro izvršenje posla i preostali iznos i to od tog datuma.

14.13 Konačani iznos

U skladu sa podparagrafom (c) podklauzule 14.7 (*Vrijeme plaćanja*), Investitor se obavezuje da Izvođaču isplati iznos koji je dospio za isplatu, umanjen za iznos svih ranijih plaćanja Investitora i bilo koje umanjenje u skladu sa podklauzulom 2.5 (*Potraživanja Investitora*).

14.14 Prestanak odgovornosti Investitora

Investitor nije odgovoran Izvođaču po bilo kom pitanju ili bilo kojoj stvari po Ugovoru ili u vezi Ugovora ili izvođenja radova, osim u mjeri u kojoj je Izvođač uključio iznos isključivo u te svrhe u:

(a) Završnom izvještaju, kao i

(b) Izvještaju po završetku iz podklauzule 14.10 (*Izvještaj po završetku*) (osim po pitanjima ili stvarima posle izdavanja Potvrde o prijemu).

Međutim, ova podklauzula ne ograničava odgovornost Investitora po obavezu obeštećenja ili odgovornosti Investitora u slučaju prevare, namjernog neizvršenja obaveza ili malverzacija od strane Investitora,

14.15 Valute plaćanja

Ugovorna cijena se isplaćuje u valuti ili valutama navedenim u Ugovoru. Ukoliko drugačije nije predviđeno Ugovorom, ako je navedeno više valuta, plaćanje se vrši kako slijedi:

(a) ako je prihvaćeni ugovoreni iznos izražen isključivo u domaćoj valuti:

(i) razmjeri ili iznosi domaćih i stranih valuta i fiksni kursevi razmjene za korišćenje pri obračunu isplata navode se u Ugovoru, osim ako ugovorne strane nisu drugačije dogovorile.

(ii) plaćanja i odijanja na osnovu podklauzule 13.5 (*Okvirna suma*) i podklauzule 13.7 (*Korekcije zbog izmjene zakonskih propisa*) vrše se u odgovarajućim valutama i razmjerama, i

(iii) ostala plaćanja i odbijanja po osnovu stavova (a) do (d) podklauzule 14.3 (*Zahtjev za izdavanje privremenih situacija)* vrše se u valutama i razmjerama navedenim u stavu (a) (i);:

(b) isplata obeštećenja navedenog u Posebnim uslovima vrši se u valutama i razmjerama navedenim u Posebnim uslovima.

(c) Izvođač vrši ostala plaćanja Investitoru u valuti u kojoj je Investitor vršio plaćanja ili u valuti u kojoj se ugovrne strane dogovore;

(d) ako je neki iznos koji je plativ Investitoru od strane Izvođača u određenoj valuti veći od iznosa koji je plativ Izvođaču od strane Investitora u toj valuti, Investitor ima pravo na povraćaj ove razlike iz iznosa koji su inače plativi Izvođaču u drugim valutama; i

(e) ako kursevi razmjene nisu navedeni u Ugovoru, koriste se kursevi centralne banke Zemlje koji su važili na dan Osnovnog datuma.

Raskid od strane investitora

15.1 Opomena za ispravljanje propusta

Ukoliko izvođač ne ispuni bilo koju ugovornu obavezu, investitor može putem obavještenja da traži da ispravi svoj propust u definisanom roku.

15.2 Raskid ugovora od strane investitora

Investitor ima pravo da raskine ugovor, ukoliko izvođač:

a) ne postupi u skladu sa podklauzulom 4.2 (*Garancija za dobro izvršenje posla*) ili putem obavještenja u okviru podklauzule 15.1 (*Opomena za otklanjanje nedostataka*).
b) napusti radove ili na drugi način jasno pokaže namjeru da neće nastavati sa ispunjavanjem obaveza iz ugovora,
c) bez razumnog objašnjenja ne nastavi sa radovima, u skladu sa klauzulom 8 (*Početak, kašnjenje i obustava*)
d) zaključi podugovor za sve radove ili prenese ugovor bez potrebnog dogovora,
e) bankrotira ili postane nesolventan, ode u likvidaciju, ima administrativnu odluku na njegovu štetu, napravi poravnanje sa njegovim povjeriocima ili poslujepod stečajnom upravom, povjerenika ili menadžera, a u korist njegovih povjerioca ili ukoliko se bilo šta učini ili dogodi što (prema važećim zakonima) ima sličan uticaj na bilo koje djelo ili događaj ili
f) preda ili ponudi nekoj osobi (posredno ili neposredno) mito, poklon, napojnicu, nadoknadu ili drugu vrijednu stvar, kao što je podsticaj ili nagrade bilo kojoj osobi:
    i) za činjenje ili nečinjenje u vezi ugovora ili
    ii) za favorizovanje ili nefavorizovanje neke osobe u vezi sa ugovorom,

ili ako je bilo koji izvođačev službenik, zastupnik ili podizvođač preda ili ponudi (posredno ili neposredno) bilo kome takvu vrstupodsticaja ili nagrade, kao što je opisano u ovom podstavu (f). Međutim, zakoniti podsticaji ili nagrade licima koja su zaposlena kod izvođača neće povlačiti za sobom i raskid.

Ukoliko se bilo šta od ovoga dogodi, investitor može da, nakon što izda upozorenje od 14 dana izvođaču, raskine ugovor i odstrani ga sa gradilišta. Međutim, u slučaju podstava e) ili f), investitor može putem obavještena odmah da raskine ugovor.

Odluka investitora da raskine ugovor ne utiče na bilo koja druga prava investitora,koja su predviđena ugovorom ili po nekom drugom osnovu.

Izvođač se zatim obavezuje da napusti gradilište i danadzornom organu preda svu traženu robu, svu dokumentaciju izvođača i drugu projektnu dokumentaciju, koju je on izradio ili koja je izrađena za njega. Međutim, izvođač se obavezuje da odmah postupi u skladu sa nalozima

sadržanim u obavještenju i) u cilju dodjeljivanja bilo kog podugovora i ii) u cilju ili imovine ili bezbednosti radova.

Po raskidu investitor može da završi radove i/ili da to neka druga lica urade za njega. Nakon toga, investitor i ovi subjekti mogu da koriste svu robu, dokumentaciju izvođača i drugu projektnu dokumentaciju koju je izradio izvođač ili koja je izrađena za izvođača.

Investitor zatim obavještava izvođača da će se oprema izvođača i privremeni radovi biti predati izvođaču na gradilištu ili u blizini gradilišta. Izvođač se obavezuje da blagovremeno organizuje njihovo uklanjanje o trošku i na rizik izvođača. Međutim, ukoliko je do ovog trenutka izvođač nije namirio potraživanja investitora, investitor ima pravo da te stvari proda, radi namirivanja svojih potraživanja i da eventualnu razliku isplati izvođaču.

15.3 Vrednovanje na dan raskida

U najkraćem mogućem roku od dana pravosnažnosti otkaza datog u skladu sa podklauzulom 15.2 *Raskid od strane investitora*, investitor postupa u skladu sa podklauzulom 3.5 *Određivanja*, radi odobravanja ili određivanja vrijednosti radova, robe i dokumentacije izvođača i svih ostalih iznosa koji se plaćaju izvođaču za izvršene radove, u skladu sa ugovorom.

15.4 Plaćanje poslije raskida

Po pravosnažnosti otkaza podnijetog u skladu sa podklauzulom 15.2 *Raskid od strane investitora*, investitor može:

a) da postupi u skladu sa podklauzulom 2.5 *Potraživanja investitora*
b) da obustavi dalja plaćanja izvođaču sve dok se ne utvrde svi troškovi koji se odnose na projektovanje, izvođenje, završetak i otklanjanje nedostataka, obeštećenja zbog odlaganja (ukoliko ih ima) i svi ostali troškovi, koje je investitor imao i/ili
c) da naplati od izvođača naknadu za sve gubitke i štetu koje je pretrpeo i troškove koje je imao, a odnose se na završetak radova, od čega se odbija eventualni iznos koji je izvođaču, u okvir podklauzule 15.3 *Vrednovanje na dan raskida*. Nakon što povrati takve gubitke, štete i dodatne troškove, investitor plaća izvođačueventualnu razliku.

15.5 Pravo investitora na raskid

Investitor ima pravo da raskine ugovor u bilo kom trenutku, ukoliko investitor nađe za shodno, tako što daje obaveštenje izvođaču o raskidu. Raskid stupa na snagu 28 dana od podnošenja otkaza izvođaču ili od vraćanja garancije za dobro izvršenje posla izvođaču od strane investitora.Investitor nema pravo da raskine ugovor na osnovu ove podklauzule da bi sam izveo radove ili angažovao nekog drugog izvođača da izvrši radove.

Nakon ovog raskida, izvođač postupa u skladu sa podklauzulom 16.3 *Prestanak radova i odstranjenje* opreme izvođača i njemu se vrši isplata u skladu sa podklauzulom (19.6 *Raskid, plaćanje i oslobađanje po slobodnom izboru*).

OBUSTAVA I RASKID OD STRANE IZVOĐAČA

16.1 Pravo izvođača na obustavu radova

Ukoliko se investitor ne pridržava podklauzule 2.4 *Finansijski aranžmani investitora* ili podklauzulu 14.7 *Plaćanja*, izvođač ima pravo da obustavi radove (ili da uspori izvođenje radova) sve dok ne dobije dokaz o isplati, nakon što obavijesti investitora najmanje 21 dan unaprijed.

Takav postupak izvođača ne utiče na njegovo pravo na obeštećenje zbog kašnjenja, u skladu sa podklauzulom 14.8 (*Kašnjenje u plaćanju*) i raskid, u skladu sa podklauzulom 16.2 *Raskid od strane izvođača*.

Ukoliko izvođač naknadno dobije takav dokaz o isplati (kao što je opisano u odgovarajućoj podklauzuli i u gore navedenom obaveštenju) prije davanja obaveštenja o raskidu, izvođač nastavlja sa uobičajenim radom, što je prije moguće.

Ukoliko izvođač kasni i/ili bude izložen troškovima kao posledice obustave rada (ili usporavanja radova), u skladu sa ovom podklauzulom, izvođač obavještava investitora i ima pravo u skladu sa podklauzulom 20.1 (*Potraživanja izvođača)* na:

(a) produženje roka srazmjerno takvom zakašnjenju, ako se kasni ili će se kasniti u završavanju radova, u skladu podklauzulom 8.4 (*Produženje roka za završetak radova*) i
(b) naknadu takvih troškova uvećanu za primjerenu dobit, što se uključuje u ugovornu cijenu.

Po dobijanju ovakvog obavještenja, investitor postupa u skladu sa podklauzulom 3.5 (*Utvrđivanja*) da radi saglašavanj ili utvrđiavanja tih stvari.

16.2 Raskid od strane izvođača

Izvođač ima pravo da raskine ugovor ukoliko:

(a) izvođač ne dobije valjan dokaz u roku od 42 dana nakon davanja obavještenja u okviru podklauzule 16.1 (*Pravo izvođača na obustavu radova*) u vezi ne postupanja u skladu sa podklauzulom 2.4 (*Finansijski aranžmani investitora*),
(b) izvođač ne dobije iznos u roku od 42 dana nakon isteka roka , koji je naveden u podklauzuli 14.7 (*Plaćanja*) tokom koga treba da se izvrši isplata (osim odbitaka, u skladu sa podklauzulom 2.5 *Potraživanja investitora*)
(c) investitor u značajnoj mjeri ne izvrši svoje obaveze iz ugovora,
(d) se investitor ne pridržava podklauzule 1.7 (*Prenos*)
(e) prolongirana obustava utiče na sve radove, kao što je opisano u podklauzuli 8.11 (*Produžena obustava*), ili
(f) investitor bankrotira ili postane nesolventan, ode u likvidaciju, has a receiving ili administrativnu odluku against him, napravi poravnanje sa povjeriocima ili posluje pod stečajnom upravom, povjerenikom ili menadžera u korist njegovihpovjerilaca ili ukoliko je bilo šta urađeno ili ukoliko se nešto dogodi (u okviru važećih zakona) što ima sličan uticaj na bilo koji od ovih dešavanja ili događaja.

U svakom od događaja ili okolnosti, izvođač može da raskine ugovor, nakon što da obavještenje investitoru 14 dana ranije. Međutim, u slučaju podstava (e) ili (f), izvođač može odmah putem obavještenja da raskine ugovor.

Izbor izvođača da raskine ugovor ne utiče na ostala prava izvođača na osnovu ugovora ili po nekom drugom osnovu.

16.3 Prestanak radova i odstranjenje opreme izvođača

Prekid radova i nakon što obavještenje o raskidu, u skladu sa podklauzulom 15.5 (*Pravo investitora na raskid*), podklauzule 16.2 (*Raskid od strane izvođača*) ili podklauzula 19.6 *Raskid, plaćanje i oslobađanje po slobodnom izboru* stupilo na snagu,izvođač bez odlaganja:

(a) prekida sve dalje radove, osim kada je riječ o radu koji može da naložen od strane investitor radi zaštite lica ili imovine ili bezbjednosti radova,
(b) predaju dokumentaciju izvođača, postrojenje, materijale i druge radove za koje je izvođač primio naknadu, i
(c) odstranjuj sve druge stvari sa gradilišta, izuzev onih koji su neophodni za bezbjednost i napušta gradilište

16.4 Plaćanje po raskidu

Nakon što obavještenje, u skladu sa podklauzulom 16.2 (*Raskid od strane investitora*) stupi na snagu, investitor se obavezuje, da bez odlaganja:

(a) vrati izvođaču garanciju za dobro izvršenje posla,
(b) izvrši plaćanje izvođaču, u skladu sa podklauzulom 19.6 (*Raskid, plaćanje i oslobađanje po slobodnom izboru*), i
(c) izvrši plaćanje izvođaču iznos izgubljene dobiti ili ostalih gubitaka ili štete koju je imao izvođač, kao posledicu ovog raskida.

RIZIK I ODGOVORNOST

17.1 Obeštećenja

Izvođač se obavezuje da obešteti i zaštiti investitora, osoblje investitora i njihove zastupnike u svim slučajevim potraživanja, šteta, gubitaka i troškova (uključujući i sudske troškove) u pogledu:

(a) tjelesne povrede, bolestu ili smrti bilo kojeg lica koje je nastalo kao posledica projekta, izvođenja i završetka radova i otklanjanja nedostataka, ukoliko se to ne može pripisati nemaru, namjernom činu ili kršenju ugovora od strane investitora, zaposlenih kod izvođača ili njihovihzastupnika, i

(b) oštećenje ili gubitak imovine, nepokretne ili lične (osim radova) u mjeri u kojoj je takvo oštećenje ili gubitak:

(i) proisteklo ili je nastalo tokom ili kao posledica projekta, izvođenja i završetka radova i otklanjanja nedostataka, i

(ii) mogu pripisati nemaru, namjernom činu ili kršenju ugovora od strane investitora, osoblja investitora, njihovih zastupnika ili bilo kog drugog lica koje oni zapošljavaju neposredno ili posredno.

Investitor će obeštetiti i štititi izvođača, osoblje izvođača i njihove zastupnike u svim slučajevim potraživanja, šteta, gubitaka i troškova (uključujući sudske troškove) u pogledu: (1) tjelesne povrede, bolesti ili smrti bilo kojeg lica koje se može pripisati nemaru, namjernom činu ili kršenju ugovora od strane investitora, osoblja investitora ili njihovih zastupnika i (2) pitanja za koje odgovornost može biti isključena, kao što je opisano u podstavu (d)(i), (ii) i (iii) podklauzule 18.3 (*Osiguranje od povrede lica i štete imovini*).

17.2 **Staranje o radovima od strane izvođača**

Izvođač preuzima punu odgovornost za staranje o radovima i robi od dana početka radova do izdavanja Potvrde o prijemu radova (ili se od trenutka kada se ona smatra izdatom u skladu sa podklauzulom 10.1*Prijem radova i sekcija*) kada se odgovornost za staranje o radovima prenosi na investitora. Ukoliko je Potvrda o preuzimanju radova izdata (ili se smatra da je izdata) za neku sekciju radova, odgovornost za brigu o sekciji prelazi na investitora.

Nakon što je odgovornost prešla na investitora, izvođač preuzima odgovornost za brigu o preostalom radu na dan koji je naveden u potvrdi o preuzimanju radova, sve dok ovaj rad nije završen.

Ukoliko dođe do gubitka ili štete na radovima, robi ili dokumentaciji izvođača u periodu tokom koga je izvođač odgovoran za staranje o njima, iz bilo kog razloga koji nije naveden u podklauzuli 17.3 (*Rizici investitora*), izvođač će nadoknaditi gubitak ili štetu na sopstveni rizik i o svom trošku, tako da radovi, roba i dokumentacija izvođača budu u skladu sa ugovorom.

Izvođač će biti odgovoran za svaki gubitak ili štetu koje su nastale usled aktivnosti od strane izvođača nakon što je izdata potvrda o prijemu. Izvođač će takođe biti odgovoran za gubitak ili štetu koje nastanu nakon izdavanja potvrde o prijemu radova i koje su nastale iz prethodnog događaja za šta je izvođač bio odgovoran.

17.3 **Rizici investitora**

Rizici iz podklauzule 17.4 su:

(a) rat, sukobi (bez obzira da li je rat objavljen ili ne), invazija, akt stranih neprijatelja

(b) pobuna, teririzam, revolucija, ustanak, vojna ili uzurpirana vlast ili građanski rat u zemlji,

(c) neredi, gužva ili nemiri u zemlji od strane lica koja nisu zaposlena kod izvođača i drugih zaposlenih lica izvođača ili podizvođača

(d) municija, eksplozivni materijali, jonizujuće zračenje ili zagađenje od radioaktivnog zračenja u zemlji, osim ako se to može pripisati korišćenju takve municije, eksploziva, radijacija i radioaktivnog zračenja od strane izvođača i

(e) vazdužni pritisci koje su izazvali avioni ili druge letilice koje putuju brzinom zvuka ili supersoničnom brzinom.

17.4 **Posledice rizika investitora**

Ukoliko neki od rizika koji su navedeni u podklauzuli 17.3 dovede do gubitka ili oštećenjs radova, roba ili dokumentaciji izvođača, izvođač će bez odlaganja obavijestiti investitora i ispraviće ovaj gubitak ili štetu u mjeri u kojoj to zahtijeva investitor.

Ukoliko izvođač pretrpi kašnjenje i/ili trošak kao rezultat ispravljanja gubitka ili štete, izvođač će obavijestiti investitora i imaće pravo, u skladu sa podklauzulom 20.1 *Potraživanja izvođača*, na:

(a) produženje roka za takvo kašnjenje, ukoliko završetak radova kasni ili će kasniti, u skladu sa podklauzulom 8.4 (*Prodežetak roka za zavr*šetak), i

(a) nadknadu za takav trošak, koja će biti uključena u ugovornu cijenu

Nakon dobijanja ovog obavještenja, investitor postupa u skladu sa podklauzulom 3.5 *Utvrđivanja*, radi saglašavanja ili utvrđivanja o gore navedenom.

17.5 Intelektualna i industrijska prava svojine

U ovoj podklauzuli, izraz "prekršaj" znači kršenje (ili navodno kršenje) nekog prava na patent, registrovanog dizajna, autorskog prava, trgovačkog znaka, trgovačkog naziva, komercijalne tajne ili nekih drugih intelektualnih i industrijskih svojinskih prava, koja se odnose na radove; a izraz "potraživanje" predstavlja potraživanje (or proceeding pursuing a claim) podneto zbog navodnog prekršaja.

Ako jedna strana ne obavijesti drugu o potraživanju, u roku od 28 dana od prijema potraživanja, smatraće se da se ta strana odrekla svakog prava na obeštećenje, u skladu sa ovom podklauzulom.

Investitor će obeštetiti izvođača i zaštititi ga od bilo kakve tužbe za navodni prekršaj, koji je ili je bio:

(a) neizbježan zbog izvođačevog postupanja, u skladu sa Zahtjevima investitora ili

(b) posledica korišćenja radova od strane investitora:

I. u svrhu koja nije navedena u Ugovoru ili koje Ugovor ne podrazumijeva ili

II. u vezi sa nečim što izvođač nije isporučio, osim ako izvođaču takvo korišćenje nije bilo saopšteno pre Osnovnog datuma ili ukoliko nije bilo predviđeno ugovorom.

Izvođač će investitora obeštetiti i zaštititi od svakog drugog potraživanja koje proistekne iz ili u vezi (i) iZvođačevog projekta, izrade, izgradnje, ili izvođenja radova, (ii) korišćenja opreme Izvođača ili (iii) pravilnog korišćenja radova.

Ako jedna strana ima pravo na obeštećenje, u skladu sa ovom podklauzulom, druga strana može da (o sopstvenom trošku) vodi pregovore u vezi tog potraživanja, povede parnicu ili preda spor na arbitražu. Druga strana će, na zahtev i o trošku prve strane, pružiti pomoć u osporavanju potraživanja. Ta druga strana (i njeno osoblje) neće priznati bilo šta što bi moglo uticati na stranu koja duguje obeštećenje, ukoliko ta strana nije pokrenula pregovore, parnicu ili arbitražu na zahtjev druge strane.

17.6 **Ograničenje odgovornosti**

Nijedna strana ne može da drugoj strani bude odgovorna za nemogućnost korišćenja bilo kojih radova, gubitak dobiti, gubitak bilo kakvog ugovora ili za posrednu ili nematerijalnuu štetu koju može da pretrpi druga strana u vezi Ugovora, osim na osnovu podklauzule 16.4 *Plaćanje po raskidu* i podklauzule 17.1 *Obeštećenja*.

Ukupna odgovornost izvođača inestitoru,na osnovu ili u vezi Ugovora, izuzev one u vezi podklauzule 4.19 *Električna energija, voda i gas*, podklauzule 17.1 *Oprema investitora i besplatni materijal*, podklauzule 17.1 *Obeštećenja* i podklauzule 17.5 *Intelektualna i industrijska prava svojine*, ne može da premaši iznos naveden u Posebnim uslovima ili (ako taj iznos nije naveden kao takav) ugovornoj ceni, koja je navedena u ugovornom sporazumu.

Ova podklauzula ne ograničava odgovornost u slučaju prevare, namjernog neizvršavanja obaveza ili nekorektnog ponašanja.

OSIGURANJE

18.1 Opšti uslovi osiguranja

U ovoj klauzuli, "strana koje obezbjeđuje osiguranje" predstavlja, kod svake vrste osiguranja, stranu koja je odgovorna za osiguranja, za vršenje i održavanje osiguranja naznačenog u relevantnoj podklauzuli.

Gde god je izvođač, strana koja obezbjeđuje osiguranje, svako osiguranje se vrši kod osiguravača i pod uslovima odobrenim od strane investitora. Ti uslovi moraju da budu u skladu sa uslovima dogovorenim između obje strane, prije nego što su potpisale contract agreement. Ovaj sporazum o uslovima osiguranja ima prednost u odnosu na odredbe ove klauzule.

Gde god je investitor strana koja obezbjeđuje osiguranje, svako osiguranje se vrši kod osiguravača i pod uslovima koji su u skladu sa pojedinostima priloženim uz Posebne uslove.

Ako je polisom predviđeno zajedničko osiguranje, pokriće je posebno za svaku stranu, kao da su posebne polise izdate svim zajedničkim osiguranicima. Ako polisa pokriva obeštećenje dodatnog zajedničkog osiguranika, odnosno još nekog osiguranika pored onih navedenih u ovoj klauzuli, (i) Izvođač djeluje po polisi u ime tih dodatnih osiguranika, s tim što Investitor deluje u ime osoblja Investitora, (ii) dodatni zajednički osiguranici nemaju pravo na neposrednu isplatu od strane osiguravača ili bolo koju drugu vrstu posla sa osiguravačem i (iii) strana koja obezbjeđuje osiguranje zahtjeva od dodatnih osiguranika da postupaju u skladu sa uslovima propisanim u polisi.

Svaka polisa osiguranja od gubitka ili oštećenja propisuje da se isplate vrše u valutama potrebnim za nadomještanje gubitka ili oštećenja. Sredstva, koja osiguravači isplate, koriste se za nadomještanje gubitka ili oštećenja.

Relevantna strana koja obezbjeđuje osiguranje obavezuje se da u odgovarajućim rokovima, navedenim u Posebnim uslovima (računato od Datuma početka), drugoj strani podnese:

(a) dokaz da su izvršena osiguranja, opisana u ovoj klauzuli i

(b) kopije polisa za osiguranja, opisana u podklauzuli 18.2 *Osiguranje radova i opreme izvođača* i podklauzuli 18.3 *Osiguranje od povreda lica i štete imovini*.

Po isplati svake premije, strana koja obezbjeđuje osiguranje podnosi drugoj strani dokaz o isplati.

Svaka strana se obavezuje da postupa u skladu sa uslovima, koji su propisani u svakoj polisi osiguranja. Strana koja obezbjeđuje osiguranje obavezuje se da osiguranike obavjesti o svim relevantnim promjenama u izvođenju radova i da se postara o održavanju osiguranja, u skladu sa ovom klauzulom.

Nijedna strana nema pravo da vrši bilo kakvu materijalnu izmjenu uslova osiguranja bez prethodne saglasnosti druge strane. Ako osiguravač izvrši (ili pokuša da izvrši) bilo kakvu izmjenu, strana koja o tome bude prva obavještena od strane osiguravača, obavezuje se da o tome odmah obavijesti drugu stranu.

Ako strana koja obezbjeđuje osiguranje ne izvrši i ne održava bilo koje osiguranje koje je na osnovu Ugovora obavezna da izvrši i održava ili nepodnese valjan dokaz i kopije polisa, u skladu sa ovom podklauzulom, druga strana može (po sopstvenom nahođenju i bez uticaja na sva druga prava i pravna sredstva) da izvrši osiguranje za relevantno pokriće i plati dospjele premije. Strana koja obezbjeđuje osiguranje obavezuje se da drugoj strani isplati iznos tih premija, a ugovorna cijena se u skladu sa tim koriguje.

Ova klauzula ne ograničava na bilo koji način ugovorne ili neke druge obaveze ili odgovornosti izvođača ili investitora. Svi iznosi koji nisu osigurani ili nisu naplaćeni od osiguravača idu na teret izvođača i/ili investitora u skladu sa tim obavezama i odgovornostima. Međutim, ako strana koja obezbjeđuje osiguranje ne izvrši i ne održava neko osiguranje koje je dostupno i koje je po Ugovoru obavezna da izvrši i održava, a druga strana niti odobrava taj propust, ni vrši osiguranje sa odgovarajućim pokrićem, strana koja obezbjeđuje osiguranje je obavezna da isplati cio iznos koji bi bio naplativ na osnovu tog osiguranja.

Jedna strana vrši plaćanja drugoj u skladu sa podklauzulom 2.5 *Potraživanja investitora* ili podklauzulom 20.1 *Potraživanja izvođača*, zavisno od slučaja.

18.2 Osiguranje radova i opreme izvođača

Strana koja obezbjeđuje osiguranje obavezuje se da osigura radove, postrojenja, materijale i dokumentaciju Izvođača najmanje za iznos koji bi bi potreban za njihovo nadomještanje, uključujući troškove rušenja i odstranjivanja ruševina, strukovnim naknadama i dobiti. Ovo osiguranje traje od dana podnošenja dokaza, u skladu sa tačkom (a) podklauzule 18.1 *Opšti uslovi osiguranja* do dana izdavanja potvrde o prijemu radova.

Strana koja obezbjeđuje osiguranje obavezuje se da do dana izdavanja Potvrde o dobrom izvršenju posla održava osiguranje od gubitka ili oštećenja za koje je izvođač odgovoran, do kojih dođe prije izdavanja Potvrde o prijemu i od gubitka ili oštećenja izazvanih od strane izvođača ili podizvođača tokom vršenja bilo kojih drugih radnji (uključujući one iz klauzule 11 Odgovornost za nedostatke i klauzule 12 Ispitivanja poslije završetka).

Strana koja obezbjeđuje osiguranje obavezuje se da opremu izvođača osigura na punu cijene njenog nadomještanja, uključujući isporuku na gradilištu. Sva oprema izvođača osigurava se od trenutka prevoza na gradilište do prestanka potrebe za njom.

Ukoliko drukčije nije predviđeno Posebnim uslovima, osiguranja predviđena ovom podklauzulom:

(a) vrši i održava izvođač, kao strana koja obezbjeđuje osiguranje,

(b) vrši se zajednički u ime strana, koje zajednički imaju pravo na isplatu od strane osiguravača, pri čemu se te isplate dele stranama isključivo za potrebe nadomještanja gubitka ili oštećenja,

(a) pokriva gubitke ili oštećenja čiji uzroci nisu navedeni u podklauzuli 17.3 *Rizici investitora,*

(b) takođe pokriva gubitke ili oštećenja od rizika koji su navedeni u tački (c) podklauzule 17.3 *Rizici investitora sa odbicima*, u svakom slučaju pojedinačno, koji nisu veći od iznosa navedenog u Posebnim uslovima u prilogu ponude (ako taj iznos nije naveden, tačka (d) se ne primjenjuje), i

(c) može da ne pokriva gubitak, oštećenje i nadomještanje:

(i) dijela radova koji ima nedostatke zbog manjkavosti projekta, materijala ili izrade (s tim što pokriće pokriva sve druge dijelove koji su izgubljeni ili oštećeni upravo zbog takvih manjkavosti, a ne iz razloga navedenih u tački (ii),

(ii) dijela radova koji je izgubljen ili oštećen pri nadomještanju bilo kog drugog dijela radova, ako je taj dio bio manjkav zbog manjkavosti projekta, materijala ili izrade,

(iii) dijela radova koji je bio primljen od strane investitora, osim u mjeri u kojoj je izvođač odgovoran za gubitak ili oštećenje i

(iv) robe dok nije u zemlji, u skladu sa podklauzulom 14.5 *Postrojenja i materijali za radove.*

Ako po isteku jedne godine od Osnovnog datuma pokriće navedeno u tački (d) prestane da bude dostupno pod komercijalno prihvatljivim uslovima, izvođač se obavezuje (kao strana koja obezbjeđuje osiguranje) da obavijesti investitora sa pojedinostima. Investitor u tom slučaju (i) ima pravo shodno podklauzuli 2.5 *Potraživanja investitora* na isplatu iznosa koji odgovara onom iznosu koji bi izvođač očekivao da plati pod takvim komercijalno prihvatljivim uslovima za takvo pokriće, i (ii) odobrio propust iz podklauzule 18.1 *Opšti uslovi osiguranja*, ukoliko nije obezbjedio osiguranje pod komercijalno prihvatljivim uslovima.

18.3 Osiguranje od povrede lica i štete imovini

Strana koja obezbjeđuje osiguranje obavezuje se da svaku stranu osigura od odgovornosti za gubitke, oštećenje fizičke imovine (osim stvari koje su osigurane u skladu sa podklauzulom 18.2 *Osiguranje radova i opreme izvođača*) ili za smrt ili tjelesnu povredu bilo kog lica (osim lica koja su osigurana u skladu sa podklauzulom 18.4 *Osiguranje osoblja izvođača*, do kojih može da dođe kao posljedica izvršavanja ugovora od strane izvođača i to prije izdavanja Potvrde o dobro izvršenom poslu.

Ovo osiguranje je ograničeno za svaki događaj pojedinačno na ne manje od iznosa navedenog u Posebnim uslovima, bez ograničenja u pogledu broja događaja. Ako iznos nije naveden u Prilogu ponude, ova podklauzula se ne primjenjuje:

Ukoliko drugačije nije navedeno u Posebnim uslovima, osiguranja navedena u ovoj podklauzuli:

(a) vrši i održava izvođač, kao strane koja obezbjeđuje osiguranje,

(b) su zajednička u ime strana,

(c) su proširena da bi se pokrila odgovornost za gubitak ili oštećenje imovine investitora (izuzev stvari, osiguranih u skladu sa podklauzulom 18.2) nastalih pri izvršavanju ugovora od strane izvođača i

(d) može da isključi odgovornost, koja proističe iz:

(i) prava investitora na izvođenje osnovnih radova na, preko, ispod, u ili kroz neki teren i na zauzimanje tog terena za permanentosnovne radove,

(ii) oštećenje koje je neizbježna posledicu obaveze izvođača da izvede radove i otkloni nedostatke i

(iii) uzroka navedenog u podklauzuli 17.3 *Rizici investitora*, osim u mjeri u kojoj je pokriće dostupno pod komercijalno prihvatljivim uslovima.

18.4 Osiguranje osoblja izvođača

Izvođač se obavezuje da izvrši i održava osiguranje od odgovornosti za potraživanja, štete, gubitke i troškove (uključujući i sudske troškove) nastale u vezi povrede, bolesti ili smrti člana osoblja izvođača.

Investitor takođe ima pravo na obeštećenje na osnovu polise osiguranja, osim što može da ne uključi gubitke i potraživanja koja proističu iz bilo kog činjenja ili nemara investitora ili njegovog osoblja.

Osiguranje se održava u punoj mjeri za sve vrijeme dok to osoblje pruža pomoć u izvođenju radova. U slučaju radnika podizvođača, osiguranje može da bude obezbijeđeno od strane tog podizvođača, ali izvođač je odgovoran za postupanje u skladu sa ovom klauzulom.

Viša sila

19.1 Definicija više sile

U ovoj klauzuli, "viša sila" znači izuzetan događaj ili okolnost:

(a) koja je izvan kontrole jedne strane,

(b) od koje ta strana objektivno nije mogla da se obezbjedi prije zaključivanja ugovora,

(c) koju, po njenom nastanju, ta strana objektivno nije mogla da izbjegne ili savlada i

(d) koja se u značajnoj mjeri ne može pripisati drugoj strani.

Viša sila može da uključi, ali se ne ograničava na sledeće izuzetne događaje ili okolnosti, ukoliko su ispunjeni uslovi pod (a) do (d):

(i) rat, neprijateljstva (bez obzira da li je rat objavljen ili ne), invaziju, djelovanje stranih neprijatelja,

(iii) pobunu, terorizam, revoluciju, ustanak, vojna ili uzurpirana vlast ili građanski rat,

(iv) metež, nemir, nered, štrajk ili onemogućavanje radnicima prilaz svojim radnim mjestima, ukoliko se ne radi o radnicima izvođača ili podizvođača,

(v) municiju, eksplozivna sredstva, jonizujuća zračenja ili radioaktivno zagađenje, ako se to ne može pripisati korišćenju municije, eksploziva, zračenja ili radioaktivnosti od trane izvođača i

(vi) prirodne katastrofe kao što su zemljotres, uragan, tajfun ili vulkanska aktivnost.

19.2 Obavještenje o nastanku više sile

U slučaju da neka strana bude spriječena da izvršava svoje ugovorne obaveze zbog više sile, ona obavještava drugu stranu o događaju ili okolnosti koje sačinjavaju višu silu i navodi obaveze koje ne može ili neće moći da izvršava. Obavještenje se podnosi u roku od 14 dana nakon što je strana saznala ili trebalo da sazna za takav događaj ili okolnost koji sačinjavaju višu silu.

Po podnošenju obavještenja, strana se oslobađa od izvršavanja takvih obaveza za sve vrijeme tokom kojega je spriječena uslijed više sile da izvršava obaveze.

Bez obzira na ostale odredbe ove klauzule, viša sila se ne primjenjuje na obaveze jedne strane da drugoj strani vrši plaćanja, u skladu sa ugovorom.

19.3 Obaveza da se zastoj svede na minimum

Obije strane se obavezuju da se postaraju da zastoji u izvršavanju ugovora zbog više sile budu svedeni na minimum.

Svaka strana se obavezuje da drugu obavijesti o prestanku dejstva više sile na nju.

19.4 Posljedice više sile

Ako izvođač bude spriječen da izvrši bilo koju svoju ugovornu obavezu zbog više sile, o čemu je dato obavještenje u skladu sa podklauzulom 19.2 (*Obavještenje o nastanku više sile*) i zbog više sile kasni i/ili biva izložen trošku, on ima pravo, shodno podklauzuli 20.1 *Potraživanja izvođača*, na:

(a) produženje roka zbog takvog zastoja, ako se sa završetkom kasni ili će se kasniti, u skladu sa podklauzulom 8.4 *Produžetak roka za završetak*,

(b) naknadu troškova, ako je događaj ili okolnost poput onih koje su opisane u tačkama (i) do (ii) podklauzule 19.1 Definicija više sile i u slučajevima navedenim pod (ii) do (iv) i ako su nastali u zemlji.

Po prijemu takvog obavještenja, investitor postupa u skladu sa podklauzulom 3.5 Utvrđivanja radi saglašavanja ili utvrđivanja tih stvari.

19.5 Uticaj više sile na podizvođača

Ako neki podizvođač ima pravo na osnovu nekog ugovora ili sporazuma, koji se odnosi na radove, na oslobađanje zbog više sile pod dodatnim ili uslovima koji su opsežniji od onih koji su predviđeni ovom klauzulom, takvi opsežniji događaji više sile ili okolnosti ne opravdavaju izvođača za neizvršavanje njegovih obaveza, niti mu daju pravo na oslobađanje u u skladu sa ovom klauzulom.

19.6 Raskid, plaćanje i oslobađanje po slobodnom izboru

Ako izvođenje radova bude onemogućeno, praktično u cjelini, zbog dejstva više sile, u neprekidnom trajanju dužem od 84 dana, o kojoj je dato obavještenje u skladu sa podklauzulom 19.2 *Obavještenje o pojavi više sile*, ili u periodu, koji je sa prekidima duži od 140 dana, bilo koja strana može drugu stranu da obavjesti o raskidu ugovora. U tom slučaju, raskid stupa na snagu 7 dana po davanju obavještenja, a izvođač postupa u skladu sa podklauzulom 16.3 *Prestanak radova i odstranjenje opreme izvođa*ča.

Posle takvog raskida, investitor plaća izvođaču:

(a) iznose, koji se plaćaju za sve izvedene radove, za koje je cijena navedena u ugovoru;

(b) cijenu postrojenja i materijala koji su naručeni za radove i koji su isporučeni izvođaču ili koje je izvođač obavezan da primi: ovo posrojenja i materijal postaju vlasništvo investitora (na njegov rizik) kada ih on bude platio, a izvođač ih stavlja na raspolaganje investitoru;

(c) sve ostale troškove i obaveze, koje je izvođač opravdano snosio, u očekivanju završetka radova;

(d) troškove vezane za odstranjivanje privremenih radova i opreme izvođača sa gradilišta i njihovo vraćanje u zemlju izvođača (ili na neko drugo mjesto, ali ne po većoj cijeni); i

(e) trošak vezan za povratak osoblja izvođača i druge radne snage, koja je u trenutku raskida u potpunosti angažovana na izvođenju radova.

19.7 Oslobađanje od izvršavanja po sili zakona

Bez obzira na ostale odredbe ove klauzule, ako nastanu događaji ili okolnosti koje su, u skladu sazakonom, van kontrole ugovornih strana (uključujući, pored ostalog, i višu silu) koje jednoj ili obema stranama onemogućavaju izvršavanje njihovih ugovornih obaveza ili ga čine nezakonitim ili koje, na osnovu zakona koji reguliše ugovore, oslobađaju ugovorne strane, obaveze daljeg izvršavanja ugovora, i jedna strana obavijesti drugu o takvim okolnostima:

(a) ugovorne strane se oslobađaju obaveze daljeg izvršavanja bez uticaja na prava bilo koje strane u vezi ranijeg kršenja ugovora i

(b) iznos, koji se plaća izvođaču plaća od strane investitora, istovjetan je iznosu koji bi bio plaćen, u skladu sa podklauzulom 19.6 *Raskid, plaćanje i oslobađanje po slobodnom izboru*, da je ugovor bio raskinut u skladu sa podklauzulom 19.6.

Potraživanja, sporovi i arbitraža

20.1 Potraživanja izvođača

Ako izvođač smatra da ima pravo na produženje roka za završetak i/ili dodatne isplate po bilo kojoj klauzuli ovih uslova ili po nekom drugom osnovu u vezi ugovora, on o tome obavještava nadzorni organ i navodi događaj ili okolnosti koje služe kao osnov za potraživanje. Obavještenje se podnosi što prije, ali najviše u roku od 28 dana od dana kada je izvođač postao ili trebalo da postane svjestan tog događaja ili okolnosti.

Ako izvođač ne podnese svoje potraživanje u pomenutom roku od 28 dana, rok za završetak radova se ne produžava, izvođač nema pravo na dodatnu isplatu i investitor se oslobađa obaveza u vezi potraživanja. U suprotnom slučaju primjenjuju se sledeće odredbe ove podklauzule.

Izvođač se takođe obavezuje da podnese sva ostala obavještenja koja su predviđena ugovorom i pateće podatke za potraživanje, koji se odnose na takav događaj ili okolnosti.

Izvođač je dužan da ažurno vodi evidenciju koja je potrebna radi okumentovanja potraživanja, bilo na gradilištu ili na nekom drugom mjestu koje je nadzornom organu prihvatljivo. Bez priznavanja odgovornosti investitora, nadzorni organ može, po prijemu obavještenja iz ove podklauzule, da prati vođenje evidencije i/ili naloži izvođaču da vodi još neku evidenciju. Izvođač se obavezuje da nazornom organu omogući pregled te evidencije i da mu na njegov zahtjev podnese kopije.

U roku od 42 dana od dana kada je izvođač postao (ili trebalo da postane) vjestan događaja ili okolnosti koje služe kao osnov za potraživanje ili u nekom drugom roku predloženom od strane izvođača i odobrenom od strane nadzornog organa, izvođač se obavezuje da nadzornom organu podnese u potpunosti obrazloženo potraživanje sa pratećim podacima, uz naznaku traženog produženja roka i/ili iznosa dodatnog plaćanja. U slučaju da je događaj ili okolnost koja služi kao osnov za potraživanje kontinuirane prirode:

(a) potpuno obrazloženo potraživanje smatra se privremenim;

(b) izvođač podnosi dalja potraživanja u mjesečnim intervaalima, navodeći kašnjenje i /ili tražene iznose kumulativno, kao i sve ostale podatke koje nadzorni organ bude opravdano tražio; i

(c) izvođač podnosi konačno potraživanje u roku od 28 dana od prestanka uticaja događaja ili okolnosti ili u nekom drugom roku predloženom od strane izvođača i odobrenom od straneinvestitora.

U roku od 42 dana od prijema potraživanja ili daljih podataka u vezi prethodnog potraživanja ili unekom drugom rokupredloženim od strane nadzornog organa i odobrenom od strane izvođača. Nadzorni organ odobrava potraživanje ili ga odbija i daje detaljno obrazloženje svoje odluke. On takođe ima pravo da traži dalje pojedinosti, stim što je dužan da da odgovore na principe potraživanja u pomenutom roku.

Svaka privremena situacija mora da sadrži iznose potraživanja za koje je utvrđeno da su dospjeli u skladu sa odgovarajućim odredbama ugovora. Ukoliko podnijeti podaci nisu dovoljni da potkrijepe cio iznos potraživanja, izvođač ima pravo samo na isplatu pokrepljenog dijela potraživanja.

Nadzorni organ postupa u skladu sa podklauzulom 3.5 *Utvrđivanja* radi saglašavanja ili utvrđivanja (i) produženja roka (eventualnog) za završetak (prije i posle isteka) u skladu sa podklauzulom 8.4 *Produženje roka za završetak* i/ili (ii) dodatnog plaćanja (eventualnog) na koje izvođač ima pravo na osnovu ugovora.

Uslovi iz ove podklauzule važe skupa sa uslovima iz svih ostalih podklauzula koje se odnose na potraživanja. Ukoliko izvođač ne postupi u skladu sa ovom ili nekom drugom podklauzulom u vezi nekog potraživanja, pri utvrđivanju produženja roka i/ili dodatnog plaćanja uzima se u obzir mjera (eventualna) u kojoj je taj propust onemogućio ili naškodio pravilnoj obradi potraživanja, ukoliko potraživanje nije isključeno shodno drugom stavu ove podklauzule.

20.2 Imenovanje komisije za rješavanje sporova

Sporove rješava komisija za rješavanje sporova (KRS) u skladu sa podklauzulom 20.4 *Dobijanje odluke Komisije za rješavanje sporova*. Ugovorne strane zajednički određuju KRS u roku od 28 dana od dana kada jedna strana obavjesti drugu o svojoj namjeri da spor podnese KRS na rješavanje u skladu sa podklauzulom 20.4.

Kako je navedno u prilogu ponude, KRS se sastoji od jednog ili tri kompetentna lica ("članovi"). Ukoliko broj nije naveden i stranke se nisu dogovorile drugačije, KRS se sastoji od tri člana.

Ako se KRS sastoji od tri člana, svaka strana kandiduje po jednog člana i njegovo ime podnosi na saglasnost drugoj strani. One zatim konsultuju oba člana i dogovorno određuju trećeg člana koji će djelovati u svojstvu predsjednika.

Međutim, ako ugovor sadrži spisak potencijalnih članova, članovi se biraju sa tog spiskapri čemu se ne uzimaju u obzir oni koji nisu u mogućnosti ili ne žele da budu članovi KRS.

Sporazum između ugovornih strana i jedinog člana ("presuđivača") odnosno svakog člana pojedinačno zaključuje se sa pozivom na opšte uslove sporazuma za rješavanje sporova iz priloga ovih opštih uslova, sa eventualnim zajednički dogovorenim izmjenama.

Strane dogovorno utvrđuju naknadu koja je plativa jedinom članu odnosno svakom članu pojedinačno pri usaglašavanju uslova postavljenja. Strane s obavezuju da ovu naknadu plaćaju po pola.

Ako se strane bilo kad dogovore u tom smislu, one mogu da postave kompetentna lica za zamjenu jednog ili više članova KRS. Ako se strane nisu drugačije dogovorile, postavljenje stupa na snagu, ako neki član odbije da radi ili ne bude u mogućnosti da radi uslijed smrti, onesposobljenosti ili prestanka postavljenja. Zamjena se postavlja na isti način kao što je zamijenjeni član bio postavljen u skladu sa ovom podklauzulom.

Mandat bilo kog člana može da prestane ako se strane o tome dogovore, ali ne i voljom investitora ili izvođača. Ukoliko se strane nisu drugačije dogovorile, mandat KRS (ili svakog člana pojedinačno) prestaje kada KRS donese svoju odluku o sporu koji joj je predat na rješavanje, u skladu sa podklauzulom 20.4 *Dobijanje odluke Komisije za rješavanje sporova*, ukoliko KRS do tada nisu bili podnijeti drugi sporovi u skladu sa podklauzulom 20.4, u kom slučaju je mjerodavan datum donošenja odluka KRS o tim sporovima.

20.3 Nesaglasnost oko imenovanja Komisije za rješavanje sporova

U bilo kojem od sledećih slučajeva:

(a) ako se strane ne dogovore o određivanju jedinog člana KRS do datuma navedenog u prvom stavu podklauzule 20.2 *Imenovanje Komisije za rješavanje sporova*,

(b) ako bilo koja strana ne imenuje člana (za odobrenje od strane druge strane) tročlane KRS do tog datuma,

(a) ako se strane ne dogovore o postavljenju trećeg člana (u svojstvu predsjednika) KRS do tog datuma ili

(b) ako se strane ne dogovore o postavljenju ili zamjeni u roku od 42 dana od dana kada je jedini član ili jedan od trojice članova odbio da radi ili postao nesposoban da radi zbog smrti, onesposobljenosti, ostavke ili prestankamandata, tada će na zahtjev bilo koje ili obje strane i posle konsultacija, organ za postavljanje ili službenik koji je imenovan u prilogu ponude postaviti tog člana KRS. Takvo postavljenje je konačno. Obje strane su obavezne da po pola isplate naknadu organu za postavljanje i službeniku.

20.4 Dobijanje odluke Komisije za rješavanje sporova

U slučaju (bilo kakvog) spora između strana u vezi ugovora ili zvođenja radova, uključujući sporove u vezi ovjervanja, utvrđivanja, naloga, mišljenja ili procjene nadzornog organa, bilo koja strana može da spor u pisanoj formi podnese KRS na odlučivanje, posle njenog određivanja u skladu sa podklauzulama 20.2 *Imenovanje Komisije za rješavanje sporova* i 20.3 *Nesaglasnost oko imenovanja Komisije za rješavanje sporova* i da primjerke dostavi drugoj strani i nadzornom organu, sa pozivom na ovu podklauzulu.

U slučaju tročlane KRS, spor se smatra predatim KRS onog dana kada bude primljen od strane predsjednika KRS.

Obje strane se obavezuju da odmah KRS stave na raspolaganje sve potrebne informacije i odgovarajuće pogodnosti i obezbjede pristup gradilištu radi rješavanja spora. KRS ne djeluje u svojstvu arbitra.

U roku od 84 dana od prijema spora ili isplate akontacije predviđenje klauzulom 6 Priloga-Opšti uslovi sporazuma o rjšavanju sporova, zavisno od posljednjeg nastalog slučaja ili u nekom drugom roku predloženim od strane KRS i prihvaćenom od strane obje ugovorne strane, KRS donosi svoju odluku, koja mora da bude obrazloženai sa naznakom da je donijeta u skladu sa ovom podklauzulom. Međutim, ako nijedna strana nije izvršila isplatu punog iznosa iz faktura podnijetih od strane svakog člana u skladu sa klauzulom 6 priloga, KRS nije u obavezi da donese svoju odluku sve doisplate punog iznosa. Odluka je obavezujuća za obje strane, koje se obavezuju da odmah postupe po njoj, ukoliko ona ne bude promijenjena na prijateljski način ili arbitražnom odlukom. Ukoliko strane već nisu odustale od ugovora ili ga se odrekle ili raskinule, izvođač se obavezuje da nastavi sa izvođenjem radova u skladu sa ugovorom.

Ako je bilo koja strana nezadovoljna odlukom KRS, ona može da u roku od 28 dana od prijema odluke svoje nezadovoljstvo saopšti drugoj strani. Ako KRS ne donese odluku u roku od 84 dana (ili u nekom drugom dogovorenom roku) od prijema spora ili takve isplate, tada bilo koja strana može da svoje nezadovoljstvo saopšti drugoj strani po isteku pomenutih 28 dana.

U svakom slučaju, u saopštenju o nezadovoljstvu navodi se da se daje u skladu sa ovom podklauzulom, izlaže se predmet spora i daje se obrazloženje nezadovoljstva. Osim onog predviđenog podklauzulom 20.7 *Nepostupanje po odluci Komisije za rješavanje spo*rova i podklauzulom 20.8 *Istek mandata Komisije za rješavanje sporova*, nijedna strana nema pravo da spor podnese na arbitražu, ukoliko prethodno nije bilo podnijeto saopštenje o nezadovoljstvu u skladu sa ovom podklauzulom.

Ako po saopštenju odluke KRS obijema stranama nijedna strana ne podnese saopštenje o nezadovoljstvu u roku od 28 dana, odluka postaje konačna i obavezujuća za obije strane.

20.5 Prijateljsko rješavanje

U slučaju saopštenja o nezadovoljstvu podnijetog u skladu sa podklauzulom 20.4, strane se obavezuju da pokušaju da spor riješe na prijateljski način prije podnošenja spora na arbitražu. Međutim, ukoliko se strane nisu drugačije sporazumjele, arbitraža se može pokrenuti po isteku 56. dana od dana kada je bilo podnijeto saopštenje o nezadovoljstvu, čak iako nije bilo pokušaja da se spor riješi na prijateljski način.

20.6 Arbitraža

Ukoliko ne dođe do rješenja na prijateljski način, a odluka KRS (ako postoji) nije postala konačna i obavezujuća, spor se rješava međunarodnom arbitražom. Ukoliko se stranke nisu drugačije sporazumjele:

(a) spor se konačno rješava po pravilima arbitraže Međunarodne trgovačke komore,

(b) spor rješavaju tri arbitra koji su određeni u skladu sa pomenutim pravilima i

(c) arbitražni postupak se vodi na jeziku za komunikacije koji je naveden u podklauzuli 1.4 *Pravo i jezik*

Arbitri su ovlašćeni da otvore, pregledaju i izmijene bilo koju situaciju, utvrđivanje, nalog, mišljenje ili procjenu nadzornog organa i bilo koju odluku KRS koja se odnosi na spor. Nadzorni organ se ni na koji način ne može osloboditi obaveze svjedočenja i davanja podataka arbitrima po bilo kom pitanju uvezi spora.

Nijedna strana se ne može ograničiti u arbitražnom postupku na dokaze i argumente koji su ranije bili predočeni KRS radi dobijanja odluke ili na obrazloženje nezadovoljstva koje je dato u saopštenju o nezadovoljstvu. Bilo koja odluka KRS može se uzeti u obzir u arbitražnom postupku.

Arbitražni postupak može da počne prije ili poslije završetka radova. Obaveze ugovornih strana, nadzornog organa i KRS ne mogu da se mijenjaju zbog arbitražnog postupka koji se vodi tokom izvođenja radova.

20.7 Nepostupanje u skladu sa odlukom Komisije za rješavanje sporova

U slučaju:

(a) da nijedna strana ne podnese saop[tenje o neyadovoljstvu u roku predvi]enim podklauzulom 20.4 *Dobijanje odluke Komisije za rješavanje sporova*,

(b) da je odluka KRS postala kona;na i obaveyujuá i

(c) jedna strana nije postupila u skladu sa tom odlukom,

onda druga strana ima pravo da bez uticaja na svoja ostala prava, to postupanje podnese na arbitražu u skladu sa podklauzulom 2.6 *Arbitraža*. U tom slučaju ne važe podklauzule 20.6 *Dobijanje odluke Komisije za rješavanje sporova* i 20.5 *Prijateljsko rješavanje*.

20.8 Istek mandata Komisije za rješavanje sporova

U slučaju nastanka spora između strana u vezi ugovora ili izvođenja radova, a u mjestu ne postoji KRS zbog isteka mandata ili iz drugih razloga:

(a) podklauzula 20.4 *Dobijanje odluke Komisje za rješavanje sporova* i podklauzula 20.5 *Prijateljsko rješavanje sporova* ne važe i

(b) spor može da se neposredno podnese na arbitražu u skladu sa podklauzulom 20.6 Arbitraža.

PRILOG

Opšti uslovi sporazuma o rješavanju sporova

1 Definicije

Svaki "sporazum o rješavanju sporova" predstavlja trojni sporazum između:

(a) "Investitora"

(b) "Izvođača"

(c) "Člana" koji je u sporazumu o rješavanju sporova definisan kao:

(i) jedini član "KRS" (ili "presuđivač") i u tom slučaju pozivanje na "ostale članove ne važi",

ili

(ii) jedno od tri lica koja se zajedno nazivaju "KRS" "(ili "Komisija za rješavanje sporova") i u tom slučaju se druga dva lica nazivaju "ostali članovi".

Investitor i izvođač su zaključili (ili namjeravaju da zaključe) ugovor koji se zove "Ugovor" koji je definisan u sporazumu o rješavanju sporova koji sačinjava ovaj prilog. Riječi i izrazi koji se koriste u sporazumu o rješavanju sporova imaju značenje kakvo im je dato u ugovoru, ukoliko nisu drugačije definisani.

2 Opšte odredbe

Sporazum o rješavanju sporova postaje pravosnažan kada bude potpisan od strane investitora, izvođača i svakog člana.

Kada sporazum o rješavanju sporova postane pravosnažan, investotor i izvođač obavještavaju člana u tom smislu. Ako član ne primi obavještenje jednog od njih u roku od šest mjeseci po zaključivanju sporazuma o rješavanju sporova, on se smatra ništavnim.

Angažovanje člana predstavlja lično postavljenje. Nije dozvoljen prenos ili podugovaranje sporazuma o rješavanju sporova bez pretodne saglasnosti strana i ostalih članova (eventualnih).

3 Garancije

Član garantuje i pristaje da bude nepristrasan i nezavistan od investitora, izvođača i predstavnika investitora. Član se obavezuje da svakog od njih i ostale članove odmah obavijesti očinjenicama ili okolnostima koje bi mogle da budu u neskladu sa njegovim/njenim garancijama i pristankom u pogledu nepristrasnoti i nezavisnosti.

Pri postavljanju člana, investitor i izvođač se oslanjaju na njegove tvrdnje:

(a) da je iskusan u pogledu radova koje izvođač obavlja po ugovoru,

(b) da je iskusan u pogledu tumačenja ugovorne dokumentacije, i

(c) da vlada jezikom za komunikacije koji je predviđen ugovorom.

4 Opšte obaveze člana

Član:

(a) ne smije da ima finansijski ili neki drugi udio u investitoru,izvođaču ili nadzornom organu, niti finansijski udio u ugovoru, osim isplata u skladu sa sporazumom o rješavanju sporova;

(b) nije ranije bio angažovan kao konsultant ili u nekom drugom svojstvu od strane investitora, izvođača ili ostalih članova, prije zaključivanja sporazuma o rješavanju sporova, osim pod okolnostima koje je saopštio investitoru i izvođaču u pisanoj formi prije nego što su oni potpisali sporazum o rješavanju sporova;

(c) mora da prije zaključivanja sporazuma o rješavanju sporova saopšti investitoru, izvođaču i ostalim članovima, u pisanoj formi, da li je ikada imao profesionalne ili lične odnose sa bilo kojim rukovodiocem, službenikom ili radnikom investitora, izvođača ili nadzornog organa, bez saglasnosti investitora, izvođača i ostalih članova (eventualnih);

(d) ne može da za vrijeme pravosnažnosti sporazuma o rješavanju sporova bude angažovan kao konsultant ili u nekom drugom svojstvu od strane investitora, izvođača ili nadzornog organa, bez saglasnosti investitora, izvođača i ostalih članova (eventualnih);

(e) mora da postupa u skladu sa pravilima postupka i podklauzulom 20.4 Opštih uslova;

(f) ne može da daje savjete investitoru, izvođaču, osoblju investitora ili osoblju izvođača u vezi izvršavanja ugovora, osim u skladu sa priloženim pravilima postupka;

(g) ne može da razgovara ili pravi aranžmane sa investitorom, izvođačem ili nadzornim organom u vezi svog zaposlenja kod njih u svojstvu konsultanta ili u nekom drugom svojstvu po prestanku svog angažmana na osnovu sporazuma o rješavanju sporova;

(h) mora da bude na raspolaganju za sve posjete gradilištu i sve potrebne rasprave; i

(i) mora da postupa sa pojedinostima ugovora i svim aktivnostima i raspravama KRS kao sa privatnim i povjerljivim stvarima i ne smije da objavi ili objelodani bez prethodne saglasnosti investitora, izvođača i ostalih članova (eventualnih).

5 Opšte obaveze investitora i izvođača

Investitor, izvođač, osoblje investitora i osoblje izvođača ne mogu da traže savjete ili konsultantske usluge od lana u vezi ugovora, osim u okviru normalnih aktivnosti KRS na osnovu ugovora i sporazuma o rješavanju sporova i u okviru prethodnog dogovora između investitora, izvođača i ostalih članova (eventualnih). Investitor i izvođač su odgovorni za postupanje u skladu sa ovom odredbom od strane njihobvog osoblja.

Investitor i izvođačse obavezuju uzajamno i članu da ukoliko drugačije nije dogovoreno u pisanoj formi između investitora, izvođača, člana i ostalih članova (eventualnih), član ne može da:

(a) bude postavljen za arbitra u bilo kom arbitražnom postupku u vezi ugovora;

(b) bude pozvan za svjedoka u bilo kom sporu o kome odlučuju arbitri postavljeni za neku arbitražu u vezi ugovora, i

(c) bude odgovoran za potraživanja za bilo kakvo činjenje ili nečinjenje u vršenju ili nevršenju funkcija članova, ukoliko se ne utvrdi da je to činjenje ili nečinjenje bilo nesvjesno.

Investitor i izvođač se solidarno obavezuju da člana obeštete i zaštite od potraživanja za koja je oslobođen odgovornosti na osnovu prethodnog stava.

6 Plaćanje

Član ima pravo na sledeća plaćanja u valuti navedenoj u sporazumu o rješavanju sporova:

(a) dnevnica koja se smatra naknadom za:

(i) svaki radni dan proveden u čitanju podnesaka, prisustvovanju raspravama (eventualnim), pripremanju odluka ili posjećivanju gradilišta (eventualnom);i

(ii) svaki dan ili dio dana do najviše dva dana provede na putovanju između članovog stana i gradilišta ili nekog drugog mjesta sastanka sa ostalim članovima (eventualnim) i/ili investitorom iliizvođačem i nazad.

(b) naknada svih opravdanih troškova napravljenih u vezi izvršavanja obaveza člana, uključujući troškove za administrativne usluge, telefonske razgovore, kurirske usluge,faks i teleks, putne troškove i troškove koji se odnose na ishranu. Potrebna je priznanica za svaku stavku koja premašuje 5% dnevnice nvedene pod tačkom (a); i

(c) porez koji se po propisima zemlje plaća u iznosima koji se isplaćuju članu (ukoliko nije državljanin zemlje ili nema stalni boravak u njoj) u skladu sa ovom klauzulom.

Iznos dnevnice se precizira u sporazumu o rješavanju sporova.

Odmah po pravosnažnosti sporazuma o rješavanju sporova, a prije nego što pristupi aktivnostima u skladu sa sporazumom o rješavanju sporova, član izvođaču podnosi fakturu (sa kopijom za investitora) (a) za akontaciju u iznosu od dvadesetpet (25) odsto procijenjenog ukupnog iznosa dnevnica na koje će imati pravo i (b) akontaciju koja odgovara procijenjenim ukupnim troškovima kojima će biti izložen u obavljanju svojih dužnosti. Izvođač se obavezuje da fakturisani iznos isplati po prijemu fakture. Član nije u obavezi da obavlja svoje dužnosti u skladu sa sporazumom o rješavanju sporova sve dok svakom članu ne budu isplaćeni iznosi koji su fakturisani u skladu sa ovim stavom.

Zatim član podnosi fakture izvođaču, sakopijom za investitora, za razliku svojih dnevnica itroškova, umanjenu za iznos akontacije. KRS nije obavezna da donese svoju odluku sve do potpune isplate svih dnevnica i troškova svakog člana pojedinačno.

Ukoliko nisu isplaćene ranije, u skladu sa prethodnim stavom, izvođač se obavezuje da u potpunosti isplati iznos faktura svakog člana pojedinačno u roku od 28 kalendarskih dana po

prijemu svake fakture i da podnese zahtjev investoru (u izvještajima predviđenim ugovorom) za isplatu polovine fakurianih iznosa. Investitor zatim vrši isplatu izvođaču u skladu sa ugovorom.

Ukoliko izvođač ne isplati članu iznos na koji ima pravo na osnovu sporazuma o rješavanju sporova, investitor se obavezuje da taj iznos isplati članu i sve ostale iznose koji su potrebni za rad KRS, bez uticaja na prava i pravna sredstva investitora. Pored ostalih prava koja proističu iz tog propusta, investitor ima pravo na naknadu svih plaćenih iznosa koji premašuju polovinu tih isplata, sa troškovima povraćaja tih iznosa i zateznom kamatom obračunatom po stopi navedenoj u podklauzuli 14.8 *Opštih uslova*.

Ako član ne primi iznos koje s plaća, u roku od 28 dana od podnošenja ispravne fakture, član ima pravo da (i) obustavi pružanje svojih usluga do islate i/ili (ii) podnese odavanjem otkaza investitoru i izvođaču. Otkaz stupa na snagu kada ga obje straneprime otkaz. Takav otkaz je konačan i obavezujući za investitora, izvođača i člana.

7 Neizvršavanje obaveza člana

Ako član ne izvršava bilo koju svoju obavezu predviđenu klauzulom 4, on nema pravo na dnevnise i naknadu toškova i obavezuje se da bez uticaja na njihova ostala prava, investitoru i izvođaču nadoknadi sve dnevnice i troškove kji su isplaćeni članu i ostalim članovima (eventualnim) za postupak ili (eventualne) odluke KRS koje se smatraju ništavnim.

8 Neizvršavanje obaveza člana

Svi sporovi ili potraživanja u vezi ovog sporazuma o rješavanju sporova, ili kršenja, raskida ili nevažnosti istog, rješava u skladu sa pravilima arbitraže Međunarodne trgovačke komore jedan arbitar koji je postavljen u skladu sa pravilima arbitraže.

Aneks – PRAVILA POSTUPKA

1 Investitor i Izvođač predaju KRS po jedan primjerak svih dokumenata koje KRS bude tražila, uključujući ugovornu dokumentaciju, izvještaje o napredovanju, naloge za izmjene, situacije i ostale dokumente koje se odnose na spor. Kopije komunikacija između KRS investitora ili izvođača upućuju se drugoj strani. Ako se KRS sastoji od tri lica, investitor i Izvođač šalju kopije traženih dokumenata i komunikacija svakom od njih.

2 KRS postupa u skladu sa podklauzulom 20.4 i ovim pravilima. S obzirom na vremenska ograničenja za donošenje odluka i ostale relevantne faktore, KRS se obavezuje da:

a) Djeluje pravično i nepristrasno u odnosu na investitora i izvođača, pruzajući im priliku da iznesu svoj slučaj i odgovore na slučaj druge strane, i
b) Usvoje postupke koji su primjereni sporu, bez nepotrebnog odlaganja i troškova.

3 KRS može da održi raspravu o sporu, u kom slučaju ona utvrđuje datum i mjesto rasprave i može da trazi da joj se pisana dokumentacija i argumenti invesitotra i izvođaca podnesu prije ili tokom rasprave.

4 Ukoliko nije drugačije dogovoreno između investitora i izvođaca, KRS je ovlašćena da usvoji istražni postupak, zabrani učešće ili prisustvo raspravi bilo kom licu osim predstavnika investitora, izvođača I nadzornog organa I da radi u odsustvu bilo kod lica za koje KRS zna da je obavijesteno o održavanju rasprave, s tim sto ima slobodu odlučivanja da li I u kojoj mjeri da to ovlašćenje iskoristi.

5 Pored ostalog, investitor i Izvođač ovlašćuju KRS da:

a) Utvrdi postupak za donošenje odluke o sporu,
b) Odlučuje u okviru svojih nadležnosti I u okviru spora koji joj je podnijet na rješavanje,
c) Sprovodi raspravu na način koji smatra primjerenim, bez obaveze da se drži bilo kojih drugih pravila ili postupaka izuzev onih navedenih u ugovoru i ovih pravila,
d) Preduzme inicijativu u utvrđivanju činjenica i stvari potrebnih za donošenje odluke,
e) Koristi sopstvena stručna znanja, ako ih ima,
f) Odlučuje o plaćanju zatezne kamate u skladu sa ugovorom,
g) Odlučuje o privremenim olakšicama kao sto su to privremene mjere ili mjere očuvanja,
h) Otvori, razmotri I izmijeni bilo koju situaciju, odluku, određenje, nalog, mišljenje ili procjenu nadzornog organa u vezi sporta.

6 KRS može da izrazi bilo kakvo mišljenje tokom rasprave u vezi vrijednosti bilo kog argumenta kojeg strane u sporu iznesu. Zatim KRS donosi svoju odluku u skladu sa podklauzulom 20.4 ili nečim drugim dogovorenim između investitora I izvođača u pisanoj formi. Ako se KRS sastoji od tri člana:

a) Ona zasijeda iza zatvorenih vrata posle rasprave, ako je održana, radi pretresa i pripreme odluke;
b) Ona se trudi da donese jednoglasnu odluku, a ako to nije moguće, odluka se donosi većinom glasova članova, koji mogu da od trećeg člana traže izvještaj za podnošenje investitoru I izvođaču; i
c) Ako jedan član ne prisustvuje zasjedanju ili raspravi ili ne izvrši bilo koju svoju dužnost, ostala dva člana mogu da uprkos tome, nastave sa donošenjem odluke, osim:
    a. Ako investitor ili izvođač bude protiv toga, ili
    b. Ako je odsutni član predsjednik koji im je naložio da ne donosi odluku.

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Opšti uslovi

Savjeti za pripremu

posebnih uslova

Uslovi ugovaranja za PNI/ključ u ruke projekte

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

Savjeti za pripremu posebnih uslova

Međunarodna Federacija Konsalting Inženjera

Savjeti za pripremu posebnih uslova

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Priručnik za pripremu posebnih uslova

Uvod

Uslovi ugovaranja za EPC/Ključ u ruke projekte su pripremljeni od strane međunarodnog saveza inženjera-konsultanata (FIDIC-a) i preporučuju se kada jedno lice preuzme punu odgovornost za inženjerski projekat, uključujući projektovanje, proizvodnju, isporuku i montažu postrojenja, kao i projektovanje i izvođenje građevinskih radova i inženjering, kao i raspisivanje tendera na međunarodnom nivou. Izmjene i dopune uslova mogu biti potrebne pod nekim jurisdikcijama, naročito ako se primjenjuju na domaće ugovore.

Veliki projekti po principu ključ u ruke mogu podrazumijevati pregovore između dviju strana. Studirajući različite opcije koje su nudili izvođači, Izvođač može smatrati da je od velike važnosti i značaja da se sastane i diskutuje sa njima razne tehničke opcije koje poslodavac smatra poželjnim. Pod uobičajenim aranžmanima za ovu vrstu ugovora, Izvođač sprovodi inženjering, nabavku i izgradnju, i pruža potpuno opremljen objekat, spreman za rad (prilikom “predaje kljuca”).

Ovi savjeti se daju u želji da se pomogne sastavljačima posebnih uslova davanjem opcija za razne podklauzule po potrebi. Gdje god je to moguće, primjer teksta je uključen između redova. Međutim, u nekim slučajevima je data samo promemorija.

Prije unošenja nekog uzornog teksta, mora da se provjeriti da li je on u cjelini prikladan za date okolnosti. Ukoliko se ne smatra prikladnim, uzorni tekst bi trebalo izmijeniti prije primjene.

U slučaju izmijenjenog uzornog teksta I u svim ostalim slučajevima u kojim vrše izmjene i dopune, potrebno je voditi računa o tome da ne dođe do dvosmislenosti u opštim uslovima ili između klauzula posebnih uslova.

Sledeći tekst može da se koristi u pripremi uslova ugovora koji se unose u dokumentaciju ponude za neki ugovor:

“Uslovi ugovora uključuju ‘opšte uslove’, koji sačinjavaju dio 1. izdanja uslova ugovora za postrojenje i projektovanje-izgradnju, koje je objavila međunarodna federacija inženjera konsultanta (FIDIC) 1999. godine, i sledeće posebne uslove, koji sadrže izmjene i dopune opštih uslova.”

Sledeće podklauzule opštih uslova zahtijevaju informacije koji se moraju uključiti u posebne uslove:

1.1.3.3 & 8.2 Rok za završetak radova

1.1.3.7 & 11.1 Period za obavještavanje o nedostacima

1.1.5.6 Definisanje svakog člana, ukoliko ih ima

1.3 Elektronski sistemi za komunikacije

1.4 Zakoni i jezici

2.1 Vrijeme za okupiranje gradilišta

4.2 Sigurnosne performanse

4.4 Obavještenje o podizvođačima

8.7/12.4&14.15(d) Štete prilikom kašnjenja i izvođenja

13.8 Korekcije za promjene u cijeni

14.2 Avansna plaćanja

14.3 (c) Zadržavanje

17.6 Ograničenje odgovornosti

18.1 Osiguranje investitora (ukoliko ga ima). Dokaz osiguranja

18.2 (d) Osiguranje od rizika investitora

18.3 Osiguranje od povreda lica i oštećenja imovine

20.2 Broj članova Komisije za rješavanje sporova

20.3 Imenovanje članova Komisije za rješavanje sporova

Napomene o primjeni dokumentacije ponude

Dokumentaciju ponude trebalo bi da pripremaju inženjeri odgovarajućih kvalifikacija koji su upoznati sa tehničkim askeptkima potrebnih radova, a poželjno bi bilo da ona bude pregledana od strane odgovarajućih pravnika. Dokumentacija ponude se izdaje podnosiocima ponude I ona sadrži uslove ugovora, zahtjeve investitora i (moguće) preferiranu formu ponude. Pored toga, svakom podnosiocu ponude trebalo bi dati podatke predviđene podklauzulom 4.10 i uputstva podnosiocima punde gdje se navode stvari koje bi investitor zelio da budu uključene u njihove ponude, ali koje ne sačinjavaju dio zahtjeva investitora.

Kada se ugovor potpiše od strane investitora i izvođača, ugovor (kada stupu na snagu) uključuje i tender kao i bilo koji memorandum koji predstavlja dodatak ugovoru.

Zahtjevi investitora trebalo bi da preciziraju posebne zahtjeve za završene radove, ukljucujuci funkcionalne zahtjeve, kvalitet i opšteg, a mogu i da zahtijevaju od izvođača da obezbijedi neke stvari kako sto su to potrošni materijali, koji bi mogli da budu navedeni u spiskovima tarifa. Mogle bi se kljuciti pojedine ili sve stvari koje se pominju u sledećim podklauzulama:

1.8 Broj primjeraka dokumentacije izvođača

1.13 Dozvole koje pribavlja investitor

2.1 Fazno uzimanje u posjed temelja, struktura, postrojenja ili sredstava pristupa

4.1 Predviđene namjene radova

4.6 Ostali Izvođači (i druga lica) na gradilištu

4.7 Obilježavanje, linije i referentne kote

4.18 Ekološka ograničenja

4.19 Električna energija, voda, gas i ostale instalacije na gradilištu

4.20 Oprema investitora

5.1 Zahtjevi, podaci i informacije za koje je odgovoran investitor

5.2 Dokumenti Izvođača koje je potrebno pregledati

5.4 Tehnički standardi i građevinski propisi

5.5 Stručna obuka osoblja Izvođača

5.6 Grafička dokumentacija u izvedenom stanju

5.7 Priručnici za eksploataciju i održavanje

6.6 Pogodnosti za osoblje

7.2 Uzorci

7.3 Zahtjevi za inspekciju van gradilišta

7.4 Ispitivanje tokom izrade i/ili izgradnje

9.1 Ispitivanje na završetku

9.4 Obeštećenje za nepovoljne rezultate ispitivanja na završetku

12.1 Ispitivanja posle završetka

12.4 Oštećenje za nepovoljne rezultate ispitivanja posle završetka

Mnoge podklauzule u opštim uslovima pozivaju se na posebne uslove za te podatke što je uglavnom navedeno od strane investitora ili se pozivaju na tender za te podatke što je uglavnom navedeno od strane ponuđača.

U uputstvima za podnosioce ponude mogu da se preciziraju eventualna ograničenja vezana za podatke koji se nalaze u ponudi, i/ili određuju stepen ostalih informacija koje ponuđač uključuje u svoju ponudu. Ako je predviđeno da svaki podnosilac obezbijedi garanciju matične kompanije i/ili garanciju za ponudu, takvi zahtjevi koji važe prije nego sto ugovor postane pravosnažan) trebalo bi da budu navedeni u uputstvima za podnosioce ponude. Uzorni obrasci su priloženi uz ovaj dokument kao akensi A i B. uputstva mogu da sadrže stvari koje se pominju u nekim ili svim sledećim podklauzulama:

4.3 Predstavnik izvođača (ime i radna biografija)

4.9 Garancija kvaliteta

9.1 Ispitivanja na završetku

12.1 Ispitivanja posle završetka

18 Osiguranje

Ključ u ruke ugovori uglavnom uključuju projektovanje, izgradnju, armature, cijevni pribor I opremu u obu navedenom u zahtjevima investitora. U obzir bi trebalo uzeti detaljne zahtjeve kao što su to oni koji se odnose na mjeru u kojoj se objekat oprema da bi bio spreman za eksploataciju, sa rezervnim djelovima i potrošnim materijalima spremnim za eksploataciju za određeni period. Pored toga, od Izvođača se može zahtijevati da rukuje radovima bilo tokom nekoliko mjeseci probnom pogodna u skladu sa podklauzulm 9.1 (c) ili nekoliko godina.

S obzirom na veliku konkurenciju, sasvim je razumljivo sto podnosioci ponude često nisu volji da se izlože velikim troškovima u pripremi ponude projekata. U pripremi uputstva za podnosioce ponude valjalo bi uzeti u obzr obim u kome bi podnosioci realno mogli da pripreme i uključe detalje u svoje ponude. Potrebno je da se obim djelatnosti navede u uputstvima za podnosioce ponude. Trebalo bi imati u vidu činjenicu da se opis ne može dati u dokumentima koji sačinjavaju ugovor, koji postaje pravosnažan tek po potpisivanju ugovora.

U obzir bi trebalo uzeti davanje izvjestne naknade podnosiocima ako bi morali da obave studije ili pripreme idejne projekte da bi mogli da pripreme valjane ponude.

KLAUZULA 1 OSNOVNE ODREDBE

Podklauzula 1.1 Definicije

Posebni uslovi će precizirati Vrijeme za završetak radova i period Obavještenja o nedostacima.

Ako se radovi preduzimaju u fazama, što nije uobičajeno za ugovore ključ u ruke, Posebni uslovi će precizirati svaku fazu sekcije, i definišu opis posla, geografsko određenje i vrijeme završetka radova.

Može se ukazati potreba za izmjenom nekih definicija. Na primjer:

1.1.3.1 osnovni datum bi se mogao definisati kao određeni kalendarski datum

1.1.4.6 određena strana valuta bi se mogla predvidjeti

1.1.4.8 neka druga valuta se može odrediti kao lokalna valuta

1.1.6.2 poziv na Zemlju može da bude neprikladan u slučaju prekograničnog gradilišta

Podklauzula 1.2 Tumačenje

Ako je potrebno da se pozivi na dobit preciznije iskažu,ova se podklauzula može izmijeniti:

PRIMJER:

Na kraju podklauzule 1.2 upisati:

U ovim Uslovima, odredbe koje sadrže izraz trošak uvećan za primjerenu dobit predviđaju dobit koja predstavlja dvadeseti (5%) dio tog troška.

Podklauzula 1.3 Komunikacije

Posebni uslovi će predvidjeti sistem elektronske komunikacija (ako ima potrebe), i mogu takođe predvidjeti adresu Inestitora za Izvođačeva obavještenja.

Podklauzula 1.4 Prava i jezik

Posebni uslovi mogu predvidjeti:

(a) mjerodavno pravo koje će važiti za Ugovor;

(b) pravila korišćenja jezika (ako bilo koja Strana bude pisala jednim jezikom i kasnije prevodila), i

(c) jezik komunikacije (ako je komunikacija nije pisana istim jezikom kojim je napisan Ugovor).

Podklauzula 1.5 Prioritet dokumenata

Redosled je obično potreban u slučaju naknadno utvrđenog sukoba između ugovornih dokumenata. Ako redosled nije određen, ova se podklauzula može izmijeniti:

PRIMJER:

Brisati podklauzulu 1.5 i zamijeniti je sledećim tekstom

Dokumenti koji sačinjavaju Ugovor smatraju se uzajamno objašnjivim. Ukoliko se utvrdi dvosmislenost ili neslaganje, prednost se daje u skladu sa mjerodavnim pravom.

Podklauzula 1.6 Ugovorni sporazum

Ugovorni Sporazum je dokument koji omogućava stupanje na snagu Ugovora, i obično predhodi pregovorima. Ugovorni sporazum treba pažljivo da bude pripremljen. Forma Sporazuma treba da bude uključena u tendersku dokumentaciju kao aneks Posebnim uslovima: na primjer forma je uključena na kraju ove publikacije.

Ugovorni Sporazum mora sadržati nazive obje Strane, ugovornu cijenu, valute plaćanja, dospjeli iznos u svakoj valuti, i bilo koji preduslov koji mora biti ispunjen prije stupanja na snagu Ugovora, a sve uz saglasnost obje Strane. Ukoliko su potrebni duži tenderski pregovori, savjetuje se da Ugovorni sporazum sadrži Osnovni datum i/ili Datum početka.

Ukoliko Investitor želi da predvidi moućnost izdavanja pisma o prihvatanju, ova podklauzula mora biti promijenjena u smislu brisanja prve rečenice, koja predviđa da Ugovor stupa na snagu nakon što Strane potpišu Ugovorni Sporazum. Pismo o namjeri treba da sadrži sledeći paragraf:

„Sve dok se formalni sporazum ne pripremi i izvrši, ovo Pismo o namjerama, zajedno sa vašim pismenim prihvatanjem, smatra se obavezujućim između nas."

Podklauzula 1.10 Korišćenje dokumentacije Izvođača

Dodatne odredbe mogu biti potrebne ako se određene stavke softvera (na primjer) prenose na Investitora. Odredbe bi trebalo da budu u skladu sa mjerodavnim pravom.

Podklauzula 1.13 Postupanje u skladu sa zakonima

Ako će Investitor da pribavi uvozne dozvole i slično, alternativne odredbe mogu biti prikladne:

PRIMJER PODKLAUZULE ZA UGOVOR O POSTROJENJU

Unijeti sledeći tekst na kraju podklauzule 1.13:

Međutim, Izvođač se obavezuje da pojednosti o robi blagovremeno podnese Investitoru, koji se potom obavezuje da odmah pribavi sve uvozne dozvole i licence koje su potrebne za tu robu.

Investitor se takođe obavezuje da pribavi i izda sve saglasnosti, uključujući dozvolu za rad, pravo prolaza i odobrenja koja su potrebna za Radove.

Podklauzula 1.14 Solidarna odgovornost

U slučaju većih ugovora, može se ukazati potreba za preciziranjem detaljnih uslova zajedničkog ulaganja. Na primjer možda bi bilo poželjno da svaki učesnik obezbijedi garanciju matične kompanije, čiji je uzorni obrazac priključen uz ovaj dokument kao Aneks A.

Takvi uslovi, koji važe prije pravosnažnosti Ugovora, trebalo bi da se unesu u Upustva ua podnosioce ponuce. Investitor bi želio da rukovodilac zajedničkog ulaganja bude imenovan što prije i da samo sa njim ima posla, ne želeći da se miješa u sporove između učesnika zajedničkog ulaganja. Investitor bi trebalo da dobro pregleda ugovor o zajedničkom ulaganju, koji inače možda podliježe odobrenju ustanove koja finansira projekat.

KLAUZULA 2 INVESTITOR

Podklauzula 2.1 Pravo pristupa gradilištu

Posebni uslovi će precizirati vrijeme (vremena) do kojeg će Investitor dati Izvođaču pravo pristupa gradilištu, nakon Datuma početka radova. Izvođaču može biti neophodno da mu se omogući raniji pristup gradilištu za potrebe premjere ili ispitivanja njegovog podzemlja. Ukoliko Investitor oganizuje izvođenje radova na gradilištu prije obezbjeđenja prava pristupa, detalji moraju biti navedeni u Investitorovim zahtjevima.

Podklauzula 2.3 Osoblje Investitora

Ove odredve bi trebalo da se odraze na Investitorove ugovore sa bilo kojim drugim izvođačima na gradilištu.

KLAUZULA 3 Investitorova administracija

Podklauzula 3.1 Predstavnik Investitora

Iako Investitor nije u obavezi da imenuje predstavnika, ovo imenovanje može pomoći Investitorovom osoblju. Ukoliko Investitor želi da imenuje nezavisni nadzorni organ kao svog predstavnika, on mora biti naveden u Posebnim uslovima.

KLAUZULA 4 IZVOĐAČ

Podklauzula 4.2

Posebni uslovi će precizirati iznos i valutu Garancije za dobro izvršenje posla, iako to nije zahtijevano.

PRIMJER

Iznos Garancije za dobro obaljeni posao će iznositi 10 posto (10%) od ugovorne cijene koja je navedena u Ugovoru, i biće izražena u valuti i razmjeri u kojoj je ugovorna cijena plativa.

Prihvatljivi obrazac za valjano izvršenje posla uključuje se u dokumentaciju ponude , u vidu dodataka Posebnih uslova. Uzorni obrasci su u ovom dokumentu dati kao Aneks C i Aneks D. Oni se sastoje od dva seta Jedinstvenih pravila koje je objavila Međunarodna trgovačka komora (sa sjedištem u 38 Cours Albert 1 er, 750008 Pariz, Francuska), koja takođe objavljuje smjernice za pomenuta Jedinstvena pravila. Može se ukazati potreba za izmjenama uzornih obrazaca i teksta ove podklauzule radi usaglašavanja sa mjerodavnim pravom.

PRIMJER

Na kraju drugog stava podklauzule 4.2 unijeti:

Ako je garancija za valjano izvršenje posla u obliku bankarske garancije (i) nju izdaje banka sa sjedištem u Zemlji ili (ii) se neposredno izdaje od strane neke inostrane banke koja je prihvatljiva Investitoru. Ako garancija za valjano izvršenje posla nije u obliku bankarske garancije, nju izdaje neka finansijska ustanova koja je registrovana za poslovanje u Zemlji ili ima licencu da u njoj posluje.

Podklauzula 4.3 Predstavnik Izvođača

Ako je predstavnik poznat u vrijeme podnošenja ponude, podnosilac može da predloži predstavnika. Podnosilac ponude može da predloži alternativne predstavnike, naročito ako izgleda da će dodjela ugovora biti odugovlačena. Ako mjerodavni jezik nije onaj jezik koji se koristi u svakodnevnim komunikacijama (u skladu sa podklauzulom 1.4) ili ako je iz bilo kog razloga potrebno da ugovor sadrži odredbu o tome da predstavnik Izvođača u potpunosti valda određenim jezikom, može se dodati jedna od sledećih rečenica:

PRIMJER

Na kraju podklauzule 4.3 dodati

Predstavnik izvođača ili ova lica moraju da tečno

Govore _____ (upisati ime jezika)

PRIMJER

Na kraju podklauzule 4.3 dodati

Ako predstavnik Izvođača ili ova lica ne govore tečno

_____(upisati ime jezika), Izvođač se obavezuje

Da obezbijedi prisustvo prevodioca tokom cijelog radnog vremena.

Podklauzula 4.4 Podizvođači

Ukoliko Investitor želi da dobija obavještenja u skladu sa ovom podklauzulom, njegov zahtjev mora bit predviđen u Posebnim uslovima.

PRIMJER

Izvođač će izdati obavještenja opisana u stavovima (a), (b) i (c) podklauzule 4.4 u vezi sa sledećim Podizvođačima:

(lista relevantnih aktivnosti i/ili djelova Radova).

Podklauzula 4.12 Nepredvidljive teškoće

Ukoliko Radovi uključuju izgradnju tunela ili druge bitne podzemne konstukcije, obično je bolje da se rizik od nepredviđenih zemljanih uslova dodijeli Investitoru. Odgovorni izvođači će nerado preuzeti rizik od nepoznatih zemljanih uslova koje je teško ili nemoguće predvidjeti unaprijed. U ovim uslovima za poslove projektivanja (ili u njihovo ime) treba koristiti Uslove ugovaranja za postrojenja i projektovanje-izgradnju.

Podklauzula 4.19 Elektirčna enegrija, voda i gas

Ako će Izvođač biti omogućeno da koristi instalacije za električnu energiju, vodu i gas, u specifikacijama se daju pojedinosti , sa lokacijama i cijenama.

Podklauzula 4.20 Oprema Investitora i besplatni materijal

Da bi ova podklauzula bila važeća, specifikacije bi trebalo da sadrže opise svakog predmeta kojeg će Investitor obezbijediti i/ili kojim će rukovati, sa svim pojedinostima. U slučaju nekih predmeta mogu biti potrebne dalje odredbe da bi se rasčistila neka pitanja, kao što su ona koja se odnose na odgovornost i osiguranje.

Podklauzula 4.22 Obezbjeđenje gradilišta

Ako Izvođač dijeli gradilište sa drugim licima, možda ne bi bilo prikladno da on snosi odgovornost za bezbjednost gradilišta. U tom slučaju trebalo bi da se obaveze Investitora preciziraju.

KLAUZULA 5 PROJEKTOVANJE

Podklauzula 5.1 Opšte obaveza u projektovanju

Ukoliko Zahtjevi Investitora sadrže konturni projekat, u cilju (na primjer) utvrđivanja izvodljivosti projekta, podnosioce tendera trebalo bi obavijestiti o mjeri u kojoj konturni projekat predstavlja predlog ili zahtjev. Ukoliko je ova podklauzula neprimjenjiva, važiće odredbe FIDIC-ovih Uslovi ugovaranja za postrojenja i projektovanje-izgradnju.

Podklauzula 5.2 Dokumentacija Izvođača

Dokumentaciju Izvođača sačinjavaju dokumenti koje je Izvođač obavezan da preda Investitoru, kao što je precizirano Ugovorom, s tim što ne moraju da budu uključeni (na primjer) svi tehnički dokumenti koji će bit potrebni osoblju Izvođača radi izvođenja Radova. Na primjer, možda bi bilo dobro da se u Zahtjevima Investitora u vezi ugovora za postrojenja precizura da dokumentacija Izvođača mora da sadrži crteže koji prikazuju način pričvršćivanja postrojenja i druge informacije koje su potrebne za:

(a) priremu odgovarajućih temelja i oslonaca,

(b) obezbjeđenje odgovarajućeg pristupa na gradilišu, postrojenju i potrebnoj opremi, na kome se postrojenje montira, i/ili

(c) izrade potrebnih spojeva sa postrojenjem,.

Mogu se precizirati razni periodi pregleda uzimajući u obzir vrijeme potrebno za pregled raznih vrsta crteža i/ili mogućnosti bitnih podnošenja u pojedinim fazama postupka projektovanja-izgradnje.

KLAUZULA 6 Osoblje i radna snaga

Podklauzula 6.6 Pogodnosti za osoblje i radnu snagu

Ukoliko će Investitor da obezbijedi smještajne kapacitete, onda bi njegova obaveza trebala da bude precizirana.

Podklauzula 6.8 Nadzor Izvođača

Ako mjerodavni jezik nije isti kao jezik svakodnevne komunikacije (u skladu sa podklauzulom 1.4), ili ako je iz bilo kog razloga neophodno navesti da Izvođačevo nadzorno osoblje treba da vlada određenim jezikom, sledeća rečenica se može dodati:

PRIMJER

Na kraju podklazule 6.8 dodati:

Razuman dio Izvođačevog nadzornog osoblja treba da ima radno znanje (navesti jezik), ili Izvođač treba da obezbijedi dovoljan broj kompetentnih prevodilaca raspoloživih na gradilištu tokom cijelog radnog vremena.

Dodatna podklauzula

Možda će biti neophodno dodati paragrafe članova koji bi uzeli u obzir okolnosti i položaj gradilišta:

PRIMJER ČLANA

Strano osoblje i radna snaga

Izvođač može da dovede strano osoblje, zanatlije i radnu snagu koliko je neophodno u cilju izvršenja Radova. Izvođač mora da obezbijedi da to navedeno osoblje ima boravišne vize i radne dozvole. Izvođač će biti odgovoran za povratak takvog osoblja u mjesto sa kog su angažovani ili u njihovo stalno boravište. U slučaju smrti nekog od osoblja ili članova njihove porodice u njihovoj zemlji, Izvođač je obavezan da obezbijedi odgovarajući aranžman za njihov povratak ili sahranu.

PRIMJER ČLANA

Alkoholna pića i droge

Izvođač ne smije, osim u skladu sa zakonoma Zemlje, izvoziti, prodavati, poklanjati, razmjenjivati ili na drugi način raspolagati bilo kakvim alkoholnim pićima i drogama od strane njegovog osobnja.

PRIMJER ČLANA

Oružje i municija

Izvođač ne smije davati, razmjenjivati ili na drugi način raspolagati bilo kakvim oružjem ili municijom bilo kog tima sa bilo kojim licem ili licima, niti će dozvoliti isto svom osoblju.

PRIMJER ČLANA

Festivali i religjski običaji

Izvođač će poštovati sve u zemlji priznate festivale, slobodne dane i religijske i ostale običaje.

KLAUZULA 7 POSTROJENJA, MATERIJALI I NAČIN IZRADE

Dodatna podklauzula

U slučaju da je Ugovor finansiran od strane institucije čija pravila ili načela zahtijevaju ograničenje korišćenja njenih fondova, još jedan član može biti dodat:

PRIMJER ČLANA

Sva roba treba da potiče iz prihvatljivih država kao što je navedeno .....(navesti naziv štampanog vodiča za nabavku)

Robu treba da prevoze špediteri iz prihvatljivih država sem ukoliko nisu izuzeti pisanim putem od strane Investitora zbog eventualnih prekomjernih cijena ili kašnjenja. U svakom slučaju, osiguranje i bankarske usluge treba da pružaju osiguravajuće organizacije i banke iz prihvatljivih država.

KLAUZULA 8 POCETAK RADOVA, KAŠNJENJA I OBUSTAVA

Podklauzula 8.7 Obeštećenje za kašnjenje

Po mnogim pravnim sistemima, iznos ovakvog unaprijed određenog obeštećenja mora predstavljati primjeren proračun mogućeg gubitka kojim bi Investitor bio izložen u slučaju kašnjenja. Posebni uslovi bi trebali da preciziraju dnevnu sumu, za Radove ili svaku sekciju, izražen u iznosu ili procentu: vidjeti takođe podklauzulu 14.5 (b)

PRIMJER

U podklauzuli 8.7 predmetna suma navedena u drugoj rečenici će biti 0.02% ugovorne cijene kao obeštećenje za kašnjenje Radova, plativa (dnevno) u djelovima i u valutama u skladu sa Ugovorom. Za svaku sekciju, dnevni iznos će biti 0.02% konačne ugovorne vrijednosti sekcije, plative (dnevno) u tim valutama. Maksimalan iznos obeštećenja za kašnjenje će biti 10 posto(10%) ugovorne cijene predviđene Ugovorom.

Dodatna podklauzula

Potrebno je da se sekcije završe u rokovima navedenim u zahtjevima Investitora, kako bi Investiror mogao da ih zauzme i koristi prije završetka Radova u cjelini. Pojedinosti o radu koji bi Izvođač morao da izvede da bi mu bila isplaćena premija i iznos premije, prikazani su u zahtjevima Investitora.

Za potrebe obračuna premija, rokovi za završetak sekcija su precizirani. Nikakve korekcije rokova odobravanjem produženja roka za završetak nisu dozvoljene.

KLAUZULA 9 Ispitivanja na završetku

Podklauzula 9.1 Obaveze izvođača

Zahtjevi Investitora trebalo bi da sadrže ispitivanja koja bi Izvođač morao da obavi prije nego štp stekne pravo na Potvrdu o prijemu. Takođe bi možda bilo dobro da Ponuda izvođača sadrži detaljne aranžmane, instrumentaciju itd. Ako radovi budu ispitivani i primani u fazama, uslovi ispitivanja treba da uzmu u obzir uticaj nedovršenih Radova.

Tekst podstavova sadrži uslove koji obično važe u slučaju ugovora za postrojenja i koji mogu iziskivati izmjene. Podstav (c) posebno predviđa probni pogon tokom kojeg svi proizvvodi koje Radovi budu proizveli postaju vlasništvo Investitora. On time stiče pravo da ih otuđi i da zaradu

od prodaje zadrži za sebe. Ako bi trebalo da Izvođač zadrži te proizvoce, onda bi trebalo da se ova podklauzula izmijeni u tom smislu.

Podklauzula 9.4 Nepovoljni rezultati ispitivanja

Ako je potrebno da se u Posebnim uslovima ili Zahtjevima Investitora definiše umanjenje zbog nepovoljnih rezultata ispitivanja kako je predviđeno zadnjim stavom, takođe bi trebalo da se preciziraju kriterijumi minimalnih prihvatljivih performansi.

KLAUZULA 10 PRIJEM OD STRANE INVESTITORA

Podklauzula 10.1 Potvrda o prijemu

Ako se primopredaja radova vrši po fazama, što nije uobičajeno po ugovorima o postrojenjima i prokejtovanju-izgradnji, ove faze trebaju biti definisane kao sekcije, u klauzuli 1 Posebnih uslova. Poželjne su i precizne geografske definicije.

KLAUZULA 11 ODGOVORNOST ZA NEDOSTATKE

Podklauzula 11.10 Neizvršene obaveze

Može da se ukaže potreba za razmatranjem uticaja ove podklauzule u odnosu na rok odgovornosti koji je određen odgovarajućim zakonom.

KLAUZULA 12 ISPITIVANJA NAKON ZAVRŠETKA

Podklauzula 12.1 Postupak za ispitivanje posle završetka

U EPC Ugovorima za postrojenja i projektovanje-izgradnju, od Izvođača se obićno zahtijeva da dokaže pouzdanost i performanse postrojenja za vrijeme Ispitivanja poslije završetka, i da su Radovi preduzeti nakon uspješnog izvršenja ispitivanja.Izuzetno, može se smatrati neophodnim da Ispitivanja budu sprovedena nakon završetka, nakon što Investitor preuzme i rukovodi Radovima, tako da garancija za dobro izvršenje posla može biti dokazana pod normalnim radnim uslovima.

Zahtjevi Investitora treba da opišu ispitivanja koja zahtijeva, nakon preuzumanja, u cilju verifikacije ad Radovi ispunjavaju uslove Garancije za uspješno izvršenje posla koji su propisani u ponudi. Za neke vrste Radova, valjano preciziranje tih ispitivanja može da bude teško , i ako su ona od kritičnog značaja za uspješan ishod. Možda bi bilo dobro da se u Ponudu unesu detaljni aranžmani i/ili u njoj definišu potrebni instrumenti, pored onih koji postoje u postrojenju.

Odredbe Opštih uslova zasnovane su na ispitivanjima koja će vršiti Izvođač i u saradnji sa Investitorom kao i osobljem itd. Ovi detalji bi trebali da budu precizirani u zahtjevima Investitora. Ako su predviđeni neki drugi aranžmani, oni moraju biti precizirani u zahtjevima Investitora, i ova odklauzula bi trebala biti promijenjena u skladu sa tim.Na primjer, odredbe FIDIC Uslova o

ugovoaranju za postrojenja i projektovanje-izgradnju su zasnovani na ispitivanjima sprovedenim od strane Investitora i njegovog operativnog osoblja, sa upustvima Izvođačevog osoblja.

Podklauzula 12.4 Nepovoljni rezultati ispitivanja poslije završetka

Ako se primjenjuje prvi dio ove podklauzule, takođe bi trebalo precizirati način obračuna obeštećenja za nepostizanje performansi (na bazi obima nepovoljnih rezultata) u Posebnim uslovima ili Zahtjevima investitora, uz navođenje i kriterijuma za minimalne prihvatljive performanse.

KLAUZULA 13 IZMJENE I KOREKCIJE

Izmjene se mogu inicirati na tri načina:

(a) Investitor može naložiti neku izmjenu u skladu sa podklauzulom 13.1 bez predhodnog sporazuma oko izvodljivosti i cijene;

(b) Izvođač može da podnese svoje predloge u skladu sa podklauzulom 13.2 koji bi bili od koristi objema stranama; ili

(c) Investitor može da traži predlog u skladu sa podklauzulom 13.3 kojim se traži predhodni dogovor da bi se spor minimalizovao.

Podklauzula 13.5 Okvirne sume

Iako obično nije prikladno za ovu vrstu ugovora, okvirna suma se može tražiti za djelove Radova čija se cijena ne određuje na rizik Izvođača. Na primjer, okvirna suma može da bude potrebna kao pokriće za stvari koje Investitor želi da izabere. Neophodno je da se definiše obim svake okvirne sume, jer se tada definisani obim isključuje iz ostalih elemenata prihvaćenog ugovornog iznosa. Ako ima izgleda da se okvirna suma odredi u skladu sa podklauzulom 13.5 (b), procenat bi trebao biti naveden u ponudi.

Podklauzula 13.8 Korekcije zbog izmjena u troškovima

Odredbe o korekcijama mogu da budu potrebne ako bi bilo nerazumno očekivati od Izvođača da snosi rizik od porasta troškova usled inflacije. Formulacija odredbi na kojima su zasnovani indeksi troškova, objavljene su u FIDIC-ovim Uslovima ugovaranja za postrojenja i prokejtovanje-izgradnju, i mogu se smatrati odgovarajućim. Potrebna je posebna pažnja u izračunavanju pondera/koeficijenata (a, b, c...čiji ukupan iznos ne premašuje jedinstvo) i izboru i provjeri troškovnih pokazatelja.Poželjno je pribavljanje mišljenje stručnjaka.

Klauzula 14 - Ugovorna cijena i plaćanje

Pri sastavljanju posebnih uslova, trebalo bi da se uzmu u obzir iznosi i dinamika plaćanja izvođaču. Pozitivni novčani tokovi očigledno idu u korist izvođača, tako da bi ponuđači trebalo da imaju u vidu postupke privremenih plaćanja pri pripremanju svojih tendera.

Obično se ovakav ugovor bazira na paušalnoj cijeni, sa malo ili nimalo naknakdnih mjerenja. Na taj način izvođač preuzima rizik od promjena u troškovima u vezi svojih projekata. Paušalna cijena može da se sastoji od dva ili više iznosa izraženih u valutama plaćanja (uključujući i lokalnu valutu, ali ne i obavezno).

Za potrebe vrednovanja izmjena, uz tender bi možda trebalo priložiti detaljnu analizu cijena, sa količinama, jediničnim stopama i ostalim podacima veznim za cijene. Te informacije bi takođe bile korisne u određivanju privremenih plaćanja. Međutim, cijene iz tih informacija mogu da budu nekonkurentne. Stoga, u pripremi tenderske dokumentacije, investitor bi trebalo da odluči da li da analize ponuđača prihvati kao obavezujuće. Ukoliko odluči da to ne prihvati, on mora da bude siguran da je investitor kompetentan za vrednovanje svih predloženih izmjena.

Dodatne podklauzule bi možda bile potrebne radi pokrića eventualnih izuzetaka od opcija navedenih u podklauzuli 14.1 i bilo kojih drugih stvari vezanih za plaćanje.

Ako ne važi podklauzula 14.1 (a), način određivanja ugovorne cijene definiše se dodatnom podklauzulom, kako je predviđeno posljednjom rečenicom podklauzule 14.1 Ako se plaćanje za bilo koji dio radova vrši na osnovu mjerenja, taj dio mora da se definiše u ugovoru, pa bi sledeća formulacija jedne od dodatnih podklauzule možda biti prikladna:

PRIMJER PODKLAUZULE ZA OSLOBAĐANJE OD CARINA

Sva roba koju izvođač uveye u zemlju oslobođena je od carina i ostalih uvoznih dažbina, ukoliko je prethodno dobijeno odobrenje Investitora za uvoz. Investitor se obavezuje da potvrdi dokumente koji su potrebni za oslobađanje koje je izvođač pripremio za podnošenje radi carinjenja i da takođe obezbjedi sledeće dokumente:

(navesti potrebne dokumente koje izvođač nije u mogućnosti da pripremi)

Ako oslobađanje od carine ne bude odobreno, investitor nadoknađuje plaćenu carinu.

Sva uvezena roba koja ne bude ugrađena ili utrošena u vezi radova, izvozi se po izvšenju ugovora.

Ukoliko ne bude izvezena. roba se carini u skladu sa zakonima zenlje.

Međutim, oslobađanju ne podliježe:

(a) roba koja je slična onoj koja je proizvedena lokalno, osim ako je nema u dovoljnoj količini ili ako nije po standardu potrebnom za radove; i
(b) bilo koji element carine ili poreza koji je nerazdvojiv od cijene robe ili usluge pribavljenih u zemlji, koji se smatra uključenim u prihvaćeni ugovorni iznos.

Lučke dažbine, kejske dažbine ili bilo koji elementi carine ili poreza koji je nerazdvojiv od cijenerobe ii usluga, osim gore pomenutih, smatra se uključenim u prihvaćeni ugovorni iznos.

PRIMJER PODKLAUZULE O OSLOBAĐANJU OD POREZA

Nerezidentno osoblje ne plaća porez na prihod koji je u zemlji propisa za zarade isplaćene u bilo kojoj stranoj valuti ili porez na prihod propisan za životne potrepštine, kirije i slične usluge koje izvođač obezbjeđuje svom osoblju ili za naknade umjesto toga. Ako se bilo kojem članu osoblja izvođača dio zarade isplaćuje u zemlji u nekoj stranoj valuti, taj član se obavezuje da po isteku svog angažmana u izvođenju radova, iz zemlje iznese nepotrošeni dio svoje zarade u stranoj valuti.

Investitor se obavezuje da traži oslobađanje u svrhe predviđene ovom klauzulom. Ako oslobađanje ne bude odobreno, investitor se obavezuje da nadoknadi plaćene poreze.

Podklauzula 14.2 - Avansno plaćanje

Pri sastavljanju posebnih uslova, trebalo bi razmotriti koristi od avansnog plaćanja. Ukoliko ova klauzula ne važi, stvari koje su opisanu o podastavovima (a) do (d) ove podklauzule treba da budu navedevi u posebnim uslovima i prihvatljivi oblici garancije bi trebalo da bude obuhvaćene tenderskom dokumentacijom, koji su u prilogu posebnih uslova: primjer obrasca je u prilogu ovig dokumenta, kao prilog E. Potrebno je da s u tendersku dokumentaciju unesu prihvatljivi obrasci garancija kao prilog posebnih uslova. Primjeri obrasca je priložen uz ovaj dokument, kao Aneks E

Ako je izvođač u obavezi da obezbjedi glavne djelove postrojenja, trebalo bi da se razmotre koristi od plaćanja u tranšama tokom proizvodnje. Za investitora bi možda bio preporučljiv neki oblik obezbjeđenja, jer s ova plaćanja ne odnose na bilo šta što je u njegovom posjedu. Ako se izvođaču odobri plaćanje u tranšama prije otpreme, dokumentacija pponude bi mogla da sadrži:

(a) odredbe priloga tendera koje vezuju avansna plaćanja (u skladu sa ovom podklauzulom) za faze proizvodnje;
(b) u vremenskom rasporedu plaćanja ili nekom drugom dokumentu koji se koristi za utvrđivanje ugovorne vrijednosti u skladu sa sa podklauzulom 14.3 (a), iznos koji se plaća u svakoj fazi pojedinačno (to bi iziskivalo unošenje dodatnih odredbi u vezi obezbjeđenja); ili
(c) detaljne izmjene podklauzole 14.5.

Podklauzula 14.3 - Zahtjev za privremenu situaciju

Posebni uslovi treba da odrede procenat zadržavanja za podstav (c), i takođe može da odredi i **ograničenje za garantni depozit.**

Podklauzula 14.4 - Vremenski raspored plaćanja

Opšti uslovi sadrže odredbe o privremenim plaćanjima izvođaču, koje mogu da budu zasnovane na vremenskom rasporedu plaćanja. Ako se predviđa neki drugi osnov za utvrđivanje privremenog vrednovanja, pojedinosti se unose u posebne uslove. Ako se plaćanja preciziraju u vremenskom rasporedu plaćanja, on bi mogao da bude u jednom od sledećih oblika:

(a) iznos (ili procenat) procijenjene konačne ugovorne cijene) bi mogao da se unese za svaki mjesec (ili neki drugi period) u roku za završetak, koji se može pokazati neprimjerenim, ako napredak izvođača značajno odstupa od očekivanog, na kome je vremensi raspored zasnovan, ili
(b) vremenski raspored može da bude zasnovan na stvarnom napredovanju u izvođenju radova, što iziskuje pažljivo definisanje repera plaćanja. Do neslaganja može da dođe, kada rad koji je potreban za jedan reper plaćannja bude skoro završen, a ostatak može da bude tek za nekoliko mjeseci.

Podklauzula 14.7 Vrijeme plaćanja

Ukoliko treba da se primjeni period za plaćanje, podklauzula može da se izmijeni:

PRIMJER U podstavu (b), podklauzule 14.7, izbrisati "56" i zamijeniti sa "42".

Ukoliko treba da se navede zemlja/zemlje plaćanja, detalji mogu biti obuhvaćeni tenderom.

14.8 Odloženo plaćanje

Ukoliko diskontna stopa valute plaćanja u centralnoj banci u zemlji nije dobra osnova za procjenjivanje finansijskih troškova izvođača, možda će biti potrebno da se definiše nova stopa. Druga mogućnost je da se trenutni troškovi finansiranja olate, imajući u vidu lokalne finansihske aranžmane.

14.9 Isplata garantnog depozita

Ukoliko se garantni depozit oslobađa i zamjenjuje odgovarajućom garancijom, moguće je dodati odgovarajuću garanciju. Prihvatljivi obrazac garancije trebalo bi da se priključi uz tendersku dokumentaciju u prilogu posebnih uslova: primjer obrasca je priložen ovom dokumentu, kao Aneks F.

Primjer podklauzule za isplaćivanje garantog depozita

Kada je garantni depozit dostigao.....investitor vrši plaćanje u iznosu od .....% garanntog depozita izvođaču, ukoliko dobije garanciju, u obliku i obezbjeđenu od strne subjekta kojeg investitor odobrava, u iznosima i u valutama koja su itovjetna isplati.

Izvođač obezbjeđuje da je garancija važeća i da je na snazi, sve dok izvođač nije završio radove i otklonio bilo kakve nedostatke, kao što je navedeno u potvrdi o dobro izvršenom polsu, u podklauzuli 4.2 i u skladu sa tim se garancija vraća izvođaču. Ovo plaćanje je u skladu sa plaćanjem druge polvine garantnog depozita, u okviru drugog stava podklauzule 14.9

Podklauzula 14.15 Valute plaćanja

Ukoliko se sva plaćanja vrše u lokalnoj valuti, ona mora biti naznačena u ugovornom sporazumu i u tom slučaju važi samo prva rečenica ove podklauzule. Druga mogućnost je, da se u tom slučaju, podklauzula može zamijeniti:

PRIMJER PODKLAUZULE ZA JEDNOVALUTNI UGOVOR

Obračunska valuta je lokalna valuta i sva plaćanja u skladu sa ugovorm, vrše se u lokalnoj valuti. Plaćanja u lokalnoj valuti moraju da budu potpuno konvertabilna, osim onih za lokalne troškove. Procenat koji se pripisuje lokalnim troškovima, navodi se u tenderu.

Finansijski aranžmani

U slučaju većih ugovora na nekim tržištima, može se ukazati potreba za obezbjeđivanjem finansijskih sredstava od subjekata, kao što su to agencije za pomoć, banke za razvoj, agencije za kreditiranje izvoza i ostale međunarodne finansiske institucije. Ako se finansiranje obezbjeđuje iz nekog od takvih izvora, u posebne uslove bi trebalo da se unesu njegovi posebni zahtjevi. Tačna formulacija zavisiće od dotične institucije, tako da je potrebno da se povjerilac njoj obrati, da bi saznao njene uslov i da traži odobrenje nacrta tenderske dokumentacije.

Ovi zahtjevi mogu da uključe tendersku proceduru, koje je potrebno usvojiti, kako bi eventualni ugovor ispunjavao uslove u pogledu finansiranja i/ili posebne podklauzule, za koje će možda biti neophodno, da postanu dio posebnih uslova. Sledeći primjeri ukazuju na neke teme, koje zahtjevi institucija mogu da pokrivaju:

(a) zabrana diskriminacije špediterskih kompanije bilo koje zemlje;
(b) obezbjediti da ugovor podliježe neutralnom zakonu, koji je široko prihvaćen;
(c) odredbe o arbitraži u okviru priznatih, međunarodnih pravila i na neutralnoj lokaciji;
(d) davanje prava izvođaču da obustavi/raskine ugovor u slučaju neizvršavanja prema finansijskim aranžmanima;
(e) ograničavanje prava na neodobravanje postrojenje;
(f) navođenje dospjelih plaćanja u slučaju raskida;
(g) navođenje da ugovor ne stupa na snagu, dok određeni uslovi nisu ispunjeni, uključujući uslove prije isplate za aranžmane finansiranja;
(h) obavezivanje investitora da vrši plaćanja iz sopstvenih izvora ukoliko, iz bilo kog razloga, sredstva u okviru finansijskih aranžmana nisu dovoljna da se izvrše plaćanja izvođaču, bez obzira da li je riječ o neizvršavanju u okviru finansijskih aranžmana ili zbog nečeg drugog.

Pored toga, institucija za finansiranje ili banka će možda željeti da ugovor uključi pozivanje na finansijske aranžmane, naročito ako sredstva finansiranja dolaze iz više izvora finansiranje, kako bi se finansirali različiti elementi nabavke.Nije neuobičajeno da posebni uslovi sadrže odredbe koje identifikuju razne kategorije postrojenja i navode dokumentaciju koja se podnosi relevantnoj finansijskoj instituciji radi dobijanja sredstava. Ako se ne ispune zahtjevi finansijske institucije, može biti teško (pa čak i nemoguće) da se obezbjedi odgovarajuće finansiranje projekta i ta institucija mogla bi da odbije finansiranje ugovora u cjelini ili djelimično.

Međutim, kada finansiranje nije vezano za izvoz robe i usluga iz određene zemlje, već se jednostavno obezbjeđuju na osnovu zajma odobrenom investitoru od strane komercijalnih banaka, te banke mogu da se postaraju o tome da prava investitora budu veoma ograničena. Ove banke bi možda željele da se ugovor ne poziva na finansijske aranžmane i/ili da ograniče pravo izvođača, u okviru podklauzule 16.

OBRAZAC PODKLAUZULE KOJI MOŽE DA TRAŽI INSTITUCIJA ZA FINANSIRANJE

Ugovorna cijena se sastoji od sledećeg

(podijeliti po pozicijama /ili nabavka /isporuku/itd.)

i investitor je plaća izvođaču, kao što je prikazano u nastavku.

(a) .....% ukupne ugovorne cijene investitor plaća izvođaču direktim putem, u roku od 28 dana od datuma i platiće se uz predaju sledeću dokumentaciju:
(i)komercijalna faktura adresirana na investitora, navodeći iznos sada dospijelog plaćanja
(ii) garancija za avansno plaćanje, koju izdaje banka u priloženoj formi
(iii) potvrda o dobro izvršenom poslu, koju izdaje banka u priloženoj formi i
(iii) Privremena Situacija, koja potvrđujeda je plaćanje prispjelo sa navedenim iznosom

(b) .....% ugovorne cijene za snabdijevanje postrojenja, se plaća na sledeći način:
I. .....% procijenjene vrijednosti isporučenog postrojenja, direktnim plaćanjem izvođaču od strane investitora, po otpremi svakog dijela, po predaji sledećih dokumenata:
(original) komercijalne fakture
(original) dokumentacija o isporuci
(original) potvrda o porijeklu
(original) potvrda o osiguranju, i (original) Privremene situacije predstavnika investitora, koji potvrđuje da je plaćanje dospjelo sa navedenim iznosom.

II. .....% procijenjene ugovorne vrijednosti isporučenog postrojenja, plaćanjem izvođaču iz ugovora o zajmu, nakon što pokaže povrdu o kvalifikovanju, u formi koja je priložena i kopija dokumenata, koji su navedeni u podstavu (b) (I).

(c) Preostali dio ugovorne cijene se plaća na sledeći način:
I. .....% procijenjene vrijednosti pruženih usluga, neposrednim plaćanjem izvođača od strane investitora, po izvršenjuodređenih usluga, uz podnošenje sledećih dokumenata: (original) komercijalne fakture i (original) Privremene Situacije predstavnika investitora, koja potvrđuje da je plaćanje dospjelo sa navedenim iznosom
II. .....% procijenjene vrijednosti ugovora pruženih usluga, plaćanjem izvođaču iz ugovora o zajmu, nakon što pokaže potvrdu o kvalifikovanju, u formi koja je priložena i kopije dokumenata, koji su navedeni u podstavu (c) (i)

(d) Direktna plaćanja od strane investitora,koja su navedena u podstavu (b) vrše se putem neopozivog akreditiva, ustanovljenog od strane investitora, a u korist izvođača i potvrđeno od strane banke, koja je prihvatljiva izvođaču.

Druga mogućnost je da izvođač bude voljan da inicira finansijske aranžmane i da zadrži odgovornost za njih, iakon on vjerovatno nije u mogućnosti da obezbjedi sredstva iz sopstvenih izvora ili nije vojan da to učini. Tada bi uslovi njegove finansirajuće banke uticali na njegov stav

u pregovorima za ugovor. Ona može da od investitora zahtijeva da vrši prevremena plaćanja, mada veliki dio ugovorne cijene može da bude zadržan do završetka radova.

Možda bi bilo dobro da u pripremi tenderske dokumentacije, investitor predvidi takav uslov, obavezujući se da obezbjedi garanciju za element plaćanja, koji izvođaču dospijeva po završetku radova. Prihvtljive obrasce garancija bi treblo unijeti u tendersku dokumentaciju, kao aneks posebnih uslova. Primjer obrasca priložen je uz ovaj dokument, kao Aneks G. Može se dodati sledeća podklauzula.

PRIMJER ODREDBI O FINANSIRANJU IZVOĐAČA

Investitor se obavezuje da pribavi (o sopstvenom trošku) garanciju za plaćanje, a iznos, valuta i njen izdavač navode se u prilogu tendera. Investitor se obavezuje da izvođaču podnese garanciju uroku od 28 dana po zaključenju ugovora. Garancija se izdaje po obrascu, koji je prihvatljiv za izvođača. Sve dok izvođač ne primi garanciju, investitor ne može da podnese obaveštenje, u skladu sa podklauzulom 8.1

Garancija se vraća investitoru:

(a) kada izvođaču bude isplaćen ugovorna cijena, koja je navedena u ugovornom sporazumu;
(b) kada su obaveze, na osnovu garancije, prestale ili su izvršene;
(c) kada je investitor izvršio sve obaveze, u okviru ugovora.

KLAUZULA 15 - RASKID OD STRANE INVESTITORA

Podklauzula 15.2 - Raskid od strane Investitora

Prije nego sto objavi poziv za podnošenje tendera, Investitor bi trebalo da provjeri da li su tekst ove podklauzule i svaki predviđeni osnov za raskid u skladu sa zakonom koji se primjenjuje na Ugovor.

Podklauzula 15.5 - Pravo investitora na raskid

Može se dodati još jedna rečenica ukoliko nije nedosledna zahtjevima Investitora i/ili finansijske institucije.

PRIMJER

Unijeti sledeći tekst na kraju podklauzule 15.5:

Investitor se takodje obavezuje da Izvođaču nadoknadi svaki gubitak ili štetu koja proistekne iz ovog raskida.

KLAUZULA 16 - OBUSTAVA I RASKID OD STRANE IZVOĐAČA

Podklauzula 16.2 - Raskid od strane Izvođača

Prije nego što objavi poziv za podnošenje tendera, Investitor bi trebalo da provjeri da li je tekst ove podklauzule u skladu sa zakonom koji se primjenjuje na Ugovor. Izvođač bi trebalo da provjeri da li je svaki osnov za raskid u skladu sa tim zakonom.

KLAUZULA 17 - RIZIK I ODGOVORNOST

Podklauzula 17.6 - Ograničenje odgovornosti

PRIMJER

U podklauzuli 17.6, iznos koji se pominje u pretposlednjoj rečenici

jeste _____.

Dodatna podklauzula - Korišćenje smještajnih kapaciteta/pogodnosti Investitora

Ako je predviđeno da Izvođač privremeno zauzme kapacitete Investitora, može se unijeti još jedna podklauzula:

UZORNA PODKLAUZULA

Izvođač preuzima svu odgovornost za staranje o nize navedenim stvarima od dana zauzimanja do dana predaje ili prestanka zauzeća (s tim sto predaja ili prestanak zauzeća mogu da budu posle dana navedenog u Potvrdi o prijemu Radova):

(unijeti pojedinosti)

Ukoliko dođe do gubljenja ili oštećenja bilo koje pomenute stvari dok je Izvođač odgovoran za staranje o njima, iz bilo kojih razloga, osim onih za koje je Investitor odgovoran, Izvođač se obavezuje da o sopstvenom trošku sanira gubitak ili oštećenje na način koji zadovoljava Investitora.

KLAUZULA 18 - OSIGURANJE

U tekstu Opštih uslova navode se osiguranja koja vrši stran koja obezbjeđuje osiguranje, a to je Izvođač, ukoliko nije drugačije predviđeno Posebnim uslovima. Osiguranja koje obezbijedi Izvođač moraju biti u skladu sa Opštim uslovima koji su dogovoreni sa Investitorom. Stoga bi trebalo da se navede da se od podnosioca tendera trazi da iznesu pojedinosti predloženih

uslova. Posebni uslovi trebaju da navedu minimalni iznos pojedinačnog udjela za tačku (d) subklauzule 18.2 i minimalni iznos osiguranja trećeg lica za podklauzule 18.3.

Ako je predviđeno da Investitor obezbijedi bilo koje osiguranje u skladu sa ovom klauzulom, dokumentacija ponude bi trebalo da sadrži pojedinosti u vidu aneksa Posebnih uslova (tako da bi podnosioci tendera mogli da utvrde koji bi im još osiguranje trebalo radi sopstvene zaštite), sa uslovima, ograničenjima, izuzecima i odbicima, a poželjno bi bilo da to bude u formi primjeraka svake polise. Investitoru bi moglo biti teško da izvrši osiguranja navedena u trećem stavu podklauzule 18.2 (za opremu Izvođača koja sadrži i opremu podizvođača), jer Investitor možda ne zna količinu ili vrijednost tih stavki opreme. Može se unijeti sledeća rečenica u Posebne uslove:

PRIMJER

Brisati poslednji stav podklauzule 18.2 i zamijeniti ga sa:

Međutim, osiguranja koja su opisana u prva dva stava podklauzule 18.2 vrši i održava Investitor kao strana koja obezbjeđuje osiguranje, a ne Izvođač.

KLAUZULA 19 - VIŠA SILA

Prije nego sto objavi poziv na podnošenje tendera, Investitor bi trebalo da provjeri da li je tekst ove klauzule u skladu sa zakonom koji se primjenjuje na Ugovor.

KLAUZULA 20 - POTRAŽIVANJA, SPOROVI I ARBITRAŽA

Ugovor treba da sadrži odredbe, koje bez odvraćanja strana od sporazumnog rješavanja sporova, Stranama omogućavaju da sporna pitanja podnose Komisiji za rješavanje sporova (KRS).

Uspjeh postupaka za rješavanje sporova zavisi, pored ostalog, i od povjerenja strana u sporazumno postavljanje lica za članove KRS. Stoga je neophodno da ni jedna strana ne nameće drugoj kandidate za tu funkciju, i ako se neko lice bira u skladu sa podklauzulom 20.3, izbor vrši potpuno nepristrasan entitet. FIDIC je voljan da prihvati takvu ulogu, ako je ovlašćenje za to dato u skladu sa dolje navedenim u podklauzuli 20.3.

Podklauzula 20.2 predviđa određivanje KRS kada jedna od strana saopšti svoju namjeru da spor podnese KRS na rješavanje. Međutim, kod neke vrste projekata, i to naročito onih koji iziskuju ekstezivne radove na gradilištu, gdje bi bilo prikladno da KRS redovno posjećuje gradilište, može se odlučiti da se koriste usluge trajne KRS. U tom slučaju bilo bi potrebno izvršiti izmjene podklauzule 20.2 i 20.4 zajedno sa Prilogom i Aneksom Opštih uslova i Sporazumom o rješavanju sporova kako bi bile u saglasnosti sa odgovarajućim tekstovima FIDIC-ovih Uslova za ugovor o izgradnji.

Podklauzula 20.2 obezbjeđuje dva alternativna aranžmana za KRS:

(a) jedno lice, koje djeluje kao jedini član KRS, po tripatitnom sporazumu sa obje ugovorne strane, ili

(b) KRS koja se sastoji od tri člana, od kojih je svaki zaključio tripatitni sporazum sa obje ugovorne strane.

Dva alternativna obrasca ovog sporazuma data su na kraju ove publikacije, koji se primjenjuju zavisno od usvojenog aranžmana. Ova obrasca sadrže u sebi Opšte uslove sporazuma o rješavanju sporova, koji su dati u Prilogu Opštih uslova, jer se oni takođe pominju u podklauzuli 20.2. U bilo kojoj alternativi Sporazum o rješavanju sporova, svako lice pominje se kao član.

Prije zaključivanja Ugovora, trebalo bi utvrditi da li bi jednočlana ili tročlana KRS bila prikladija u datom projektu, uzevši u obzir njegovu veličinu, trajanje i oblast stručnosti.

Određivanje KRS može da se olakša aako se u Ugovor unese spisah potencijalnih članova.

Podklauzula 20.3 Nepostizanje saglassnosti oko Komisije za rješavanje sporova

PRIMJER

Predsjednik FIDIC-a ili lice koje on imenuje biće postavljeni subjekat ili predstavnik.

Podklauzula 20.5 Prijateljsko rješavanje

Odredbe ove podklauzule predviđene su da se ugovorne strane podstaknu na rješavanje sporova na prijateljski način, bez pribjegavanja arbitraži, na primjer putem neposredih pregovora, mirenja, posredovanja i ostalih oblika alternativnog rješavanja sporova. Uspjeh postupka za prijateljsko rješavanje sporova zavisi od povjerenja i obostranog prihvatanja postupka. Stoga nijedna strana ne smije da ovaj postupak nameće drugoj.

Podklauzula 20.6 Arbitraža

Ugovor bi trebalo da sadrži odredbe za rješavanje putem međunarodne arbitraže sporova koji ne budu riješeni na prijateljski način. U slučaju međunarodnih ugovora za izgradnju, međuarodna trgovačka arbitraža ima mnogo prednosti u odnosu na parnične postupke pred domaćim sudovima i ona može biti prihvatljivija stranama.

Potrebno je da se strogo vodi računa o tome da izabrana pravila međunarodne arbitraže budu u skladu sa odredbama klauzule 20 i ostalim elementima navedenim u Ugovoru. Pravila arbitraže Međunarodne trgovačke komore (čije je sjedište u 38 Cours Albert 1er, 75008 Pariz, Francuska) često se uključuju u međunarodne ugovore. U nedostatku dogovora o broju arbitara i mjestu arbitraže, Međunarodni arbitražni sud Međunarodne trgovačke komore odlučuje o broju arbitara (obično biva po tri u većim sporovima) i mjestu arbitraže.

U slučaju opredjeljenja za pravila UNCITRAL-a (ili neka druga pravila arbitraže), bilo bi potrebno da se u Posebnim uslovima navede institucija koja određuje arbitra ili koja će voditi

arbitražu, ukoliko takva institucija nije navedena (i njena uloga precizirana) u pravilima arbitraže. Takođe bi bilo potrebno prije određivanja institucije da se utvrdi spremnost za postavljenje.

U slučaju većih projekara za koje se tenderi podnose na medjunarodnom nivou, poželjno je da mjesto arbitraže ne bude u zemlji Investitora ili Izvođača. Ta zemlja bi trebalo da ima moderan i liberanan zakon o arbitraži i da je ratifikovala bilateralnu ili multilateralnu konvenciju (kao što je Njujorška konvencija o priznavanju i primjeni inostranih arbitražnih odluka) ili obje, što bi pospješilo primjenu arbitražne odluke u državama ugovornih strana.

U nekim slučajevima bilo bi poželjno da se i druge strane pridruže arbitraži između ugovornih strana, čime bi se stvorila višestrana arbitraža. Iako je to izvodljivo, višestrana arbitraža iziskuje stručno planiranje i obično se priprema od slučaja do slučaja. Za sada ne postoji zadovoljavajući standardni oblik klauzule o višestranoj arbitraži za međunarodnu primjenu.

ANEKSI - OBRASCI GARANCIJA

Potrebno je da se prihvatljivi obrazci unesu u tendersku dokumentaciju, i to: za Aneks A i/ili B, u uputstvima za podnosioce tendera, i za Anekse C do G, kao prilog posebnih uslova. Sledeći primjeri obrazaca koji su (izuzev Aneksa A) obuhvataju jedinstvena pravila koje je objavila Međunarodna trgovačka komora (čije je sjedište u ulici 38 Cours Albert 1er. 75008, Pariz, Francuska), možda bi morali da se izmjene radi usaglašavanja sa važećim zakonom. Iako Međunarodna trgovačka komora objavljuje priručnike za pomenuta jedinstvena pravila, bio bi potreban pravni savjet prije nego šro se pripreme garancije. Iznos garancije trebalo bi da se navede u svim valutama u kojim je ugovorom predviđeno da garanti plaćaju korisnicima.

Aneks A - PRIMJER OBRASCA GARANCIJE MATIČNE KOMPANIJE

(pogledati stranu 4. i komentare o podklauzuli 1.14)

Kratak opis ugovora.....

Naziv i sjedište kompanije.....

.....(sa pravnim sljedbenicima i cesionarima).

Obavješteni smo da.....(u daljem tekstu: izvođač) podnosi ponudu za pomenuti ugovor u odgovoru na vaš poziv i da je po uslovima vašeg poziva potrebno da njegova potvrda bude potkrijepljena garancijom matične kompanije.

U slučaju da u svojstvu investitora dodijelite izvođaču, mi (naziv matične kompanije)..... neopozivo i bezuslovno garantujemo, u prvom redu za valjano izvršavanje svih izvođačevih ugovornih obaveza i odgovornosti, uključujući i njegovo postupanje u skladu sa svim uslovima ugovora prema njihovoj stvarnoj svrsi i značenju.

Ukoliko izvođač ne izvrši svoje obaveze i ne postupi u skladu sa ugovorom, obavezujemo se da investitora obeštetimo za svu štetu, gubitke i troškove (uključujući sudske troškove) koji nastanu zbog neizvršavanja obaveza za koje je izvođač odgovoran investitoru, na osnovu ugovora.

Ova garancija postaje pravosnažna po potpunoj pravosnažnosti ugovora. Ukoliko ugovor ne postane pravosnažan u roku od godinu dana od dana izdavanja ove garancije ili ako pokažete da nemate namjeru da zaključite ugovor sa izvođačem, ova garancija će postati ništavna. Ova garancija ostaje na snazi sve dok izvođač ne izvrši sve svoje obaveze po ugovoru, nakon čega njena važnost ističe i ona se nama vraća, a naše obaveze po ovom poslu će se smatrati u potpunosti izvršenim.

Ova garancija se odnosi na ugovor i predstavlja prilog ugovoru sa svim svojim izmjenama i dopunama, koje investitor i izvođač budu izvršili u bilo kojem trenutku. Ovim ih ovlašćujemo da se dogovore o takvim izmjenama i dopunama i garantujemo za valjano izvršenje istih. Naše obaveze i odgovornosti, na osnovu ove garancije, ne mogu da prestanu zbog produženja roka ili drugih povlastica koje investitor bude dao izvođaču ili zbog izmjena ili obustavljanja radova koji se izvode po ugovoru ili zbog izmjena i dopuna ugovora ili ustrojstva izvođača ili investitora ili zbog drugih stvari, sa ili bez našeg znanja ili saglasnosti.

Mjerodavno pravo za ovu garanciju je ono pravo koje je mjerodavno i za ugovor, a bilo kakav spor po na osnovu ove garancije rješava se po pravilima arbitraže Međunarodne trgovačke komore od strane jednog ili više arbitara koji su postavljeni u skladu sa ovim pravilima. Potvrđujemo da se naknada iz ove garancije može prenijeti samo pod uslovima za prenos koji su ugovorom predviđeni.

Datum.....
Potpis.....

ANEKS B - PRIMJER OBRASCA GARANCIJE ZA TENDER

(pogledati stranu 4)

Kratak opis ugovora.....

Naziv i sjedište korisnika.....

.....(koji je u tenderskoj dokumentaciji definisan kao investitor).

Obavješteni smo da..... (u daljem tekstu: komitent) predaje ponudu za ugovor, kao odgovor na vaš poziv, i da uslovi vašeg poziva ("uslovi poziva", koji su objašnjeni u dokumentu, koji je naslovljen "uputstva podnosiocima tendera") zahtijevaju da njegova ponuda bude potkrijepljena garancijom za tender.

Na zahtjev komitenta, mi (naziv banke)..... se ovim neopozivo obavezujemo da vama, korisniku/investitoru, isplatimo bilo koji iznos, koji ne premašuje..... (i slovima)....., po prijemu vašeg zahtjeva u pisanoj formi i vaše pisane izjave u (u zahtjevu) u kojoj se navodi:

(a) da je komitent bez vaše saglasnosti povukao svoju ponudu po isteku posljednjeg roka za njeno dostavljanje i prije isteka roka važnosti ponude, ili
(b) da je komitent odbio da prihvati ispravku grešaka u svojoj ponudi, u skladu sa pomenutim uslovima poziva, ili
(c) da ste ugovor dodijelili komitentu i da on nije dostavio potvrdu o dobro izvršenom poslu, u skladu sa podklauzulom 4.2 uslova ugovora.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom, ovjerenim od strane vaših bankara ili notara. Ovjereni zahtjev i izjava moraju da nam se podnesu u našim prostorijama (do 35. dana po isteku važnosti tendera), kada ova garancija prestaje da važi i kada se nama vraća.

Ova garancija podliježe jedinsvenim pravilima o potražnim garancijama, koja su objavljena od strane Međunarodne trgovačke komore pod brojem 458, osim u gore navedenim slučajevima.

Datum.....
Potpis(i).....

ANEKS C - PRIMJER OBRASCA GARANCIJE ZA DOBRO IZVRŠENI POSAO

(vidjeti komentare o podklauzuli 4.2)

Kratak opis ugovora.....

Naziv i sjedište korisnika.....

.....(koji je u ugovoru definisan kao investitor).

Obavješteni smo da je..... (u daljem tekstu: komitent) vaš izvođač po pomenutom ugovoru, kojim je predviđeno da on podnese garanciju za dobro izvršavanje posla.

Na zahtjev komitenta, mi (naziv banke)..... se ovim neopozivo obavezujemo da vama, krisniku/investitoru, isplatimo bilo koji iznos ili iznose koji ne premašuju..... (i slovima.....) po prijemu vašeg zahtjeva u pisanoj formi i vaše pisane izjave (u zahtjevu) u kojoj se navodi:

(a) da komitent krši svoje ugovorne obaveze, i
(b) u kom pogledu komitent krši te obaveze.

(Po prijemu ovjerenog primjerka potvrde o prijemu svih radova, u skladu sa klauzulom 10. uslova ugovora, taj garantovani iznos se smanjuje za.....% i odmah ćemo vas obavijestiti da smo primili takvu potvrdu i da smo garantni iznos umanjili u toj mjeri)[1].

Svaki zahtjev za isplatu mora da bude sa vašim potpisom (potpisom ministra/direktora) koji je ovjeren od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se podnesu u našim prostorijama do (70 dana prije očekivanog isteka roka za prijavljivanje nedostataka radova).....(datum isteka), kada ova garancija prestaje da važi i kada se vraća nama.

Obavješteni smo da korisnik može da od komitenta traži produženje ove garancije ukoliko potvrda o valjanom izvršenju posla ne bude izdata najmanje 28 dana prije datuma isteka. Obavezujemo se da vam isplatimo takav garantni iznos u roku od 28 dana od prijema vašeg zahtjeva i izjave u pisanoj formi da potvrda o valjanom izvršenju posla nije izdata iz razloga koji se pripisuju komitentu i da ova garancija nije produžena.

Ova garancija podliježe..... i jedinstvenim pravilima o potražnim garancijama, koje je izdala Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima.

Datum.....
Potpis(i).....

[1] Prilikom izrade tenderske dokumentacije, lice koje priprema tendersku dokumentaciju bi trebalo da odluči da li da unese tekst, koji nije obavezan, u zagradi ().

ANEKS D - PRIMJER OBRASCA GARANCIJE ZA DOBRO IZVRŠENJE POSLA - ZA OBEZBJEĐENJE

(pogledati komentare o podklauzuli 4.2)

Kratak opis ugovora.....

Naziv i sjedište korisnika.....

.....(zajedno sa pravnim sljedbenicima i cesionarima, koji su u ugovoru definisani kao investitor).

Ovom garancijom, (naziv i sjedište izvođača).....(koji je izvođač po takvom ugovoru), kao komitent i (naziv i sjedište garanta).....kao garant se neopozivo obavezuju korisniku za ukupan iznos od.....(garantni iznos, i slovima.....) za valjano izvršavanje svih obaveza i odgovornosti komitenta. (Takav garantni iznos se umanjuje za.....% po izdavanju potvrde o prijemu radova u cjelini, u skladu sa klauzulom 10. uslova ugovora).[2]

Garancija postaje pravosnažna na datum početka, koji je preciziran u ugovoru.

Ako komitent ne izvrši bilo koju svoju ugovornu obavezu ili po nastanku bilo kog događaja ili okolnosti navedenih u podklauzuli 15.2 uslova ugovora, garant se obavezuje da namiri i nadoknadi štetu koju korisnik bude pretrpio zbog takvog neizvršavanja, događaja ili okolnosti.[3] Međutim, sveukupna odgovornost garanta ne premašuje garantni iznos.

Obaveze i odgovornosti garanta ne mogu da prestanu zbog produženja roka ili drugih povlastica koje korisnik bude dao komitentu, ili zbog izmjena ili obustavljanja radova koji se izvode po ugovoru ili zbog izmjena i dopuna ugovora ili ustrojstva komitenta ili korisnika ili zbog drugih stvari, sa ili bez znanja ili saglasnosti garanta.

Svako potraživanje po ovoj garanciji mora da se podnese garantu do (datum je šest mjeseci poslije očekivanog isteka roka za prijavu nedostataka radova).....(datum isteka), kada ova garancija prestaje da važi i kada se vraća garantu.

Naknada po ovoj garanciji može da se prenese, u skladu sa odredbama za prenos ugovora, pod uslovom da se garantu podnese dokaz o potpunom postupanju u skladu sa tim odredbama.

---

[2] Prilikom izrade tenderske dokumentacije, lice koje priprema tendersku dokumentaciju bi trebalo da odluči da li da unese tekst, koji ne obavezan, u zagradi.

[3] Dodati: (i neće imati pravo da izvršava ugovorne obaveze komitenta.)

ili: (ili po izboru garanta, koji se iskazuje u pisanoj formi, u roku od 42 dana od prijema potraživanja, u kome se navodi takvo neizvršavanje, da izvršava ugovorne obaveze komitenta)

Garancija podliježe zakonima iste zemlje čijim zakonima podliježe i ugovor. Ova garancija obuhvata i podliježe jedinstvenim pravilima o potražnim garancijama koja je izdala Međunarodna trgovačka komora pod brojem 524 i riječi koje se koriste u ovoj garanciji imaju značenje koje im je dato u pomenutim pravilima.

Ovu garanciju su izdali komitent i garant dana.....

Potpisao u ime komitenta.....

Potpisao u ime garanta.....

Aneks E – UZORNI OBRAZAC GARANCIJE ZA AVANSNA PLAĆANJA

[vidjeti komentare o podklauzuli 14.2]

Kratak opis Ugovora _____

Naziv i sjedište Korisnika _____
_____(koji je u Ugovoru definisan kao Investitor).

Obaviješteni smo da je _____ (u daljem tekstu: Komitent) vaš izvođač po pomenutom Ugovoru i da želi da mu bude isplaćen avans, za šta je po Ugovoru obavezan da obezbijedi garanciju.

Na zahtjev Komitenta, mi (naziv banke) _____ se neopozivo obavezujemo da isplatimo vama, Korisniku/Investitoru, bilo koji iznos ili iznose koje sve skupa ne premašuju _____(garantni iznos, i slovima _____) po prijemu vašeg zahtjeva i izjave u pisanoj formi u kojoj se navodi:

(a) da Komitent nije izvršio povraćaj avansa u skladu sa uslovima Ugovora, i

(b) iznos koji Komitent nije vratio.

Ova garancija postaje pravosnažna kada Komitent primi (prvu tranšu) avansa. Pomenuti garantni iznos se umanjuje za iznose avansu koji vama budu vraćeni prema vašim obavještenjima izdatim u skladu sa podklauzulom 14.6 uslova Ugovora. Po prijemu (od Komitenta) primjerka svakog obavještenja, odmah ćemo vam saopštiti izmijenjeni saldo garantnog iznosa.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom koji je ovjeren od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se dostave do (*u roku od 70 dana o očekivanog isteka Roka za završetak*) _____ (datum isteka), kada ova garancija prestaje da važi i vraća se nama.

Obaviješteni smo da Korisnik može da od Komitenta traži produženje garancije, ako avans ne bude vraćen najmanje 28 dana pre pomenutog datuma isteka. Obavezujemo se da vam pomenuti garantni iznos isplatimo u roku od 28 dana od prijema vašeg zahtjeva i izjave u pisanoj formi da vans nije vraćen i da ova garancija nije produžena.

Ova garancija podliježe zakonima _____ i Jedinstvenim pravilima o potražnim garancijama koja je izdala Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima

Datum _____ Potpis(i) _____

Aneks F – UZORNI OBRAZAC GARANCIJE ZA GARANTNI DEPOZIT

[vidjeti komentare o podklauzuli 14.9]

Kratak opis Ugovora _____

Naziv i sjedište Korisnika _____
_____(koji je u Ugovoru definisan kao Investitor).

Obaviješteni smo da je _____ (u daljem tekstu: Komitent) vaš izvođač po pomenutom Ugovoru i da želi prevremenu isplatu garantnog depozita (ili njegovog dijela), za šta je po Ugovoru obavezan da obezbijedi garanciju.

Na zahtjev Komitenta, mi (naziv banke) _____ se ovim neopozivo obavezujemo da vama, Korisniku/Investitoru, isplatimo svaki iznos ili iznose koji skupa ne premašuju _____(garantni iznos, i slovima _____) po prijemu vašeg zahtjeva i izjave u pisanoj formi u kojoj se navodi:

(a) da Komitent nije izvršio svoju obavezu da otkloni nedostatke za koje je odgovoran na osnovu Ugovora, i

(b) priroda pomenutih nedostataka.

Naša odgovornost po ovoj garanciji ne može da bilo kada premaši iznos garantnog depozita koji je Komitentu prenet sa vaše strane, što se potvrđuje vašim obavještenjima izdatim u skladu sa podklauzulom 14.6 uslova Ugovora, čiji su primjerci nama proslijeđeni.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom ovjerenim od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se podnesu do (*u roku od 70 dana od očekivanog isteka Roka za prijavljivanje radova*) _____ (datum isteka), kada ova garancija prestaje da važi i vraća se nama.

Obaviješteni smo da Korisnik može da od Komitenta traži produženje ove garancije, ako Ugovorom predviđena potvrda o valjano izvršenom poslu ne bude izdata najmanje 28 dana pre pomenutog roka. Obavezujemo se da vam pomenuti garantni iznos isplatimo u roku od 28 dana od prijema vašeg zahtjeva i izjave u pisanoj formi da potvrda o valjanom izvršenju posla nije izdata iz razloga koji se ne mogu pripisati Komitentu i da ova garancija nije produžena.

Ova garancija podliježe zakonima _____ i Jedinstvenim pravilima o potražnim grancijama koja je izdala Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima.

Datum _____ Potpis(i) _____

Aneks G – **UZORNI OBRAZAC GARANCIJE ZA PLAĆANJE OD STRANE INVESTITORA**

[vidjeti str. 194: Finansiranje izvođača]

Kratak opis Ugovora _____

Naziv i sjedište Korisnika _____
_____(koji je u Ugovoru definisan kao Izvođač).

Obaviješteni smo da je _____ (koji je u Ugovoru definisan kao Investitor i koji se u daljem tekstu pominje kao Komitent) u obavezi da obezbijedi bankarsku garanciju.

Na zahtjev Komitenta, mi (naziv banke) _____ se neopozivo obavezujemo da vama, Korisniku/Izvođaču, isplatimo svaki iznos ili iznose koji skupa ne premašuju _____(i slovima: _____) po prijemu vašeg zahtjeva i izjave u pisanoj formi u kojoj se navodi:

(a) da Komitent nije isplatio u potpunosti iznos koji je dospio po Ugovoru u roku od 14 dana od isteka roka predviđenog Ugovorom za takvu isplatu, i

(b) iznos koji Komitent nije isplatio.

Uz svaki zahtjev za plaćanje prilaže se primjerak (spisak dokumenata koji dokazuju pravo na isplatu) _____, u vezi kojeg Komitent nije izvršio isplatu u potpunosti.

Svaki zahtjev za isplatu mora da bude sa vašim potpisom ovjerenim od strane vaše banke ili javnog bilježnika. Ovjereni zahtjev i izjava moraju da nam se podnesu do (*u roku od 70 dana od očekivanog isteka Roka za prijavljivanje nedostataka*) _____, kada ova garancija prestaje da važi i vraća se nama.

Ova garancija podliježe zakonima _____ i Jedinstvenim pravilima o potražnim garancijama koja je objavila Međunarodna trgovačka komora pod brojem 458, osim u gore navedenim slučajevima.

Datum _____ Potpis(i) _____

Opšti uslovi

Savjeti za pripremu

posebnih uslova

Uslovi ugovaranja za PNI/ključ u ruke projekte

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

Obrasci ponuda, ugovora i

sporazuma o rješavanju sporova

Međunarodna Federacija Konsalting Inženjera

PONUDA

NAZIV UGOVORA:

PRIMA:

Pregledali smo Uslove ugovora, Zahtjeve investitora, Planove i preglede, Prilog i Dodatke br. _____ za pomenute Radove. Pregledali smo, razumjeli i provjerili te dokumente i utvrdili da u njima nema grešaka i drugih manjkavosti. Stoga se nudimo da projektujemo, izvedemo i završimo Radove i da otklonimo njihove eventualne nedostatke u skladu sa ovom Ponudom koja sadrži sva ta dokumenta i ponudu za paušalni iznos od

(u valutama plaćanja) _____

Prihvatamo vaše predloge u vezi određivanja KRS, kako je predviđeno u planu _____

*[Plan smo kompletirali unošenjem naših predloga u vezi drugog Člana KRS, ali naši uslovi nisu i uslovi ove ponude]. **

Pristajemo da se držimo ove Ponude do _____ i on ostaje obavezujući za nas i može da bude prihvaćen bilo kada prije pomenutog datuma. Potvrđujem da Prilog sačinjava sastavni dio Ponude.

Ukoliko ova ponuda bude prihvaćena, obavezujemo se da obezbijedimo predviđenu garanciju za valjano izvršenje posla, da otpočnemo izvođenje Radova u što je moguće kraćem roku posle Datuma početka i da završimo radove u skladu sa gore pomenutim dokumentima u Roku za završetak. Garantujemo da će Radovi tada biti u skladu sa garancijama.

Sve do pripreme i zaključenja zvaničnog Ugovora, ova Ponuda skupa sa vašom potvrdom o prihvatanju istog sačinjavaće obvezujući ugovor između nas.

Poznato nam je da niste u obavezi da prihvatite najnižu ili bilo koju drugu ponudu koju budete primili.

Potpis _____ u svojstvu _____

Koji je ovlašćen za potpisivanje ponude u ime _____

_____

Adresa: _____

_____

Datum: _____

* Ako podnosilac tendera ne prihvata, ovaj se stav može brisati i zamijeniti sledećim stavom.

Ne prihvatamo vaše uslove za određivanje KRS. Mi smo unijeli naše predloge u plan, ali ti predlozi ne predstavljaju uslove ove ponude. Ako su vam naši predlozi neprihvatljivi, predlažemo da se KRS zajednički odredi u skladu sa podklauzulom 20.2 Uslova ugovora.

UGOVOR

Ovaj sporazum sačinjen dana.....20.....

Između.....(u daljem tekstu ,,Investitor") sa jedne strane

i.....(u daljem tekstu "Izvođač") sa druge strane

Pošto investitor želi da radovi, poznati kao.....treba da budu projektovani i izvedeni od strane izvođača i prihvatio je ponudu izvođača za projektovanje, izvođenje i kompletiranje radova i uklanjanje svih nedostataka na istim.

Investitor i izvođač su saglasni sa sledećim:

1. U ovom sporazumu, riječi i izrazi će imati ista značenja kao ona koja su im dodijeljena u uslovima ugovorau daljem tekstu.

2. Sledeća dokumenta ćine i biće shvaćena i tumačena kao sastavni dio ovog sporazuma:

    (a) Memorandumi koji su priloženi uz ovaj dokument (što uključuje i analizu ugovorne cijene po stavkama)
    (b) Dopune.....
    (c) Uslovi ugovora
    (d) Zahtjevi investitora, i
    (e) Ponuda izvođača

3. Uzevši u obzir plaćanja koja će biti izvršena izvođaču od strane investitora, kao što je u daljem tekstu pomenuto, izvođač se ovim ugovorom dogovorio sa investitorom da projektuje, izvede i kompletira radove i ukloni sve nedostatke u skladu sa odredbama ugovora
4. Investitor je saglasan da plati izvođaču, uzevši u obzir projektovanje, izvođenje, i kompletiranje radova i uklanjanje nedostataka, finalnu ugovornu cijenu, u rokovima i na način propisan ugovorom.
5. Ugovor stupa na snagu na dan kada su sledeći uslovi ispunjeni:
   (spisak preduslova)

   Investitor blagovremeno potvrđuje izvođaču datum kada su svi ovi uslovi ispunjeni. Ukoliko neki od ovih uslova nije ispunjen u roku od nekoliko dana u odnosu na gore navedeni datum kada je ovaj sporazum napravljen, ovaj Sporazum biće ništavan i neće proizvoditi pravno dejstvo i sve hartije od vrijednosti izdate u vezi sa radovima biće vraćene.

Kao svjedočanstvo o tome, strane su stavile svoje potpise na ovaj ugovor dana i godine, koji su na početku napisani, u skladu sa njihovim relevantnim zakonima.

Potpisano od strane:

U ime investitora i u prisutvu svedoka:

Svjedok:

Ime:

Adresa:

Datum:

Potpisano od strane:

U ime investitora i u prisutvu svedoka:

Svjedok:

Ime:

Adresa:

Datum:

SPORAZUM O RJESAVANJU SPOROVA

(za jednočlanu KRS)

Naziv i pojedinosti Ugovora _____

Naziv i sjedište Investitora _____

Naziv i sjedište Izvođača _____

Ime i adresa člana _____

Pošto su Investitor i Izvođač zaključili Ugovor i žele da zajednički odrede člana koji ce da djeluje kao jedini presuđivač u sporu pokrenutom u vezi _____.

Investitor, Izvođač i Član su se sporazumjeli kako slijedi:

1. Uslove ovog sporazuma o rješavanju sporova predstavljaju opšti uslovi sporazuma o rješavanju sporova, koji su dati u vidu dodataka opštih uslova 1. izdanja uslova ugovora za EPC/ključ u ruke projekte objavljenog od strane FIDIC-a 1999. godine i sledeće odredbe. Riječi i izrazi koji se koriste u pomenutim odredbama, koje uključuju Izmjene i dopune opštih uslova sporazuma za rješavanja sporova, imaju isto onakvo značenje kakvo im je pripisano u opštim uslovima sporazuma za rješavanje sporova.

2. (Pojedinosti vezane za izmjene i dopune opštih uslova sporazuma za rješavanje sporova, ukoliko su vršene.)

3. U skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, članu se isplaćuje dnevna naknada u iznosu od _____.

4. U zamjenu za pomenutu naknadu i ostala plaćanje koja ce investitor i izvođač vršiti u skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, član se obavezuje da djeluje kao presuđivač u skladu sa sporazumom o rješavanju sporova.

5. Investitor i Izvođač se solidarno obavezuju da plaćaju članu za pružanje pomenutih usluga u skladu sa klauzulom 6. Opštih uslova sporazuma o rješavanju sporova.

6. Ovaj sporazum o rješavanju podliježe zakonima _____.

POTPISAO:	POTPISAO:	POTPISAO:
za i u ime investitora u prisustvu	za i u ime investitora u prisustvu	član u prisustvu

Svjedok: _____	Svjedok: _____	Svjedok: ____
Ime: _____	Ime: _____	Ime: _____
Adresa: _____	Adresa: _____	Adresa: _____
Datum: _____	Datum: _____	Datum: _____

(Unijeti kratak opis ili naziv spora.)

SPORAZUM O KOMISIJI ZA RJESAVANJE SPOROVA

(za svakog člana KRS)

Naziv i pojedinosti Ugovora _____

Naziv i sjedište Investitora _____

Naziv i sjedište Izvođača _____

Ime i adresa člana _____

Pošto su Investitor i Izvođač zaključili ugovor i žele da zajednički odrede člana koji će da djeluje kao jedno od tri lica koja se zbirno nazivaju KRS (i žele da član djeluje u svojstvu predsedavajućeg) u rješavanju spora koji je nastao u vezi _____.

Investitor, Izvođač i član su se sporazumjeli kako slijedi:

1. Uslove ovog sporazuma o rješavanju sporova predstavljaju opšti uslovi sporazuma o rješavanju sporova, koji su dati u vidu dodataka opštih uslova 1. izdanja uslova ugovora za EPC/ključ u ruke projekte objavljenog od strane FIDIC-a 1999. godine i sledeće odredbe. Riječi i izrazi koji se koriste u pomenutim odredbama, koje uključuju Izmjene i dopune opštih uslova sporazuma za rješavanja sporova, imaju isto onakvo značenje kakvo im je pripisano u opštim uslovima sporazuma za rješavanje sporova.

2. (Pojedinosti vezane za izmjene i dopune opštih uslova sporazuma za rješavanje sporova, ukoliko su vršene.)

3. U skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, članu se isplaćuje dnevna naknada u iznosu od _____.

4. U zamjenu za pomenutu naknadu I ostala palacanje koja ce investitor i izvođač vršiti u skladu sa klauzulom 6 opštih uslova sporazuma o rješavanju sporova, član se obavezuje da djeluje u skladu sa sporazumom o rješavanju sporova kao jedno od tri lica koja zajednički djeluju u svojstvu KRS.

5. Investitor i Izvođač se solidarno obavezuju da plaćaju clanu za pružanje pomenutih usluga u skladu sa klauzulom 6. Opštih uslova sporazuma o rješavanju sporova.

6. Ovaj sporazum o rješavanju podleže zakonima _____.

POTPISAO:	POTPISAO:	POTPISAO:
za i u ime investitora u prisustvu	za i u ime investitora u prisustvu	član u prisustvu
Svjedok: _____	Svjedok: _____	Svjedok: ____
Ime: _____	Ime: _____	Ime: _____
Adresa: _____	Adresa: _____	Adresa: _____
Datum: _____	Datum: _____	Datum: _____

(Unijeti kratak opis ili naziv spora.)

F. Project descriptions and procedures with technical requirements

F. Particular technical requirements

Issue and Revision Record

No.	Date	Originator	Checker	Description
A	26/05/2014	Dj. Debljovic	U. Becker	-

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F4.1. Educational Building 1
“BrankoBožović” Primary School, Podgorica

F4.1.1 Technical description of building and trade works

for energy efficiency improvement in ''BrankoBožović" Primary School in Podgorica

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P.S. "BrankoBožović" Podgorica
Doc. origin:	Final Architectural Design
Date:	March 2014

The purpose of reconstruction of "BrankoBožović"Primary School in Podgorica is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

In terms of envisaged building and trade works, improvement of energy efficiency is achieved through application of following measures:

- Setting up "Demit" thermal facade (thermal insulation at the external side of the walls),
- Thermal insulation and waterproofing of the roof.
  There are three types of roofs:
  -R1, pitched roof of the main school building, covered with burnt clay tiles,
  -R2, parts of the flat roof over the above the gym's locker room and in one part of the entrance hall.
  -R3, roof over the gym.
- Replacement of façade joinery,
- Reduction of the area to be heated with suspended ceiling.

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities. Those works include:

- Dismantling, and then preparation and installation of new vertical and horizontal gutters,
- Dismantling and installation of air conditioning units, cameras, antennas, lights,
- Dismantling and installation of new flashings,
- Removal of protective bars from the windows and installation of new ones,
- Removal of the external emergency stair case metal structure at rear side of the facility (kindergarten entrance) and it's refitting after installation of the ETICS facade,
- Partial renovation /construction of the pavement around the school building,
- Installation of smooth wooden boards for covering the internal expansion joints inside the building.

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned, whereat:

- Reconstruction of sanitary facilities:
  -all toilets, with the exception of toilet for handicapped persons and toilets in the kindergarten (which are not in use),
  -dressing rooms next to the gym,

- Skimming and treatment of walls, painting of all walls using oil-based paint up to the height of 1,5m, while the rest, till the full wall height and the ceilings, shall be treated with semi-dispersed paint,
- Setting up the side entrance canopy used as protection of entrance for kindergarten,
- Planting new trees in school courtyard.

THERMAL INSULATION OF FACADE WALLS

Expanded EPS polystyrene, having thermal conductivity coefficient of λmax = 0,037 W/mK, thickness 8 cm, produced by the relevant EN standards will be used for external insulation of RC facade walls and brick walls. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate. The lower part of the facade walls in the ground floor level (all parapets in the ground floor, pillars and parts of the full wall), will be treated with harder insulating material XPS - extruded polystyrene, thickness d=8cm with nominal thermal conductivity λ=0,035-0,04 W/mK.

The existing mortar plinth shall be completely removed because it is peeling off from the substructure and it shall be finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), size 2.2mm, using at the same time as splash guard and protection against vandalism.Type and colour of the “Kulie” shall be selected by the Employer/Employer's Representative.

Thermal panels with B1 flammability class (DIN 4102 B1 highly anti-flammable, non-combustible and self-extinguishing) shall be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above openings at the floor slab section made pressed mineral wool reaching A1 flammability class. EPS/XPS thickness d=3 cm are used for jambs externally.
Thermal boards are lap-joint and fixed to the facade wall with adequate enriched mineral adhesive and anchored with adequate screw anchor. Board surface is protected with fibrous plaster made of following components:
* the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth.Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case additional mechanical anchoring is required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
* reinforcing mesh;
* the second layer of mortar is applied in the same way as the previous. This mortar shall be applied on a well settled first layer and smoothen with a screed afterwards;
* contact coating, made base on emulsion of synthetic resin and water glass, as agent for impregnation of settled fibrous mortar;
* finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in colour selected by the Employer / Employer’s Representative, fully in line with the Design details.

Prior to installation of thermal plates, following works must be performed:
* all the works on roof, including sheet metal works,
* replacement of facade joinery,
* installation of envisaged installations and equipment on the façade,
* planed partial or total closing of the openings, building new parapets,
* covering and protection of all the surfaces that remained untreated – glass...
* checking existing cradling on the building:

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm shall be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand.

If during separation of polystyrene only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.
If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.
If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.

Corners and jambs of wall openings shall be installed with reinforcing mesh or angle profiles. Facade finishes along the plinth are made with installation of U profile strips adjusted to the thickness of thermal plate.
Prior to installation of plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates shall be additionally anchored using adequate bolts.
During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.

Window benches shall also be thermally insulated. Drips, made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm, are placed over newly fitted window benches. Drips are placed along the entire width of windows and skylights with overhangs.

Concrete shading elements, known as “Brisoleji”, over the windows on the ground floor and the upper floor at the south side of the school façade, shall be insulated using expanded polystyrene- EPS, thickness: d=2 cm. The concrete shading elements shall be finally treated with dash plast, known as “Kulie” (a decorative, ready-mixed, even, smooth marble mortar based on grain, natural color size to 2,2 mm, which is combined with a polymer, acrylic resins giving a homogeneous mixture). Type and colour of the “Kulie” shall be selected by the Employer/Employer's Representative.

Facade Scaffolding
For execution of described works for application of energy efficiency measures in Primary School “BrankoBožović”, in Podgorica it is necessary to install adequate facade scaffold.
Facade scaffold shall be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It shall be used throughout the whole execution of works. Platforms or scaffold shall be used primarily to ensure safety of workers, and then ensure quality execution of required works.
Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.
Note: As per available equipment and works execution technology prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

ROOF THERMAL INSULATION AND WATERPROOFING

Within the use of one of the measures for energy efficiency improvement in the Primary school“ BrankoBožović” in Podgorica, new thermal insulation of the pitched roof slab (roof type: R1), new waterproofing and thermal insulation of flat roof (roof type: R2) as well as the repair of the existing roof covering of the gym (roof type: R3) are foreseen too.

Within the previous works, removal of the existing roof coverings is designed:
R1 Removal of the existing roof covering from the roof above the main school building, consisting of:
-“Sterreberg” interlocking clay tiles,
-cement mortar 2-4 cm and battens.
-Roof covering shall be removed until the RC-slab of the pitched roof is reached.
R2a Removal of existing thermal insulation and waterproofing from the flat impassable roof until reaching concrete floor in following layers (data from existing designs):
- waterproofing 4+2+1 1,5cm
- cement glazing 1:3 2cm

- sloping layer 4-20cm
- roofing paper
- "Heraklith" boards or perlite 3cm
- roofing paper.

R2b Removal of the existing roof cover (waterproofing layer) from the eaves cantilever slabs over the school's entrance and entrance of the dressing rooms.

When the existing roof covers are removed, new covering is foreseen, over previously prepared base:

R1* Covering the roof of the main school building using roof polyurethane composite panels. The panels shall have thermal conductivity ʎ, up to 0,025 W/mK, with a total thickness of at least 8 cm and standard modular width of 1000 mm. Panels shall be fixed to the rectangular metal profiles 60/40/3 mm at the 60-150 cm distance, and over the RC-slab. The upper metal sheet has unique trapezoid shape, d=0,5 mm, while the lower one is standard “SNVs”, d=0,5 mm.

After the roof is covered, valley and roof ridge flashings are foreseen as well as the flashings of the roof parapet walls. This item includes use of all necessary bonding material.

R2a* New horizontal waterproofing and thermal insulation of the impassable flat roofs:

a) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil,
b) Vapour barrier made of the post bituminized aluminum foil lined with glass matt,
c) Thermal insulation made of the plates of extruded polystyrene XPS d =10 cm, with heat transfer coefficient of λmax = 0.033 W / mK (over already applied foil),
d) Layer used for separating from PVC foil,
e) Sloping layer of light-weight concrete d=5-16cm, sloped by 1%,
f) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil,
g) Waterproofing made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminum foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is placed freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing.
h) Heavy protection of waterproofing by means of gravel d = 5 cm, with the sliding layer of waterproof dimpled foil, installed dry between waterproofing and gravel.

R2b* Waterproofing of canopy above main school entrance, entrance to the dressing rooms and cantilever slab, on the sloped layer d=3-8 cm, made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproofed bitumen strip. One strip is lined with aluminum foil, the other with glass matt. Every strip has a thickness of d = 4 mm. The first layer is put freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing.

R3* Repair of the existing roof covering on the gym, 5% of total roof area.

REPLACEMENT OF FACADE JOINERY

Following measure for increasing energy efficiency in Primary school ‘’BrankoBožović’’ in Podgorica includes replacement of facade joinery.

Before implementation of this measure, some additional works on closing the façade openings (partially or, in some cases, totally), formed removal of existing façade joinery shall be done.

The new walls shall be plastered, skimmed and painted from the internal side. Colour tone and treatment of these walls shall be the same as for the remaining existing walls. Exceptions are walls in the upper floor classrooms, where the suspended ceilings shall be constructed. External side of these walls shall be plastered and “Demit” thermal façade shall be set up, as in case with the other parts of façade.

New windows will be made of high-quality 6-chamber PVC profiles which need to have appropriate thickness (3.5 mm) and reinforced with galvanized steel profiles, everything in line with the “RAL” quality

standards. Heat transfer coefficient of the profiles with metal reinforcement (according to DIN EN 12412-2) shall be less than 1.4 W/m²K.
Glass system 4+16+4mm with thermal conductivity up to U=1.81 W/m² K and solar energy transmittance (solar factor) g≤65%, with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber (in accordance with EN410 and EN 673, Ug=do 2.0 W/m² K) are used as an infill.
Installed joinery shall be equipped with high-quality exchangeable gaskets, high-quality fittings of nickel and Al-alloys, knobs, locks and keys.
PVC profile colour to be white as per joinery scheme and details.
Natural air-streaming at closed window is envisaged through for that purpose specially installed elements in the window frame type “Regel air”, or in some other way, in line with DIN and EU norms. Number and size of these elements depend on the size of the window – given minimum per 2 pieces. These elements shall not be installed in fixed windows and fan lights.
For windows exceeding 2.2 m, window leaves are opened using “Ventus” mechanism on rail with opening using a handle that turns by 360 degrees. Tilt and turn mechanism is operated vial steel rail on a spindle that allows opening up to minimum 20 degrees.
Windows shall be installed over the previously mounted blind frames, fixed with anchors at 50 mm depth into the existing walls i. e. existing structure.
Windows need to be placed so that the external side is at the same level as the previous windows.
Drips, made of ready-made plastic-laminated galvanized steel metal sheets=0.7mm, shall be installed on the external side of the windows.These are placed along the entire window with set overhang.
On the internal side of the window, it is necessary to place PVC window sills, along the entire width of the window, depth depending on the depth of the existing parapet wall.
Quality certified shackle must ensure opening according to the given joinery schemes. Special attention must be paid to shackles for “Ventus” windows to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window sashes.

Façade doors and fan lights shall be made the same way as the existing ones. Façade doors, single and double leaf, have type of opening toward outside, while the fan lights have thermal insulated glass 4+16+4, equipped with 3 hinges.
For installation of doors, quality certified metal window support needs to ensure opening in line with set scheme and installation of self-closing mechanism, cylinder lock with three keys and floor rubber stoppers.
The building's entrance portal as well as the all items on high level which have small parapets shall be replaced with new Al- façade joinery with thermal break, double glazed glass 4+16+4 mm and with heat transfer coefficient Umax = 2.80 W/m²K.

Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.

Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.

Everything from the description shall be included: purchase of material, manufacturing, transport and installation of joinery along with shackles and blind frames, as well as the aluminium sill of required width. Measures shall be taken on site.
The item includes manufacturing and installation of the plastic coated aluminum construction system with thermal break, heat transfer coefficient of U_{max}=2.80 W/m^{2}K, fittings, required set for hanging and closing. Type of opening, shall be as shown on the drawings - joinery schemes. Al sill of required width shall be envisaged within the item. Profile colour shall be natural aluminum.

Selection of facade joinery colour or possible changes in details (elevation) can be determined either by Client or Supervisor, with previously obtaining Employer / Employer’s Representative permission.

Attests, the manufacturer – contractor shall provide for all the ironmongery, are:

- System window testing in line with 14351-1 and B 5300,
- Air permeability attest EN 12207 - Class 4,

- Water resistance attest EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,
- Mechanical requirements EN 12400 - Class 2,
- Sound proofing attest up to protection class 5,
- Heat transfer coefficient attest DIN EN 12412-2,
- Glass attest EN 673,
- Metal supporters attest V ENV 1627-1630, resistance class 3.

In the process of evaluation of bids, the bidder is obliged to prove typical drawings of angle types of windows and doors, as well as other catalogue and presentation material. It is necessary to prepare shop documentation for certain buildings, i.e. Employer / Employer's Representative's approval. In process of ironmongery production, it is necessary to enable Employer / Employer's Representative to inspect the products.
Prior to starting major production of joinery, it is necessary to prepare and install typical widow complete with ironmongery set, which will be recoded and accepted by developer and Employer / Employer's Representative after removal of all possible remarks.

REDUCTION OF THE AREA TO BE HEATED WITH SUSPENDED CEILING

In order to reduce the area to be heated with suspended ceiling, construction of suspended ceiling in the classrooms on the first floor and in the psychologist's office on the ground floor at 3,10m height is foreseen. Construction will be performed using gypsum boards "Knauf" d=1,25cm on the metal structure made of zinc-plated steel profiles.After lining the gypsum boards, to all joints shall be fixed with fixing strips. All areas shall be skimmed two times after required preparations. For finishing treatment to use semi-dispersive paint, double painted using a colour as per the Employer / Employer's Representative's choice including use of proper scaffolds.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Removal of Protective Bars from the Windows and Installation of New Ones
Removal of existing protective bars from the facade before replacement of joinery and itsrefitting, upon new joinery is installed. Cleaning and scraping. The bars have to be painted two times by anti-corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted.
Production and installation of new protective bars for skylight above the garage door at the ground floor is foreseen, after dismantling of the old one.

Removal of the External Emergency Stair Case and its Refitting after Installation of the ETICS Facade
Removal of the external emergency stair case metal structure at rear side of the facility (kindergarten entrance) and it's refitting after installation of the ETICS facade. After installation, stair case shall be connected to the grounding installations.

Partial Renovation /Construction of the Pavement around the School Building
Construction of a new top layer of 10 cm thick reinforced concrete MB20 over the old pavements around building. The surface of the existing pavement shall be thoroughly cleaned before pouring. The new pavement has to be strained into fields of approx. 1.5m2. Expansion joints shall be filled up with bituminous joint filler. Areas to be treated shall be determined on the site with the Employer / Employer's Representative.

Installation of Smooth Wooden Boards for Covering the Internal Expansion Joints inside the Building
Supply and installation of smooth wooden boards for covering the internal expansion joints inside the building, boards shall be placed along the walls and ceilings. Boards shall be 2,5cm thick and 15cm width.

After installing, boards shall be varnished (process: filling and grinding, primer, grinding, two layers of synthetic resin paint).

RENOVATION MEASURES, AIMING TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS IN THE BUILDING

Reconstruction of Sanitary Facilities

In addition to measures directly impacting energy efficiency improvement, the Design Brief envisages reconstruction of sanitary facilities:

-all lavatories, with the exception of toilet for handicapped persons and toilets in the kindergarten (which are not in use),
-dressing rooms next to the gym.

This reconstruction includes works on waterproofing, ceramic works and painting works. Other reconstruction works in sanitary facilities (replacement of sanitary fittings, water pipes, and drain pipes) are defined in sections of Design called-Water Supply and Sewerage Services and Thermal Technical Services (heating services).

Following works, beside the previous works on dismantling and demolition, need to be performed:

* Making of the skimmed cement screed for a sloping layer in the toilets, including the installation of the mesh (1 kg/m2). Floated coat is used as the finishing layer. Screed thickness is d=4cm.
* Setting up of horizontal waterproofing in the toilets, on different floors, in the following layers (from the bottom up):

- bitulith + polyasbestos + glass mesh,
- polyasbestos + glass mesh,
- polyasbestos.

Put the waterproofing at least 10 cm up the wall.

* Installation of vertical waterproofing on walls in the shower booths, from floor to the ceilings, h=3,30 m, using "Texaspenetrat".
* Plastering of internal toilet walls with cement mortar 1:3 in two layers with the previous spraying of cement slurry to prepare the wall for ceramic tiles.
* Tiling the toilet walls with the class I ceramic tiles, while the size, colour and tone will be sampled and approved by the Employer/Employer's Representative.

Line the tiles in layer of adhesive, placing them “joint to joint”manner by pointing the joints using pointing plaster.

Ceramics will be placed up to the ceiling height, h=2,75 m. Coating of the jambs and niches is included in the item price and it won’t be calculated separately.

* Floor tiling in the toilets and other premises with the class I anti-slip tiles. The size, colour and tone will be selected and approved by the Employer/Employer's Representative.

Line the tiles in the waterproof adhesive layer “joint to joint”manner, by using pointing plaster.

In the toilets, where there is a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).

* Polishing and painting of the ceilings. The Employer / Employer’s Representative will select the tone of semi dispersed distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer.

Works on Internal Ceilings and Walls

In addition to measures directly impacting energy efficiency improvement, the Design Brief envisages repairing and painting the walls and ceilings in all building.

Following works need to be performed:

* Scraping and skimming old walls and ceilings on the ground floor and the upper floor with emulsion putty (all surfaces need to be scraped and washed and then smoothen, cleaned and impregnated. Inspect and remedy minor damages and cracks using putty).
* Painting of internal walls on the ground floor and the upper floor, in the area higher than 1.5m, ceilings on the ground floor and partly ceilings on the upper floor (in places where suspended ceiling is not foreseen), as

well as the ceilings at the parts of the flat roof with semi-dispersed distemper, by applying two layers of the paint, in colour selected by the Employer/Employer's Representative, using scaffold.
* Treatment the walls, up to the height of 150 cm, with double layer of oil based paint in colour selected by the Employer/Employer's Representative.
* In the psychologist office, on the ground floor of the building, suspended ceiling is foreseen. Ceiling shall be constructed at the height of 3,10m using gypsum panels, placed over the proper substructure.

Setting up the Side Entrance Canopy Used as Protection of Entrance for Kindergarten
A small canopy shall be constructed as protection of kindergarten entrance against poor weather conditions.Canopy shall be made of the proper steel profiles, covered with painted aluminum trapezoid metal sheet.

Planting New Trees in School Courtyard
New trees shall be planted in school courtyard as a sun protection measure and measure for improvement of general working conditions.

Prior to commencement of works, the Contractor is obliged to provide the Employer / Employer’s Representative with samples of materials and certificates for all the materials to be used during the works.
Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

F4.1.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in ‘’BrankoBožović’’ Primary School in Podgorica

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	‘’BrankoBožović’’ Primary School, Podgorica
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	17 October 2013

The purpose of reconstruction of ‘’BrankoBožović’’ Primary School in Podgorica is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management
2. New heating system

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, ultrasonic heat flow meter at feeding pipe of the boiler group, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system.
Fuel flow meters for metering fuel consumption shall be installed at the oil feeders from the tank into burner. The meters compare the amount of oil that reaches the burner with the amount of oil that goes back into the tank and provides information on consumed fuel.
Ultrasonic calorimeter will be fitted at the main branch used for transporting hot water into the system from the boiler and return pipe towards the boiler to measure the amount of transferred heat to the consumer in the building. Calorimeter measures water flow and feeding and return temperatures, thus obtaining the amount of transferred heat.
All obtained data shall be processed in computer with designated software and, based on this, any problem that occurs in the heating system at the entire school will be timely resolved.

NEW HEATING SYSTEM

Dismantling of the existing equipment in the boiler room

It is planned to dismantle existing boiler room equipment: old boilers with burners, funnels made of steel pipes, pumps, fittings, expansion vessel, automation, etc. New equipment shall be installed in the boiler room. Pipes that go from the boiler room towards heat emitters or return from it, will be kept with alterations which will be made due to simpler piping and connecting of the two branches.

Dismantling of existing manifold and heat emitters

It is planned to replace all heat emitters and heating system in the gym, but also to keep most of the pipe network which is in good condition.

Aluminum radiators are planned to be dismounted and left to school for its disposal. Steel panel radiators, fitted when the school was expanded, were planned to be dismounted and remounted in other locations. Part of the pipeline that feeds radiators in the expanded part of the school, from the boiler room to the point where the pipes enter the classroom from outside, is planned to be dismantled. Remaining part of this branch will be adapted for connecting to the branch that feeds heat emitters in offices and east part of the school.

Hot water air convectors in the gym and pipe network will be dismantled, as well as ventilation duct placed beneath the ceiling. Pipes that transfer hot water from the boiler room to the gym will be kept.

Preliminary works on installation of new equipment

Existing light distilled oil tank needs cleaning to remove deposits, with dumping of the deposits. Intake elements at the oil feeder shall be replaced. New oil filters shall be fitted at the light distilled oil feeders, before the burners.

Pipe network shall be flushed, steel panel radiators, which will be dismounted, also need to be flushed and reused. It is necessary to provide new wall mounting brackets for these radiators so these could be remounted in new positions. Subsequently mounted steel cast radiators are mounted in hallways in the south and east side of the school. These radiators shall be dismounted and deposits settled inside the radiators flushed. These radiators will be reused for new heating system, because their dimensions are of those newly designed and they are in pretty good condition.

Fitting of new equipment in the boiler room

<u>Boilers</u>
Installation of new three-way boilers is envisaged (two boilers rated heat yield of 180kW each, main and stand-by), with self-protection system, which do not require boiler pumps for protection of cold water side in the boiler. Boiler size is determined based on required amount of heat for school building and gym so that one boiler is capable of covering 75% of the total heating system requirements. Boilers will be running alternatively at reduced capacity and at higher loads shall work together when required.

Boiler digital automatic control will be used to control operation of the boiler and the burner in line with the variations of the outdoor temperature. Temperature sensor, fitted on the external side of the outside wall, sends signals on outdoor temperature variations and based on it, automatic control sets operating of the burner on first or second degree or it switches it off. Automatic control regulates operation of circulation pumps on branches and sets feeding water temperature towards heat emitters in the classrooms with mixing valve, which sets ratio of hot feeding water from the boiler and cold water from return network. Feeding water temperature towards heat emitters of each separate branch ranges between 40 and 90°C, depending on the level of outdoor temperature.

Boiler room equipment will be connected to the reconstructed electric power wiring. This equipment will be controlled via boiler system automatic control.

Light distilled oil will be transferred from the tank via existing pipes which are in good condition, which will be fitted with new oil filters. Existing below ground light distilled oil tank will be used for storing oil.

Water softener

It is envisaged to fit equipment for chemical water treatment at the branch from the town mains. Compact softener of water from town mains shall be installed, for heating systems with installed boiler power 500 kW. Its basic function is to protect the heating system from boiler scale and other deposits in water. Along with the device, it is necessary to use protective backwash pre-filter which consists of a casing with permanent mesh. Compact softener casing contains ion-exchange resin which is automatically regenerated once its capacity is spent. Regeneration is automatic and is carried out without the supervision at in advance programmed time.
Water softener will be installed in direct vicinity of the return pipe to which it will be connected to refill water in the system. Selected water softener requires power supplying.

Water softener will be connected to the heating system with adequate pipe. It shall be also connected to town water mains right in front of the existing tap and connected to it by PP-R water pipe mounted on the wall. Prior the water softener, this pipe shall be connected to necessary equipment in front of water softener in accordance with the annexed drawing from the graphical part of the Tender Documentation.
On the town water mains, in front of the softener, water flow meter – water gauge shall be installed. Softened water is injected into the system through automatic water fill valve, which reacts mechanically to the previously set pressure level in the system.

Expansion vessel

Capacity of the expansion vessel is determined depending on the total capacity of the system and static water pressure of the system. Expansion vessel with gas is planned to be fitted in the corner against the wall next to the boilers. It will be connected to return pipe between return manifold and the boiler.

Chimney system

Since the existing concrete chimney is in good condition but needs muffling (dampening), i.e. to adjust its cross cut section to the capacity of new boilers. It is planned to fit self-supporting prefabricated insulated stainless steel chimney system, which is used for repair of existing chimney.
Funnel is made of twin-wall stainless steel with insulation between the walls and is connected to the outlet that extracts smoke from the boiler. It is laid horizontally to the existing concrete chimney and connected to the new vertical section. Vertical part of the chimney is made of elements with single wall and insulation on the external side, up to the exit from the building.
Chimney is fitted with condensation vessel, at the bottom of the vertical section, doors for cleaning, all assembly elements such as bends, branches, outlets, telescopic elements, etc.

Circulation pumps

Circulation pumps at branches towards parts of the school are selected according to calculated amount of water that can be pumped through the branches and pressure drop.
Frequency controlled circulation pump will be used for feeding the entire heating system in the school. The pump can operate with the option of automatic control (self-control from “one to the other proportional pressure curve”) or by maintaining proportional pressure, by maintaining constant pressure or in compliance with constant curve. The pump will be controlled by boiler automatic control.

Frequency controlled circulating pump is selected due to installation of radiator valves with thermostatic heads that cause changes in the flow during operation of the heating system.

Gym heating system shall be fed by three-speed pump with fixed number of revolutions. Mixing valves shall be installed on distribution branches, which control feeding water temperature and are also operated by boiler automatic control.

Duplex pump with double power drive (two motors) is selected. The motors will run alternatively, as main and stand-by, which substantially prolongs life-span of the pump and increases stable operating of the installation.
Three-way mixing valve for variable slide temperature control of feeding water shall be fitted in front of the pump, with connection to return pipe. The mixing valve will be controlled by boiler automatic control.
Three-stage pump with fixed number of runs, without mixing valve for variable slide temperature control of feeding water, shall be used to supply heating system in the gym. Circulation pump would be running constantly on operating point until 18°C degree temperature in the gym is achieved, after which it would be switched off with signal from thermostat, which will be mounted on the wall inside the gym. Fans on air convectors will be switched on manually with switches mounted on wall near the convectors.

Boiler room ventilation
Required amount of fresh air for fuel combustion will be provided through grille on the doors and air intake is enabled with fans on the burners. Boiler room doors will be fitted with two grilles that allow undisturbed fresh air flow.

Feeding and return pipes
Feeding and return pipes are dimensioned depending on the water flow through them and depending on dimensions of supporting equipment connected to the feeder and return pipe. At the highest points of feeding and return pipe from the boilers, it is planned to fit air-release vessels with overflow pipes and valves, and also at the highest points of feeders towards the gym.
Feeding and return manifolds are planned to be mounted on self-supporting brackets along the boiler room wall, one next to the other so as to group all the equipment in one part of the boiler room to make it accessible for maintenance.

Thermal insulation of boiler room equipment
Entire boiler room equipment will be thermally insulated with mineral wool, 50mm thick, coated in aluminum foil.

Installation of new radiators in the entire school building

Steel panel radiators which are in good condition will be used and fitted as heat emitters in school offices and teachers cabinets next to the classrooms and library. The main reason for this is to lower the installation cost and it was decided to fit these in rooms with minimal exposure to vandalism, because they are far more sensitive than steel cast radiators.

Existing steel radiators in hallways will be also remounted, however, they first need to be flushed and painted. New radiators need to be assembled in accordance with required dimensions and, if possible, complete old radiators shall be fitted in the positions of new ones, if their number of ribs is adequate.
All the radiators in the upper floor of the building need to be fitted with air release vessels which will be released with special tool, so the janitor is the only who can perform deaeration.

Installation of new air convectors in the gym

New air convectors on existing piping will be used for heating the gym. Existing piping from the boiler room to the gym will be kept, and new piping, adjusted to the new air convectors, will be installed in the gym.

Gym will be fitted with four hot water air convectors, capacity 18 kW, supplied with hot water temperature 90/70°C (80/60), from the heating system.

The air convectors will be fitted in the corners of the gym. Fresh air from the facade is injected through the facade grate into mixing box where fresh air is mixed with exhaust air. Ratio of fresh and exhaust air is set on the mixing box. The air is then filtered and supplied into air convectors, where it is heated and supplied into the gym space.

Operating of air convectors is controlled through change in number of fan revolutions via five-stage speed controller and wall-mounted thermostat for setting desired temperature in the gym.
To prevent freezing of water in air convectors at very low outdoor temperatures, fresh air ducts shall be fitted with motor-driven control jealousies, which will close when temperature sensor at the entrance signals that temperature reached critical values.
To ensure supply of fresh air into every air convector, new openings size 50x50cm shall be made on the facade, while excess air is extracted from the room through overpressure grille, fitted with light flaps that open when internal pressure increases. To install this grille, it is necessary to make an opening in the gym wall in the middle of shorter sides, beneath the roof. Existing opening, to which duct for fresh air injection is connected, will be used for one of the overpressure jealousies.

Fitting of thermostatic radiator valves with thermal heads

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermo-heads. Selected thermostatic heads are convenient for buildings envisaged to be used by a large number of users with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermo-head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.
Due to dismantling of all the radiators for their flushing, during dismantling of existing radiator valves, it is also necessary to dismantle radiator sub-valves – valves.

Installation of balancing valves

Balancing of the pipework will be realized with fitting pairs of balancing valves in positions marked in the drawings, so as to separate certain parts of the pipework.
Return pipe will be fitted with differential pressure controllers without additional power supply, with the option of precise continuous pressure difference setting. The feeding pipe will be fitted with valves to balance pressure in riser pipe, with linear properties and meter gauges and the option of setting reading on a display of hand-wheel.
These two valves are mutually connected with capillary pipe up to 1m length and as a pair balance pressure variations.

F4.1.3 Technical description of electrical services

for energy efficiency improvement in ‘’BrankoBožović’’ Primary School in Podgorica

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	‘’BrankoBožović’’ Primary School in Podgorica
Doc. origin:	Final Design of Electrical Services
Date:	17 October 2013

The purpose of reconstruction of Primary School ‘’BrankoBožović’’ in Podgorica is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.
The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Power supply and electrical installation for new heating system
- Installation of energy efficient lighting systems
- Replacement of lightning protection system

POWER SUPPLY AND ELECTRICAL INSTALLATION FOR NEW HEATING SYSTEM

Installation of new heating system in the school is proposed as one of the measures to improve energy efficiency in Primary School ‘’BrankoBožović’’ in Podgorica. It is envisaged to mount new distribution RT-KO board in place of the existing one. This board will be supplied with existing cable PP00 5x6 mm2 mm2 from main distribution board GRT and it will provide electrical supply to new heating equipment, lighting and general consumption (burner, circulation pumps, air convectors, axial fan, water softeners, general consumption and lighting and cabinets for automatic control).

Cabinets for automatic control of operation of new heating equipment shall be delivered within the scope of heating services. Inside the boiler room, power supply is envisaged using electrical cables type PP-y and cross section 3x1,5 mm2; 3x2,5 mm2, 5x2,5 mm2 and 5x4 mm2 through rigid installation conduits OBO Betterman or similar.
The proposed electrical power supply from existing main distribution board GRT does not affect total power consumption, and the existing cables are preserved.
It is envisaged to install inner circle of deep galvanized tape Fe Zn 25x4 mm2 on prefabricated tape carriers for potential equalization JUS N.B4.925 P, connected to the existing output from foundation grounding unit. Within this circle, each conductive element shall be connected inside the boiler room using yellow-green conduit P/F 1x16 mm2.

It is envisaged to replace air convectors in the gym, which will be mounted 3.5 meters high from the finished floor level. Power supply to air convectors shall be provided from existing gym switch board RO-S, using conductors PP00-y 3x2,5 mm2, which shall be placed through hard PVC pipes of appropriate cross section. The pipes should be mounted through the walls/ceilings and plaster. The total installed power of RO-S shall not be changed, therefore the existing power cable shall be kept.

Near the underground fuel tank, it is necessary to mount cabinet or pillar for discharge of static electricity, which shall be connected by tape Fe/Zn 25x4mm to the existing grounding unit of building.

INSTALLATION OF ENERGY EFFICIENT LIGHTING SYSTEMS

Replacement of old and non-functional lamps within the facility is envisaged. The newly designed lamps will make it possible to reach the illumination level of more than 300lx, which is consistentwithEuropean standards forparticular uses for schools and as required by DetailedEnergy Audits. The selectedlamps are withbright parabolicgrid, of exceptionalphotometricproperties andwith onelight source(T16 1x54W) 840 (neutral whitesource colour), with an electronicballast for whicha photometriccalculation was prepared in specialized lighting software program. As analternative, it is possible to install lamp type 2x28W, with a bright parabolicgrid and T16840 tubes (neutralwhite sourcecolour) with electronicballast. The proposedlampshave slightly higherinstalled power, and about the samephotometricproperties, so theDesigneroptedforthe model1x54W. However, as the requirements were met and confirmed by photometric calculation inboth cases, the other solution is also possible. When positioningthe newly designedlamps, special attention was paid to theexistingelectricfeeders, so that thereconstructionis not expected to involve any extraworkfor the relocationof existinglightingin order to keepthe designed array. For this purpose it is planned to move one power outlet in eachclassroom. Switches for lamps remain the same.
For the purposes of lighting the blackboard, two lamps are envisaged per each classroom (where there is only one board, only one lamp will be installed), i.e. lamps with parabolic asymmetric grid 1x80W grid, with an electronic pre-connection device and a lamp of 840 T16 colour. Power supply for these lamps will come from the nearest junction box, to be switched on from any of the existing command centres in the classroom or from the gate in case of centralized solution.
In the toilets, luminaries with IP 54 protection degree shall be installed with 1x28WT5840 lampswith electronicballastandopalprotector, and in the hallways 2x28W T16 840 with high frequency electronic ballast with PMMA BIVERGENZ dark light diffuser or similar technology which eliminates glare.
Within the gym, light fittings with special net cover for mechanical protection are envisaged with fluorescent tubes 4x80W, also with electronic ballast and tubes T16840.
In the new boiler room, luminaries with IP 65 protection degree shall be installed with 2x35WT16840 and these luminaires are commanded locally with one way switches and on-wall installation.
Bearing in mind type of the building, emergency escape and anti-panic lighting system is designed according to the EN 1838, LED 5W, 1h light fittings. Light fittings which are envisaged enable safe escape from the building with luminance level on the escape route 1 lx and anti-panic luminance of 0.5 lx. in case of total black out. For supply of emergency lights, cables PP-y 3x1,5 mm^2 shall be installed from the nearest switchboard.

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and replacement of roof cover on main school building, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, laid down in foundations of the building and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. New roof cover on the main school building shall be made of ribbed roof thermal sandwich panels (TRIMO), on a metal sub-structure, fixed on a concrete roof slab.
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quantities for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.
New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

F4.1.4 Technical description of sanitary (water supply and sewerage) services

for energy efficiency improvement in "BrankoBožović" Primary School in Podgorica

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P.S."BrankoBožović", Podgorica
Doc. origin:	Final Design of Water Supply and Sewerage Services
Date:	17 October 2013

Apart from the measures that directly affect energy efficiency improvement in of "BrankoBožović'' Primary School in Podgorica, in terms of Water Supply and Sewerage Services, it is envisaged to perform a reconstruction all toilets, with the exception of toilet for handicapped persons and toilets in the kindergarten.

The reconstruction of water supply installations implies replacement of indoor pipes network made of zinc-plated steel pipes. The replacement shall be performed from an entry point of pipeline into the building, so that the complete replacement of network is foreseen in the renovated toilets.

In addition to replacement of water supply installations, a replacement of sanitary units and replacement of sanitary sewerage installation have been also foreseen. The existing sewerage outputs from the building and exhaust pipes to the manholes shall be used and are not subject to any changes.

DESCRIPTION OF EXISTING SITUATION

Sewerage installation

The existing toilet sewerage installation, in ''BrankoBožović'' Primary School in Podgorica, is predominantly manufactured of cast iron pipes, sealed by hemp with cast iron plug. Conversation with the school staff and visual review of visible parts of installations led the Employer / Employer's Representative to conclusion that sewerage installation is obsolete and it needs to be reconstructed. Since the exact position of sewerage installation is not known, nor it's condition in the walls and beneath the floors and the As-built Design does not exist, drawings of the new sewerage installation have not been prepared. The contractor shall provide the routes and drawings of new sewerage installation, after revealing existing installation in walls and floors of the sanitary facilities planned for reconstruction. Before the commencement of the works, the Contractor will submit the necessary drawings to the Employer / Employer's Representativefor approval. The Estimated Bill of Quantities was prepared on the basis of previous experience and similar scope of reconstruction works of sanitary rooms in other schools within this project.

Water supply installation

The water supply installations are constructed of zinc-plated steel pipes. There are no visible points of leakages, but after long term use, one may expect an incrustation on the inner surface of the pipes.

As in the case of sewerage installations, the As-built Design of water supply installations does not exist and the exact position of pipes is not determined. Conversation with the school staff and visual review of visible parts of installations led the Employer / Employer's Representative to conclusion that water supply installation is obsolete and it needs to be reconstructed.Since the exact position of water supply installation is

not known, nor it's condition in the walls and beneath the floors and the As-built Design does not exist, drawings of the new water supply installation have not been prepared. The contractor shall provide the routes and drawings of new water supply installation, after revealing existing installation in walls and floors of the sanitary facilities planned for reconstruction. Before the commencement of the works, the Contractor will submit the necessary drawings to the Employer / Employer's Representativefor approval. The Estimated Bill of Quantities was prepared on the basis of previous experience and similar scope of reconstruction works of sanitary rooms in other schools within this project.

WATER SUPPLY INSTALLATION

Solution concept

The water supply installation is designed in accordance with standard solutions except that water supply pipes are envisaged to be manufactured of polypropylene (PP) to withstand the operation pressures of 10 bars and mutually joined by fusion process. The cold water has to be connected to the existing water connections to the assumed positions according to visual toilet preview and then distributed to the outflow point.
Installation of hot water is not foreseen in new toilets.
Installation is equipped with required switch valves enabling an independent operation of each water supply branch. In front of each outflow, point installing of an adequate switch valve is foreseen to allow for intervention in case of a failure or replacement of sanitary equipment.
Water supply pipes are laid into the wall. Thermal insulation of the pipes is not necessary since polypropylene is a poor conductor of temperature.
Upon completion of work, water supply installations shall be checked for test pressure of 12 bars. After the testing, it is necessary to perform rinsing and disinfection of complete water supply installation. Disinfection must be performed by a certified firm issuing adequate written certificate.

Analysis of water requirement

Water requirements do not change in regards to the present needs and do not affect the size of connection to the school building.

Available quantities of water

Available quantities of water do not change in regards to the existing state.

Quality of water at spring sources

Since the building is connected to the public water supply system, the quality of water has to be guaranteed by the public local PE ‘’Vodovodikanalizacija’’, Podgorica.

Procedure of preparing drinking water

Since the building is connected to the public water supply system, the quality of water shall be guaranteed by the public Local Water Supply and Sewerage PE ‘’Vodovodikanalizacija’’, Podgorica.

Solution for transport and water distribution to final user

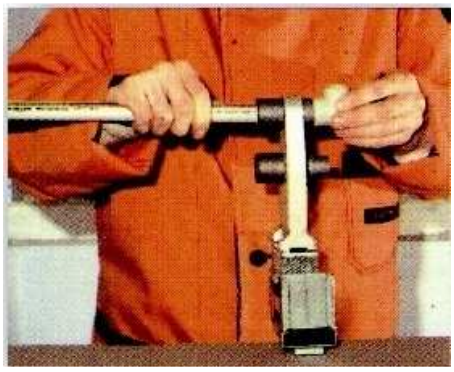
Water is distributed through water supply installations. No hydraulic calculation is necessary because the quantity of water does not change, and the position of outflow points does not change significantly.

Stages of construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Materials used in constructing the water supply system

Assembling of PP water supply pipelines for interior installation implies installing PP lines in the sanitary facilities and distribution in the bathrooms. The pipe length is not supposed to exceed 2m, works include bringing pipes to the bench from the distance of max.50m of horizontal or vertical route, taking measure, cutting pipes, installing with all necessary cross-sections of welding by poly-fusion weld. Welding is performed in the following way:
Pipes and cross-section pieces to be welded must be cut under straight angle and cleaned from dirt and grease. The parts to be welded are placed at the welding unit simultaneously (thorn and bushing) to the limit stop.



When the welding temperature is achieved, which can be shown either by the lamp or timer, depending upon the type of the welding unit, the elements are taken off the unit and impress into each other. They are retained in that position without movement until they get cold. It is very important not to exceed the limit of depth of inserting one element into the other.

Other specifics, manual instruction with human resources

This water supply installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for rehabilitation of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the community network.

SEWERAGE INSTALLATION

Solution concept

The existing sewerage installations are predominantly made of cast iron pipes. The newly designed sewerage installation, consisting of PP sewerage pipes for interior installations, together with fittings and all required equipment for proper network operation, shall be connected to the existing one, as it is foreseen. The connection of new designed sewage to the existing installations shall be performed by means of transitional sewage fittings, from PP to cast iron pipes and stainless steel pipe straps with rubber gaskets.
Pipes bottom decline of the main bathroom sewage line is J=2%.

SANITARY EQUIPMENT

The existing sanitary equipment in toilets shall be replaced with the new one as per specification given in the Estimated Bill of quantities. Lavatories are equipped with wall taps for cold water. Concrete lavatories in the gym toilet shall be retained and repaired by coating them with new ceramics.

F4.2. Educational Building 2
“Oktoih”, Primary School, Podgorica

F4.2.1 Technical description of building and trade works

for energy efficiency improvement in "Oktoih" Primary School in Podgorica

1. INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P.S "Oktoih, Podgorica
Doc. origin:	Final Architectural Design
Date:	Mart 2014

The purpose of reconstruction of ''Oktoih'' Primary School in Podgorica is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

In terms of envisaged building and trade works, improvement of energy efficiency is achieved through application of following measures:

- Setting up "Demit" thermal facade (External thermal insulation),
- Thermal insulation and waterproofing of the roof, three types of roof:
  -R1, pitched roof above the main school building, covered with painted TR metal sheet,
  -R2, parts of the flat roof over the main school building,
  -R3, roof over the gym,
- Replacement of facade joinery,
- Reduction of the area to be heated with suspended ceiling.

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities. Those works include:

- Dismantling, and then preparation and installation of new vertical and horizontal gutters,
- Dismantling and installation of air conditioning units, cameras, antennas, lights,
- Dismantling and installation of new flashings,
- Installation of new protective bars,
- Partial renovation /construction of the pavement around the school building,
- Installation of smooth wooden boards for covering the internal expansion joints inside the building.

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned, whereat:

- Skimming and treatment of walls, painting of all walls using oil-based paint up to the height of 1,5m, while the rest, till the full wall height and the ceilings, shall be treated with semi-dispersed paint,
- Planting new trees in school courtyard.

THERMAL INSULATION OF FAÇADE WALLS

Expanded EPS polystyrene, having thermal conductivity coefficient of λmax = 0,037 W/mK, thickness 8 cm, produced by the relevant EN standards will be used for external insulation of RC facade walls and brick walls. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.

The lower part of the facade walls in the ground floor level (all parapets in the ground floor, pillars and parts of the full wall), will be treated with harder insulating material XPS - extruded polystyrene, thickness d=8cm with nominal thermal conductivity λ=0,035-0,04 W/mK.

The existing mortar shall be finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), using at the same time as splash guard and protection against vandalism. Type and colour of the “Kulie” shall be selected by the Employer/Employer's Representative.

Thermal panels with B1 flammability class (DIN 4102 B1 highly anti-flammable, non-combustible and self-extinguishing) shall be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above openings at the floor slab section made pressed mineral wool reaching A1 flammability class. EPS/XPS thickness d=3 cm are used for jambs externally.

The existing external plaster (on 70-80% of facade walls) has to be removed completely before the installation of the ETICS facades, as it is dissolving from the substructure.

Thermal boards are lap-joint and fixed to the facade wall with adequate enriched mineral adhesive and anchored with adequate screw anchor. Board surface is protected with fibrous plaster made of following components:
* the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth. Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case additional mechanical anchoring is required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
* reinforcing mesh;
* the second layer of mortar is applied in the same way as the previous. This mortar shall be applied on a well settled first layer and smoothen with a screed afterwards;
* contact coating, made base on emulsion of synthetic resin and water glass, as agent for impregnation of settled fibrous mortar;
* finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in colour selected by the Employer / Employer’s Representative, fully in line with the Design details.

Prior to installation of thermal plates, following works must be performed:
* all the works on roof, including sheet metal works,
* replacement of facade joinery,
* installation of envisaged installations and equipment on the façade,
* planed partial or total closing of the openings, building new parapets,
* covering and protection of all the surfaces that remained untreated – glass...
* checking existing cradling on the building:

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm shall be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand. If during separation of polystyrene only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.

If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.
If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.
Corners and jambs of wall openings shall be installed with reinforcing mesh or angle profiles. Facade finishes along the plinth are made with installation of U profile strips adjusted to the thickness of thermal plate.
Prior to installation of plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates shall be additionally anchored using adequate bolts.
During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.
Window benches shall also be thermally insulated. Drips made of readymade galvanized plastic-laminated steel metal sheets d=0,70 mm are placed over newly fitted window benches. Drips are placed along the entire width of windows and skylights with overhangs.

Concrete shading elements, known as “Brisoleji”, over the windows on the ground floor and the upper floor at the south side of the school façade, to be insulated using expanded polystyrene- EPS, thickness: d=2 cm. The concrete shading elements shall be finally treated with dash plast, known as “Kulie” (a decorative, ready-mixed, even, smooth marble mortar based on grain, natural colour size to 2,2 mm, which is combined with a polymer, acrylic resins giving a homogeneous mixture). Type and colour of the “Kulie” shall be selected by the Employer/Employer's Representative.

Facade scaffolding

For execution of described works for application of energy efficiency measures in ‘’Oktoih’’ Primary School in Podgorica, it is necessary to install adequate facade scaffold.
Facade scaffold shall be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It shall be used throughout the whole execution of works. Platforms or scaffold to be used primarily to ensure safety of workers, and then ensure quality execution of required works.
Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.
Note: As per available equipment and works execution technology, prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

ROOF THERMAL INSULATION AND WATERPROOFING

Within the use of one of the measures for energy efficiency improvement in the Primary School “Oktoih”, in Podgorica new thermal insulation of the pitched roof slab (roof type: R1), new waterproofing and thermal insulation of flat roofs (roof type: R2) as well as the new roof covering of the gym (roof type: R3) are foreseen too.

Within the previous works, removal of the existing roof coverings is designed.
R1 Removal of the existing roof covering from the main school building, consisting of the painted trapezoid metal sheet, cement mortar 2-4 cm and battens is foreseen. Roof covering shall be removed until the RC-slab of the pitched roof is reached.
R2a Removal of existing thermal insulation and waterproofing from the flat impassable roof until reaching concrete floor in following layers (data from existing designs):

- waterproofing 4+2+1 1,5cm
- cement glazing 1:3 2cm
- sloping layer 4-20cm
- roofing paper
- "Heraklith" boards or perlite 3cm
- roofing paper.

R2b Removal of the existing roof cover (waterproofing layer) from the eaves cantilever slabs over the school's entrance and entrance of the dressing rooms is envisaged.

When the existing roof covers are removed, new covering is foreseen, over previously prepared base:
R1* Covering the roof of the main school building using roof polyurethane composite panels. The panels shall have thermal conductivity ʎ, up to 0,025 W/mK, with a total thickness of at least 8 cm and standard modular width of 1000 mm. Panels shall be fixed to the rectangular metal profiles 60/40/3 mm at the 60-150 cm distance, and over the RC-slab. The upper metal sheet has unique trapezoid shape, d=0,5 mm, while the lower one is standard “SNVs”, d=0,5 mm.
After the roof is covered, valley and roof ridge flashings are foreseen as well as the flashings of the roof parapet walls. This item includes use of all necessary bonding material.
R2a* New horizontal waterproofing and thermal insulation of the impassable flat roofs:
a) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil,
b) Vapour barrier made of the post bituminized aluminum foil lined with glass matt,
c) Thermal insulation made of the plates of extruded polystyrene XPS d = 10 cm, with heat transfer coefficient of λmax = 0.033 W / mK (over already applied foil),
d) Layer used for separating from PVC foil,
e) Sloping layer of light-weight concrete d=5-16cm, sloped by 1%,
f) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil,
g) Waterproofing made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminum foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is placed freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing.
h) Heavy protection of waterproofing by means of gravel d = 5 cm, with the sliding layer of waterproof dimpled foil, installed dry between waterproofing and gravel.
R2b* Waterproofing of canopy above main school entrance, entrance to the dressing rooms and cantilever slab, on the sloped layer d=3-8 cm, made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproofed bitumen strip. One strip is lined with aluminum foil, the other with glass matt. Every strip has a thickness of d = 4 mm. The first layer is put freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing.
R3* Covering the double pitched roof construction of the gym using painted trapezoid Al metal sheet: 40/230/0,7 mm. After the roof is covered, valley and roof ridge flashings are foreseen as well as the flashings of the roof parapet walls. This item includes use of all necessary bonding material.

REPLACEMENT OF FACADE JOINERY

Following measure for increasing energy efficiency in Primary School ’’Oktoih’’ in Podgorica includes replacement of facade joinery.

Implementation of this measure causes some additional works on closing the façade openings (partially or, in some cases, totally), formed removal of existing façade joinery.
The new walls shall be plastered, skimmed and painted from the internal side. Colour tone and treatment of these walls shall be the same as for the remaining existing walls. Exceptions are walls in the upper floor classrooms, where the suspended ceilings shall be constructed. External side of these walls shall be plastered and “Demit” thermal façade shall be set up, as in case with the other parts of façade.

New windows will be made of high-quality 6-chamber PVC profiles which need to have appropriate thickness (3.5 mm) and reinforced with galvanized steel profiles, everything in line with the “RAL” quality standards.Heat transfer coefficient of the profiles with metal reinforcement (according to DIN EN 12412-2) to be less then 1.4 W/m²K .

Glass system 4+16+4mm with thermal conductivity U=1.50 W/m² K and solar energy transmittance (solar factor) g≤65%, with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber (in accordance with EN410 and EN 673, Ug=do 2.0 W/m² K) are used as an infill.
Installed joinery to be equipped with high-quality exchangeable gaskets, shackles high-quality fittings of nickel and Al-alloys, knobs, locks and keys.
PVC profile colour to be white as per joinery scheme and details.
Natural air-streaming at closed window is envisaged through for that purpose specially installed elements in the window frame type “Regel air”, or in some other way, in line with DIN and EU norms. Number and size of these elements depend on the size of the window – given minimum per 2 pieces. These elements shall not be installed in fixed windows and fan lights.
For windows exceeding 2.2 m, window leaves are opened using “Ventus” mechanism on rail with opening using a handle that turns by 360 degrees. Tilt and turn mechanism is operated vial steel rail on a spindle that allows opening up to minimum 20 degrees.
Windows shall be installed over the previously mounted blind frames, fixed with anchors at 50 mm depth into the existing walls i. e. existing structure.
Windows need to be placed so that the external side is at the same level as the previous windows.
Drips made of pre-painted ready-made plastic-laminated galvanized steel metal sheets=0.7mm are installed on the external side of the windows.These are placed along the entire window with set overhang.
On the internal side of the window, it is necessary to place PVC window sills, along the entire width of the window, depth depending on the depth of the existing parapet wall.

Quality certified shackle must ensure opening according to the given joinery schemes. Special attention must be paid to shackles for “Ventus” windows to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window sashes.

Façade doors and fan lights are made the same way as the existing ones. Façade doors, single and double leaf, have type of opening toward outside, while the fan lights have thermal insulated glass 4+16+4, equipped with 3 hinges.

For installation of doors, quality certified metal window support needs to ensure opening in line with set scheme and installation of self-closing mechanism, cylinder lock with three keys and floor rubber stoppers.

The building's entrance portal as well as the all items on high level which have small parapets shall be replaced with new Al- façade joinery with thermal break, double glazed glass 4+16+4 mm and with heat transfer coefficient Umax = 2,80 W/m²K.

Everything from the description shall be included: purchase of material, manufacturing, transport and installation of joinery along with shackles and blind frames, as well as the aluminium sill of required width. Measures shall be taken on site.

The item includes manufacturing and installation of the plastic coated aluminum construction system with thermal break, heat transfer coefficient of Umax=2,8 W/m2K, fittings, required set for hanging and closing. Type of opening, shall be as shown on the drawings- joinery schemes. Al sill of required width shall be envisaged within the item. Profile colour shall be natural aluminum.

Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.

Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.

Mounting of Al window jalousie for mechanical and sun protection is foreseen. Jalousies shall be installed on two windows of janitor’s apartment.

Selection of facade joinery colour or possible changes in details (elevation) can be determined either by Client or Supervisor, with previously obtaining Employer/Employer’s Representative permission.

A supplier has to submit the following certificates for all the joinery:

- Systematic window testing, in line with14351-1 and B 5300,
- Certificate for air permeability. EN 12207 - Class 4,

- Certificate to water resistance EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,
- Mechanical requirements EN 12400 - Class 2,
- Certificate for sound protection up to class 5,
- Certificate for heat energy transfer coefficient DIN EN 12412-2,
- Glass Certificate EN 673,
- Fittings CertificateV ENV 1627-1630, resistance class 3.

In the process of bids evaluation, the Contractor is obliged to prepare typical drawings for angles of standard windows and doors and other catalogue and presentation material. Upon preparation of shop documentation for certain structures, Employer/ Employer's Representative's approval needs to be obtained. In the process of production of joinery, the Supervisor shall be allowed to carry out inspection during the production process.

Prior to starting major production of joinery, it is necessary to prepare and install typical widow complete with metalwork set, which will be recoded and accepted by the Employer/Employer's Representative or the Supervisor, after removal of all possible complaints.

REDUCTION OF THE AREA TO BE HEATED WITH SUSPENDED CEILING

In order to reduce the area to be heated with suspended ceiling, construction of suspended ceiling in the classrooms on the first floor and in the psychologist's office on the ground floor at 3,10m height is foreseen. Construction will be performed using gypsum boards "Knauf" d=1,25cm on the metal structure made of zinc-plated steel profiles.After lining the gypsum boards, to all joints shall be fixed with fixing strips. All areas shall be skimmed two times after required preparations. For finishing treatment to use semi-dispersive paint, double painted using a colour as per the Employer / Employer's Representative's choice including use of proper scaffolds.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Installation of New Protective Bars

Production and installation of new protective bars for skylight above the garage door at the ground floor is foreseen, after dismantling of the old one.

Partial Renovation /Construction of the Pavement Around the School Building

Construction of a new top layer of 10 cm thick reinforced concrete MB20 over the old pavements around building. The surface of the existing pavement shall be thoroughly cleaned before pouring. The new pavement has to be strained into fields of approx. 1.5m2. Expansion joints shall be filled up with bituminous joint filler. Areas to be treated shall be determined on the site with the Employer / Employer's Representative.

Installation of Smooth Wooden Boards for Covering the Internal Expansion Joints Inside the Building

Supply and installation of smooth wooden boards for covering the internal expansion joints inside the building, along the walls and ceilings is envisaged. Boards shall be 2,5cm thick and 15cm width. After installing, boards shall be varnished (process: filling and grinding, primer, grinding, two layers of synthetic resin paint).

RENOVATION MEASURES, AIMING TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS IN THE BUILDING

Works on Internal Ceilings and Walls

In addition to measures directly impacting energy efficiency improvement, the Design Brief envisages repairing and painting the walls and ceilings in all building.
Following works need to be performed:

* Scraping and skimming old walls and ceiling on the ground floor and the upper floor with emulsion putty (all surfaces need to be scraped and washed and then smoothened, cleaned and impregnated. Inspect and remedy minor damages and cracks using putty).
* Painting of internal walls in the areas higher than 1.5m on the ground and the upper floor; ceilings on the ground floor and partly ceilings on the upper floor, as well as the ceilings at the parts of the flat roof with semi-dispersed distemper, by applying two layers of the paint, in colour selected by the Employer/Employer's Representative, using scaffold.
* Treatment the walls, up to the height of 150 cm, with double layer of oil based paint in colour selected by the Employer/Employer's Representative.
* In the psychologist office, on the ground floor of the building, suspended ceiling is foreseen. Ceiling shall be constructed at the height of 3,10m using gypsum panels, placed over the proper substructure.

Planting new trees in school courtyard
New trees shall be planted in school courtyard as a sun protection measure and measure for improvement of general working conditions.

Prior to commencement of works, the Contractor is obliged to provide the Employer / Employer's Representative with samples of materials and certificates for all the materials to be used during the works.
Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

F4.2.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in ''Oktoih'' Primary School in Podgorica

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	''Oktoih'' Primary School, Podgorica
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	17 October 2013

The purpose of reconstruction of ''Oktoih'' Primary School in Podgorica is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management
2. Replacement of boilers and heating system optimization

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, ultrasonic heat flow meter at feeding pipe of the boiler group, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system.
Fuel flow meters for metering fuel consumption shall be installed at the oil feeders from the tank into burner. The meters compare the amount of oil that reaches the burner with the amount of oil that goes back into the tank and provides information on consumed fuel.
Ultrasonic calorimeter will be fitted at the main branch used for transporting hot water into the system from the boiler and return pipe towards the boiler to measure the amount of transferred heat to the consumer in the building. Calorimeter measures water flow and feeding and return temperatures, thus obtaining the amount of transferred heat.
All obtained data shall be processed in computer with designated software and, based on this, any problem that occurs in the heating system at the entire school will be timely resolved.

REPLACEMENT OF BOILERS AND HEATING SYSTEM OPTIMIZATION

Dismantling of the existing equipment in the boiler room

It is planned to dismantle existing boiler room equipment: old boilers with burners, funnels made of steel pipes, pumps, fittings, expansion vessel, automation, etc. New equipment shall be installed in the boiler room. Pipes that go from the boiler room towards heat emitters or return from it, will be kept with alterations.

Preliminary works on installation of new equipment

It is planned to keep the existing electrical wiring in the boiler room as much as possible to ensure power supplying for the new equipment. New equipment is planned to be fitted instead of the existing, so majority of existing electrical wiring with minor changes and adjustments will be used.

Position of branches for distribution of hot water remains the same, so it will not be necessary to make new openings in the walls, and furnace funnel will be connected to the existing concrete chimney at straight angle at the level of outlets from boilers, so it is necessary to make new openings in the concrete chimney.

Existing light distilled oil tank needs cleaning to remove deposits, with dumping of the deposits to a suitable location, in accordance with regulations. Intake elements at the oil feeder shall be replaced. New oil filters need to be fitted at the light distilled oil feeders, before the burners.

To ensure proper operating of the heating system in the future, all the radiators need to be dismantled, and flushed with highly pressurized pump, to remove deposits settled over exploitation period. Piping also needs to be flushed, as well as air release fittings on all risers on the second floor.

Fitting of new equipment in the boiler room

Installation of new three-way boilers is envisaged (two boilers with rated heat yield of 140kW each, main and stand-by) with self-protection system, which does not require boiler pumps for protection of cold water side in the boiler. Boiler size is determined based on required amount of heat for school building and gym so that one boiler is capable of covering 75% of the total heating system requirements. Boilers will be running alternatively at reduced capacity, and at higher loads shall work together when required.

Boiler digital automatic control will be used to control operation of the boiler and the burner in line with the variations of the outdoor temperature. Temperature sensor, fitted on the external side of the outside wall, sends signals on outdoor temperature variations and based on it, automatic control sets operating of the burner on first or second degree or it switches it off. Automatic control regulates operation of circulation pumps on branches and sets feeding water temperature towards heat emitters in the classrooms with mixing valve, which sets ratio of hot feeding water from the boiler and cold water from return network. Feeding water temperature towards heat emitters of each separate branch ranges between 35 and 90°C, depending on the level of outdoor temperature.

Boiler room equipment will be connected to the reconstructed electric power wiring. This equipment will be controlled via boiler system automatic control.

Light distilled oil will be transferred from the tank via existing pipes which are in good condition, which will be fitted with new oil filters. Existing below ground light distilled oil tank will be used for storing oil, but needs to be cleaned and prepared.

It is envisaged to fit equipment for chemical water treatment at the branch from the town mains. Compact softener of water from town mains shall be installed, for heating systems with installed boiler power 500 kW. Its basic function is to protect the heating system from boiler scale and other deposits in water. Along with the device, it is necessary to use protective backwash pre-filter which consists of a casing with permanent mesh. Compact softener casing contains ion-exchange resin which is automatically regenerated once its capacity is spent. Regeneration is automatic and is carried out without the supervision at in advance programmed time.
Water softener will be installed in direct vicinity of the return pipe to which it will be connected to refill water in the system. Selected water softener requires power supplying which can be ensured with alterations of the existing electrical wiring in the room.

Water softener will be connected to the heating system with adequate pipe. It shall be also connected to town water mains right in front of the existing tap and connected to it by PP-R water pipe mounted on the wall. Prior the water softener, this pipe shall be connected to necessary equipment in front of water softener in accordance with the annexed drawing from the graphical part of the Tender Documentation.
On the town water mains, in front of the softener, water flow meter – water gauge shall be installed. Softened water is injected into the system through automatic water fill valve, which reacts mechanically to the previously set pressure level in the system.

Capacity of the expansion vessel is determined depending on the total capacity of the system and static water pressure of the system. Expansion vessel with gas is planned to be fitted in the corner against the wall next to the boilers. It will be connected to return pipe between return manifold and the boiler.

Since the existing concrete chimney is in good condition but needs muffling (dampening), i.e. to adjust its the cross cut section to the capacity of new boilers. It is planned to fit self-supporting prefabricated insulated stainless steel chimney system, which is used for repair of existing chimney.
Funnel is made of twin-wall stainless steel with insulation between the walls and is connected to the outlet that extracts smoke from the boiler. It is laid horizontally to the existing concrete chimney and connected to the new vertical section. Vertical part of the chimney is made of elements with single wall and insulation on the external side, up to the exit from the building.
Chimney is fitted with condensation vessel, at the bottom of the vertical section, doors for cleaning, all assembly elements such as bends, branches, outlets, telescopic elements, etc.

Circulation pumps at branches towards parts of the school are selected according to calculated amount of water that can be pumped through the branches and pressure drop.
Frequency controlled circulation pump will be used for feeding the entire heating system in the school. The pump can operate with the option of automatic control (self-control from “one to the other proportional pressure curve”) or by maintaining proportional pressure, by maintaining constant pressure or in compliance with constant curve. The pump will be controlled by boiler automatic control.

Duplex pump with double power drive (two motors) is selected. The motors will run alternatively, as main and stand-by, which substantially prolongs life-span of the pump and increases stable operating of the installation.
Three-way mixing valve for variable slide temperature control of feeding water shall be fitted in front of the pump, with connection to return pipe. The mixing valve will be controlled by boiler automatic control.

Three-stage pump with fixed number of runs, without mixing valve for variable slide temperature control of feeding water, shall be used to supply heating system in the gym. Circulation pump would be running constantly on operating point until 18°C degree temperature in the gym is achieved, after which it would be switched off with signal from thermostat, which will be mounted on the wall inside the gym. Fans on air convectors will be switched on manually with switches mounted on wall near the convectors.
Required amount of fresh air for fuel combustion will be provided through grille on the doors and air intake is enabled with fans on the burners. Boiler room doors will be fitted with two grilles that allow undisturbed fresh air flow.

Feeding and return pipes are dimensioned depending on the water flow through them and depending on dimensions of supporting equipment connected to the feeder and return pipe. At the highest points of feeding and return pipe from the boilers, it is planned to fit air-release vessels with overflow pipes and valves, and also at the highest points of feeders towards the gym.
Feeding and return manifolds are planned to be mounted on self-supporting brackets along the boiler room wall, one next to the other so as to group all the equipment in one part of the boiler room to make it accessible for maintenance.

Entire boiler room equipment will be thermally insulated with mineral wool, 50mm thick, coated in aluminum foil.

Some radiators in premises within the gym are dismounted; however, installation of one new radiator in one of the two cloak rooms is planned. Steel panel radiator, equivalent to the existing, will be installed.
A room, presently used as library, was additionally built on the upper floor in part of the hallway. Currently, there is no heating in the room, so it is planned to add one steel panel radiator. One new branch is planned to be connected to the main branch that goes beneath this room. This new branch will be used to supply solely this radiator.

Installation of new air convectors in the gym

New air convectors on existing piping will be used for heating the gym. A special pipe will lead from the supply manifold, which will be used solely for feeding gym heating system. Existing pipes will be kept. In the very gym, one set of pipes will remain. Pipes mounted on the southern wall will be dismounted and used for feeding the air convectors to be mounted on the western wall, which will be the most remote from the first branching point.
Gym will be fitted with four hot water air convectors, capacity 18 kW, supplied with hot water temperature 90/70°C (80/60), from the heating system.
The air convectors will be fitted in the corners of the gym. Fresh air from the facade is injected through the facade grate into mixing box where fresh air is mixed with exhaust air. Ratio of fresh and exhaust air is set on the mixing box. The air is then filtered and supplied into air convectors, where it is heated and supplied into the gym space.

Operating of air convectors is controlled through change in number of fan revolutions via five-stage speed controller and wall-mounted thermostat for setting desired temperature in the gym.
To prevent freezing of water in air convectors at very low outdoor temperatures, fresh air ducts shall be fitted with motor-driven control jealousies, which will close when the temperature sensor at the entrance signals that temperature reached critical values.
To ensure supply of fresh air into every air convector, new openings size 50x50cm shall be made on the facade, while excess air is extracted from the room through overpressure grille, fitted with light flaps that open when internal pressure increases. To install this grille, it is necessary to make an opening in the gym wall in the middle of shorter sides, beneath the roof. Existing opening, to which duct for fresh air injection is connected, will be used for one of the overpressure jealousies.

Fitting of thermostatic radiator valves with thermal heads

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermo-heads. Selected thermostatic heads are convenient for buildings envisaged to be used by a large number of users with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermo-head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.
Due to dismantling of all the radiators for their flushing, during dismantling of existing radiator valves, it is also necessary to dismantle radiator sub-valves – valves.

Installation of balancing valves

Balancing of the pipework will be realized with fitting pairs of balancing valves in positions marked in the drawings, so as to separate certain parts of the pipework.
Return pipe will be fitted with differential pressure controllers without additional power supply, with the option of precise continuous pressure difference setting. The feeding pipe will be fitted with valves to balance pressure in riser pipe, with linear properties and meter gauges and the option of setting reading on a display of hand-wheel.
These two valves are mutually connected with capillary pipe up to 1m length and as a pair balance pressure variations between certain branches.

F4.2.3 Technical description of electrical services

for energy efficiency improvement in ‘’Oktoih’’ Primary School in Podgorica

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	‘’Oktoih’’ Primary School in Podgorica
Doc. origin:	Final Design of Electrical Services
Date:	17 October 2013

The purpose of reconstruction of Primary School ‘’Oktoih’’ in Podgorica is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.
The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Power supply and electrical installation for new heating system
- Installation of energy efficient lighting systems
- Replacement of lightning protection system

POWER SUPPLY AND ELECTRICAL INSTALLATION FOR NEW HEATING SYSTEM

Installation of new heating system in the school is proposed as one of the measures to improve energy efficiency in Primary School ‘’Oktoih’’ in Podgorica. It is envisaged to mount new distribution RT-KO board in place of the existing one. This board will be supplied with existing cable PP00 5x6 mm2 mm2 from main distribution board GRT and it will provide electrical supply to new heating equipment, lighting and general consumption (burner, circulation pumps, air convectors, axial fan, water softeners, general consumption and lighting and cabinets for automatic control).

Cabinets for automatic control of operation of new heating equipment shall be delivered within the scope of heating services. Inside the boiler room, power supply is envisaged using electrical cables type PP-y and cross section 3x1,5 mm2; 3x2,5 mm2, 5x2,5 mm2 and 5x4 mm2 through rigid installation conduits OBO Betterman or similar.
The proposed electrical power supply from existing main distribution board GRT does not affect total power consumption, and the existing cables are preserved.
It is envisaged to install inner circle of deep galvanized tape Fe Zn 25x4 mm2 on prefabricated tape carriers for potential equalization JUS N.B4.925 P, connected to the existing output from foundation grounding unit. Within this circle, each conductive element shall be connected inside the boiler room using yellow-green conduit P/F 1x16 mm2.

It is envisaged to replace air convectors in the gym, which will be mounted 3.5 meters high from the finished floor level. Power supply to air convectors shall be provided from existing gym switch board RO-S, using conductors PP00-y 3x2,5 mm2, which shall be placed through hard PVC pipes of appropriate cross section. The pipes should be mounted through the walls/ceilings and plaster. The total installed power of RO-S shall not be changed, therefore the existing power cable shall be kept.

Near the underground fuel tank, it is necessary to mount cabinet or pillar for discharge of static electricity, which shall be connected by tape Fe/Zn 25x4mm to the existing grounding unit of the building.

INSTALLATION OF ENERGY EFFICIENT LIGHTING SYSTEMS

Replacement of old and non-functional lamps within the facility is envisaged. The newly designed lamps will make it possible to reach the illumination level of more than 300lx, which is consistentwithEuropean standards forparticular uses for schools and as required by DetailedEnergy Audits. The selectedlamps are withbright parabolicgrid, of exceptionalphotometricproperties andwith onelight source(T16 1x54W) 840 (neutral whitesource colour), with an electronicballast for whicha photometriccalculation was prepared in specialized lighting software program. As analternative, it is possible to install lamp type 2x28W, with a bright parabolicgrid and T16840 tubes (neutralwhite sourcecolour) with electronicballast. The proposedlampshave slightly higherinstalled power, and about the samephotometricproperties, so theDesigneroptedforthe model1x54W. However, as the requirements were met and confirmed by photometric calculation inboth cases, the other solution is also possible. When positioningthe newly designedlamps, special attention was paid to theexistingelectricfeeders, so that thereconstructionis not expected to involve any extraworkfor the relocationof existinglightingin order to keepthe designed array. For this purpose it is planned to move one power outlet in eachclassroom. Switches for lamps remain the same.
For the purposes of lighting the blackboard, two lamps are envisaged per each classroom (where there is only one board, only one lamp will be installed), i.e. lamps with parabolic asymmetric grid 1x80W grid, with an electronic pre-connection device and a lamp of 840 T16 colour. Power supply for these lamps will come from the nearest junction box, to be switched on from any of the existing command centres in the classroom or from the gate in case of centralized solution.
In the toilets, luminaries with IP 54 protection degree shall be installed with 1x28WT5840 lampswith electronicballastandopalprotector, and in the hallways 2x28W T16 840 with high frequency electronic ballast with PMMA BIVERGENZ dark light diffuser or similar technology which eliminates glare.
Within the gym, light fittings with special net cover for mechanical protection are envisaged with fluorescent tubes 4x80W, also with electronic ballast and tubes T16840.
In the new boiler room, luminaries with IP 65 protection degree shall be installed with 2x35WT16840 and these luminaires are commanded locally with one way switches and on-wall installation.
Bearing in mind type of the building, emergency escape and anti-panic lighting system is designed according to the EN 1838, LED 5W, 1h light fittings. Light fittings which are envisaged enable safe escape from the building with luminance level on the escape route 1 lx and anti-panic luminance of 0.5 lx. in case of total black out. For supply of emergency lights, cables PP-y 3x1,5 mm^2 shall be installed from the nearest switchboard.

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and replacement of roof cover on main school building and gym, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, laid down in foundations of the building and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. New roof cover on the main school building shall be made of ribbed roof thermal sandwich panels (TRIMO), on a metal sub-structure, fixed on a concrete roof slab. New roof cover on the gym shall be made of plastic-coated coloured aluminum metal sheet Al.Tr.40/230/0,7mm, on a wooden sub-structure.
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quantities for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.
New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

F4.3. Educational Building 3
“VukoJovović” Primary School, Danilovgrad

F4.3.1 Technical description of building and trade works

for energy efficiency improvement in "VukoJovović" Primary School, Danilovgrad

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P.S. "VukoJovović" Danilovgrad
Doc. origin:	Final Architectural Design
Date:	Mart 2014

The purpose of reconstruction of the "VukoJovović" Primary School, Danilovgradis implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit.

In terms of envisaged building and trade works, improvement of energy efficiency is achieved through application of following measures:

- Thermal insulation of facade walls,
- Thermal insulation and waterproofing of the roofs,
- Replacement of facade joinery.

Reconstruction works also include non EE measures, such as ancillary works arising from implementation of EE measures, which need to be executed in order to enable proper function of reconstructed facilities. Those works include:

- Removal of old vertical and horizontal gutters, and then preparation and installation of new ones,
- Dismantling and installation of air conditioning units, cameras, antennas, lights,
- Removal and preparation of new dripping eaves; mortar and paintwork repairs,
- Removal and installation of new flashings and sheet metal drips,
- Removal of old and installation of the new protective bars on windows,
- Partial replacement of existing pavement around school building,
- Removal of the unused chimneys.

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building are also planned:

- Reconstruction of existing lavatories and dressing rooms,
- Skimming and treatment of walls, painting of all walls using oil-based paint up to the height of 1,7m, while the rest, till the full wall height and the ceilings, shall be treated with semi-dispersed paint,
- Sun protection on the three classrooms on top of the gym.

THERMAL INSULATION OF FACADE WALLS

Expanded EPS polystyrene, having thermal conductivity coefficient of λmax = 0,037 W/mK, thickness 8 cm minimal specific mass 16kg/m3, produced by the relevant EN standards will be used for external insulation of facade walls. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.

The lower part of the facade walls in the ground floor level (up to 2m), will be treated with harder insulating material XPS - extruded polystyrene, thickness d=8cm resilient to mechanical damages.
The existing mortar plinths have to be removed where it is peeling off from the substructure and it shall be finally treated with decorative ready mixed marble based mortar, created on grain ("Kulie"), using at the same time as splash guard and protection against vandalism. Type and colour of the “Kulie” shall be selected by the Employer/Employer's Representative.

Thermal panels with B1 flammability class (DIN 4102 B1 highly anti-flammable, non-combustible and self-extinguishing) should be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, horizontal breaks of 50 cm width above openings at the floor slab section made pressed mineral wool reaching A1 flammability class.

EPS/XPS thickness d=3cm are used for jambs externally.

Thermal boards are lap-joint and fixed to the facade wall with adequate enriched mineral adhesive and anchored with adequate screw anchor. Board surface is protected with fibrous plaster made of following components:
* the first layer – enriched mortar with cementing agent, mineral aggregates and additives for improvement of elasticity and water tightness. Surface on which this layer of mortar is spread has to be flat and smooth. Possible uneven surfaces on joints of placed polystyrene plates are filled with polyethylene foam. Reinforcing mesh with adequate lap joint and additional protection at the openings and angles is placed into fresh layer of this mortar. In case additional mechanical anchoring is required, it can be achieved with impact bolt through reinforcing mesh 24 hours upon placing this layer;
* reinforcing mesh;
* the second layer of mortar is applied in the same way as the previous. This layer of mortar shall be applied on a well settled first layer and smoothen with a screed afterwards;
* contact coating, made base on emulsion of synthetic resin and water glass, as agent for impregnation of settled fibrous mortar;

* finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in colour selected by the Employer / Employer’s Representative, fully in line with the Design details.

Prior to installation of thermal plates, following works must be performed:
*all the works on flat roof, including sheet metal works,
* replacement of facade joinery,
* installation of envisaged installations and equipment on the façade,
*closing of the classroom windows on shorter envelopes of the annex building,
* demolition of newly built parapet walls of the windows in the toilets.
*covering and protection of all the surfaces that remained untreated – glass, stone...
*checking existing cradling on the building:

Prior to installation of thermal plates, façade base needs to be fully cleaned from dust, grease and mortar.

The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat has settled, EPS block dimensions 5x5x5 cm shall be fixed with expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand. If during separation of polystyrene only adhesive is detached but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable.
If, during separation of polystyrene, not entire adhesive is removed, but parts of it still remain on the wall and parts on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.

If during separation of polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough and shall not withstand new layer of thermal insulation.

Corners and jambs of wall openings shall be installed with reinforcing mesh or angle profiles. Facade finishes along the plinth are made with installation of U profile strips adjusted to the thickness of thermal plate.
Prior to installation of plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates shall be additionally anchored using adequate bolts.

During installation of facade, cradling, mortar and adhesive, temperature of air must not drop below +5°C or go above +25°C. Mortar must not be applied in case of strong wind, rain or fog.

Classroom windows on shorter envelopes of the annex building, which are obsolete and cause high sun radiation in summertime, shall be closed. Office windows on the same envelopes of the annex building shall remain the same.Windows shall be closed by gas concrete bricks d=20 cm ("Ytong" or equivalent with similar or better characteristics) with proper connection to existing wall and reinforcement, and vertical and horizontal beams in line with regulations. The inner side of new walls shall be covered by gypsum boards 12 mm thick in line with existing ones. Outer side of the new wall shall be prepared for the installation of the ETICS facade.

Existing stone cladded facade including plinths covered with natural stone shall be cleaned from the dirt and grease until the natural colour of stone is reached.

Facade Scaffolding

For execution of described works for application of energy efficiency measures in ''VukoJovović'' Primary school in Danilovgrad, it is necessary to install adequate facade scaffold.
Facade scaffold shall be placed fully in line with valid regulations and health safety measures. The scaffold must be stable, anchored to the structure and properly grounded. It shall be used throughout the whole execution of works. Platforms or scaffold shall be used primarily to ensure safety of workers, and then ensure quality execution of required works.
Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms for execution of works.
Note: As per available equipment and works execution technology prior to execution of facade works, the Contractor is obliged to submit the design for installation of selected type of scaffold to the Supervisor, for verification and approval.

THERMAL INSULATION AND RENOVATION OF THE ROOFS

Within application of one of the EE measures in Primary school “VukoJovović” in Danilovgradis installation of new horizontal waterproofing and thermal insulation on existing roofs on existing non-passable flat roofs.
It is designed to remove existing thermal insulation and waterproofing layer off the flat roof up to the concrete slab, which is assumed to comprise following layers:

- waterproofing (3 layers of card board and 4 layers of coating with finishing protective layer),
- sloping layer (lean concrete d = 5-16cm),
- thermalinsulation layer (hollow brick d=7cm or “Durisol” panels).

Before, installation of the new layers on the roof dismantling of old unused chimneys is foreseen. This includes: dismantling of ten old chimneys which are not functioning, parts through the attic and above the roof, while part of chimney that is on the ground floor and on the upper floors shall remain.

In the Detailed Energy Audit Report of the Primary school ''VukoJovović'' in Danilovgrad it is recommended to apply inverse insulation system of the flat roofs. The Employer / Employer’s Representative, with consent of the Client, choose to apply regular way of thermal insulation for impassable roofs as better and more reliable solution and also to unify all solutions for flat impassable roofs of the schools in the scope of EEPPB project.

On prepared base, upon removal of existing layers, new waterproofing and thermal insulation shall be placed in following layers:

a) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil,
b) Vapour barrier of post bituminized aluminium foil with glass-fibre fleece
c) Thermal insulation made of extruded polystyrene boards XPS d = 8 cm with heat transfer coefficient λmax = 0.033 W / mK (on top of already installed foil),

d) Layer used for separating from PVC foil,
e) Sloping layer made of light-weight concrete d=5-22cm, sloped in range from 1.5% up to 5.4%,
f) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil,
g) Waterproofing of the cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproofing bitumen strip. One strip is with aluminium foil, the other with glass-fibre fleece. Every strip has a thickness of d = 4 mm. The first layer is put freely over hot bitumen with overlapping of 10-15cm, welded along the whole length. The second layer is 100% welded to the first one. Set waterproofing at least 15 cm up the walls. Take care of the connections between horizontal and vertical waterproofing.
h) Heavy protection of waterproofing of gravel d = 5 cm, using the sliding layer of waterproof dimpled foil, dry between waterproofing and gravel.

Use ''Krovoplast'' or similar coating,over the sloping layer, to protect waterproofing on the eaves.

Works on flat roofs and drips on pitched roofs require dismantling of the existing lightening rod and installation of a new one. This item is treated in the Electrical Installations design.

Pay special attention on the flat roof of the main entrance canopy. After removal of the existing roof covering layers, it is necessary for structural engineer and Employer/Employer's Representative to do site inspection in order to determine the condition of RC-slab of the canopy. Visual review of the building led the Employer / Employer's Representative to conclusion that RC-slab seems to be sinking, but there were no cracks on it. Site inspection of the structural engineer, in this case, is just precautions. When the structural engineer gives his report, work shall continue in line with his instructions.
Bottom side of the existing roof's top cover (manhole) shall be insulated with 10 cm thick layer of XPS.

REPLACEMENT OF FACADE JOINERY

The following measure for improvement of energy efficiency ''VukoJovović'' Primary School in Danilovgrad includes replacement of facade joinery, windows, doors and skylights.

New windows will be made of high-quality 6-chamber PVC profiles which need to have appropriate thickness (3.5 mm) and reinforced with galvanized steel profiles. Heat transfer coefficient, for profiles shall be maximum U=1,50W/m²K, i.e. 3,00W/m²K for panels and solar energy transmittance factor (solar factor) g≤65%. Anti-burglary protection shall be class 3 in line with DIN V ENV 1627, air permeability in line with EN 12207, Wind resistance EN 12210 and weather elements in line with class 9A/E750 (DIN EN 12208).

Windows must be fitted with high-quality exchangeable gaskets, high-quality shackles made of nickels and AL-alloys, knobs, i.e. locks with keys. All windows and balcony doors must be fitted with tilt and turn mechanism.

Entire PVC joinery must be installed in line with schemes in white colour.
Natural air-streaming at closed window is envisaged through for that purpose specially installed elements in the window frame type "Regel air", or in some other way, in line with DIN and EU norms. Number and size of these elements depend on the size of the window – given minimum per 2 pieces. These elements shall not be installed in fixed windows and fan lights.
For windows exceeding 2.2 m, window leaves are opened using "Ventus" mechanism on rail with opening using a handle that turns by 360 degrees. "Ventus" mechanism is operated vial steel rail on a spindle that allows opening on "Ventus" up to minimum 20 degrees.
Windows need to be fixed with anchors at 150mm depth into the walls i.e. existing structure.
Windows need to be placed so that the external side is at the same level as the previous windows.
Drips, made of galvanized sheet metal so called "solbank", are installed on the external side of the windows. These are placed along the entire window with set overhang over newly fitted thermal façade.
On the internal side of the window, it is necessary to place PVC window sills, along the entire width of the window, depth depending on the depth of the existing parapet wall.

Quality certified shackle must ensure opening according to the given joinery schemes. Special attention must be paid to shackles for “Ventus” windows to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window sashes.
Already installed windows which will not be replaced need to be fitted with new window sills, drips made of galvanized sheet metal.
Facade doors are made of plastics-coated aluminum profiles with thermo-break, according to joinery scheme and details, with high quality mechanism, hinges and metal support for opening. Glass system 4+16+4mm with hermetically sealed gas argon between two glass panes and tightened with permanently elastic EPDM rubber is used for glazing. Part with aluminum infill must be made of sandwich panel with infill from extruded polystyrene. Thermal conductivity must be maximally U=2,3 W/m² and solar energy transmittance factor (solar factor) g≤65%.

Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.

Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.

A vestibule area shall be constructed in the interior of the main entrance of the school building and it shall include double wing swinging doors. The item also includes production and assemblage of plastic coated aluminium profiles without thermal-break, single glazed-thickness of the glass 4mm, including metal supporters, required hanging and closing set.
For installation of doors, quality certified metal window support needs to ensure opening in line with set scheme and installation of self-closing mechanism, cylinder lock with three keys and floor rubber stoppers.

Selection of facade joinery colour or possible changes in details (elevation) can be determined either by Client or Supervisor, with previously obtaining Employer / Employer’s Representative permission.
Attests the manufacturer – contractor shall provide for all the ironmongery are:

- System window testing in line with 14351-1 and B 5300,
- Air permeability attest EN 12207 - Class 4,
- Water resistance attest EN 12208 - Class E 900 A,
- Wind resistance EN 12210 - Class C5,
- Mechanical requirements EN 12400 - Class 2,
- Sound proofing attest up to protection class 5,
- Heat transfer coefficient attest DIN EN 12412-2,
- Glass attest EN 673,
- Metal supporters attest V ENV 1627-1630, resistance class 3.

In the process of evaluation of bids, the bidder is obliged to prove typical drawings of angle types of windows and doors, as well as other catalogue and presentation material. It is necessary to prepare shop documentation for certain buildings, i.e. Employer / Employer’s Representative’s approval. In process of ironmongery production, it is necessary to enable Supervisor to inspect the products.

Prior to starting major production of joinery, it is necessary to prepare and install typical widow complete with ironmongery set, which will be recoded and accepted by developer and Employer / Employer’s Representative after removal of all possible remarks.

GENERAL MEASURES AND WORKS TO BE PERFORMED DUE TO IMPLEMENTATION OF BASIC ENERGY EFFICIENCY MEASURES

Dismantling and Installation of New Bars on Windows

Dismantling of existing protective metal meshes from the façade is foreseen and mounting of new protective wire net for windows made of welded crimped mesh is foreseen. Protective wire net to be welded to the L- profile frame, anchored to the wall by 150 mm length anchors. Galvanized mesh is made of wire 3,5-4 mm of thickness, while the size of openings shall not be less than 10 mm, neither larger than 30 mm. Total area of mesh openings shall not be less than 60 % of total mesh area.

Renovation /Construction of the Pavement Around the School Building

The following works shall be performed, where necessary:
*Clearing up and removing layer of humus d=10 cm, and planning of the terrain for sidewalk preparation, Preparing the layer of compacted gravel, d=10 cm,
*Concreting of sidewalk around the school building using compacted concrete, type MB20, of 10 cm thickness, along with simultaneously prepared floated surface of d=2cm thickness (in total of 12cm), preparation of border curb (dim. 10/20cm). Pavement has to be strained into the fields approx. 1,5m2. Expansion joints shall be filled with bitumen.Sidewalks shall have the same width as the existing.
Areas to be treated shall be determined on the site with the Employer / Employer's Representative.

The Contractor is obliged to provide the Employer / Employer's Representative with sample of material and certificates for all the materials to be used in the execution of works prior to starting with the works. Certificates must be issued by relevant institute for referred type of works.
Certificates cannot be older than a year commencing from certificate issuing date to the day of starting the works.

RENOVATION MEASURES, AIMING TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS IN THE BUILDING

Renovation of Lavatories

In addition to measures directly impacting energy efficiency improvement, the Design Brief envisages reconstruction of sanitary facilities:

-all lavatories in the school building,
-cloak rooms within the gym.

Cloak rooms next to gym hall shall be rearranged to meet the requirements and needs of the school administration as presented on the drawings annexed.
Following works need to be performed:

- Removal of the existing doors, all the layers of existing floor and wall tiles,
- Plastering walls where tiles were removed using gauged cement plaster, followed by fitting of all floor layers,
- Preparation of waterproofing below floors in the sanitary blocks and below the walls in shower cubicles, up to the height of 180 cm, in line with the descriptions given in the Bill of Quantities,
- Coating walls and floors with wall and floor ceramic tiles I class, size, colour and tone sampledand approved by Employer / Employer's Representative. Tiles are laid in layer of adhesive "joint to joint", with joints pointing using pointing compound. Wall tiles are laid up to 220cm height. Coating of jambs and niches shall not be subject to separate calculation.
- Preparation and installation of doors in sanitary facilities made of hard highly resistant PVC profiles, reinforced with stainless steel U- profiles, plastic coated, as per joinery scheme and details.

Works on Internal Ceilings and Walls

In addition to measures directly impacting energy efficiency improvement, the Design Brief envisages repairing and painting the walls and ceilings in all building.
Following works need to be performed:

- Scraping and skimming of existing walls and ceilings. After these works, treated surfaces will be smooth and flat.
- Final painting of all interior walls, from the height of 170 cm to the ceiling, including the ceilings. Use double layer of semi-dispersed paint.
- Final painting of all walls, up to the height of 170 cm, using oil-based paint.

Sun Protection on the Three Classrooms on Top of the Gym

Windows of the 3 classrooms on the top of the gym marked as 11 and 12 shall be equipped with blinds for sun protection The structures to be installed shall be simple and low cost, easy to replace/repair, mounted only on the upper part of the windows and rustproof. Technical proposal: Several layers of perforated PVC or min. 1mm thick L-shaped aluminium sheet profiles (approx. 10 cm wide) shall be screwed horizontally

onto the new PVC window frames (max. load bearing and bending capacity to be considered; use of raw plugs for hollow profile). All screws shall be from stainless steel.

Prior to commencement of works, the Contractor is obliged to provide the Employer/Employer's Representative with samples of materials and certificates for all the materials to be used during the works. Certificates must be issued by relevant institute for subject type of works.
Certificates cannot be older than a year from the day of issuing certificates to the day of starting the works.

F4.3.2 Technical description of thermal-technical (heating) services

for energy efficiency improvement in ‘’VukoJovović’’ Primary School in Danilovgrad

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	‘’VukoJovović’’ Primary School, Danilovgrad
Doc. origin:	Final Design of Thermal-technical (Heating) Services
Date:	17 October 2013

The purpose of reconstruction of ‘’VukoJovović’’ Primary School in Danilovgrad is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.

The following works on thermal-technical (heating) services are related to improvement of energy efficiency:

1. Energy management
2. Replacement of boilers and heating system optimization

ENERGY MANAGEMENT

Control of thermal energy consumption shall be achieved through installation of additional device, ultrasonic heat flow meter at feeding pipe of the boiler group, connected to the automatic control of the boiler and connected to the computer with software for data processing, obtained from the heating system. This measure will be implemented in all other schools covered by the project as unique central control system.

Fuel flow meters for metering fuel consumption shall be installed at the oil feeders from the tank into burner. The meters compare the amount of oil that reaches the burner with the amount of oil that goes back into the tank and provides information on consumed fuel.

Ultrasonic calorimeter will be fitted at the main branch used for transporting hot water into the system from the boiler and return pipe towards the boiler, to measure the amount of transferred heat to the consumer in the building. Calorimeter measures water flow and feeding and return temperatures, thus obtaining the amount of transferred heat.

All obtained data shall be processed in computer with designated software and, based on this, any problem that occurs in the heating system at the entire school will be timely resolved.

REPLACEMENT OF BOILERS AND HEATING SYSTEM OPTIMIZATION

Dismantling of the existing equipment in the boiler room

It is planned to dismantle existing boiler room equipment: old boilers with burners, funnels made of steel pipes, pumps, fittings, expansion vessel, automation, etc. New equipment shall be installed in the boiler room. It is also necessary to dismount existing steel chimney fitted along the wall of the school building, because it will be replaced with new prefabricated flues.

Preliminary works on installation of new equipment

The boiler room is planned to be fitted with new equipment that requires preliminary works, fitting of concrete base for new boilers, mending holes in walls after dismantling of old equipment. Openings that will remain in walls after dismounting of existing furnace funnels need to be closed and new openings shall be made in boiler room wall. Floor needs to be renovated with ceramic tiles and wall needs to be repaired where plaster is in poor condition and then painted.

Existing light distilled oil tank needs cleaning to remove deposits, with dumping of the deposits to a suitable location, in accordance with regulations. Intake elements at the oil feeder shall be replaced. New oil filters need to be fitted at the light distilled oil feeders, before the burners. At position where new flues will be fitted, it is necessary to construct adequate base where the bottom of the new chimney will be placed.

To ensure proper operating of the heating system in the future, all the radiators need to be dismantled, and flushed with highly pressurized pump, to remove deposits settled over exploitation period. Piping also needs to be flushed, as well as air release fittings on all risers on the second floor.

Fitting of new equipment in the boiler room

Installation of new three-way boilers is envisaged (two boilers with rated heat yield of 140kW each, main and stand-by) with self-protection system, which does not require boiler pumps for protection of cold water side in the boiler. Boiler size is determined based on required amount of heat for school building and gym so that one boiler is capable of covering 75% of the total heating system requirements. Boilers will be running alternatively at reduced capacity, and at higher loads shall work together when required.

Boiler digital automatic control will be used to control operation of the boiler and the burner in line with the variations of the outdoor temperature and cascade automatic control shall regulate operating of the entire system together with circulation pumps, mixing and throttle valves. Entire boiler room equipment will be connected to the new electrical wiring. This equipment will be controlled via boiler's automatic control.

Light distilled oil will be transferred from the tank via existing pipes which are in good condition, which will be fitted with new oil filters. Existing below ground light distilled oil tank will be used for storing oil, but needs to be cleaned and prepared.

It is envisaged to fit equipment for chemical water treatment at the branch from the town mains. Compact softener of water from town mains shall be installed, for heating systems with installed boiler power 500 kW. Its basic function is to protect the heating system from boiler scale and other deposits in water. Along with the device, it is necessary to use protective backwash pre-filter which consists of a casing with permanent mesh. Compact softener casing contains ion-exchange resin which is automatically regenerated once its capacity is spent. Regeneration is automatic and is carried out without the supervision at in advance programmed time.

Water softener shall be fitted into substation which was used for recharging water into the system. Selected water softener electric requires power supply, which can be provided from the existing power socket on the wall.

Water softener will be connected to the heating system with adequate pipe. It shall be also connected to town water mains right in front of the existing tap and connected to it.
On the town water mains, in front of the softener, water flow meter – water gauge shall be installed. Softened water is injected into the system through automatic water fill valve, which reacts mechanically to the previously set pressure level in the system.

Capacity of the expansion vessel is determined depending on the total capacity of the system and static water pressure of the system. Expansion vessel with gas is planned to be fitted in the corner against the wall next to the boilers. It will be connected to return pipe between return manifold and the boiler.

It is planned to fit self-supporting prefabricated insulated stainless steel chimney system. The entire furnace funnel, from the boilers to the vertical part of the chimney, is made of twin-wall stainless steel with insulation – “super wool” between the walls. It was planned to fit two new chimneys instead of the existing and to fix it to the wall with brackets.
Due to its length, the furnace funnel must be supported with holder from the lower side, at the middle of its length.

Circulation pump at branches towards parts of the school is selected calculated according to amount of water that can be pumped through the branches, when the heating in the gym is off, and according to pressure drop. Circulation pump for the gym is selected according to water flow required to feed existing air convectors in the gym and according to calculated pressure drop.
Frequency controlled circulation pump will be used for feeding the entire heating system in the school. The pump can operate with the option of automatic control (self-control from “one to the other proportional pressure curve”) or by maintaining proportional pressure, by maintaining constant pressure or in compliance with constant curve. The pump will be controlled by boiler automatic control.

Three-way mixing valve for variable slide temperature control of feeding water shall be fitted in front of the pump, with connection to return pipe. The mixing valve will be controlled by boiler automatic control.

Three-stage pump with fixed number of runs, without mixing valve for variable slide temperature control of feeding water, shall be used to supply heating system in the gym. Circulation pump would be running constantly on operating point until 18°C degree temperature in the gym is achieved, after which it would be switched off with signal from thermostat, which will be mounted on the wall inside the gym. Fans on air convectors will be switched on manually with switches mounted on wall near the convectors.

Existing hot water supply of these air convectors will be omitted and new branch from the boiler room to the gym will be fitted, that will be used solely for water supply of the air convectors. Pipes will be installed from the boiler room throughout the wall, up to the building, and it will enter the building through the window in the gym toilet. Then, these pipes will be placed beneath the ceiling, through ancillary premises next to the gym, up to the air convectors, which will not be moved from their current positions.

Required amount of fresh air for fuel combustion will be provided through grille on the doors and air intake is enabled with fans on the burners. Both boiler room doors will be fitted with one grille each, since the doors are placed on opposite sides, to allow undisturbed ventilation of the boiler room.

To protect the equipment in the boiler room from freezing, it is envisaged to fit electric air convector, which will be activated in the boiler room when the temperature drops below 2°C, measured with its own thermostat.

Feeding and return pipes are dimensioned depending on the water flow through them and depending on dimensions of supporting equipment connected to the feeding and return pipe. At the highest points of feeding and return pipe from the boilers, it is planned to fit air-release vessels with overflow pipes. Air release vessels will be mounted at feeding and return pipes towards the school and the gym

Feeding and return manifolds are planned to be mounted on self-supporting brackets along the boiler room wall, one next to the other so as to group all the equipment in one part of the boiler room to make it accessible for maintenance.

Entire boiler room equipment will be thermally insulated with mineral wool, 50mm thick, coated in aluminum foil. Part of the new set of pipes from the boiler room towards the gym needs to be protected against weather elements, as pipes go outside from the boiler room up to the school building.

Fitting of thermostatic radiator valves with thermal heads

To control room temperature, it is planned to fit the radiators with thermostatic valves with thermo-heads. Selected thermostatic heads are convenient for buildings envisaged to be used by a large number of users with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is achieved via a key which does not require removal of protective cap. Thermostat has liquid sensor integrated in the thermo-head casing Setting range is between 8 °C and 26 °C. Closing time is 24 min.
Due to dismantling of all the radiators for their flushing, during dismantling of existing radiator valves, it is also necessary to dismantle radiator sub-valves – valves.

Installation of balancing valves

Balancing of the pipework will be realized with fitting pairs of balancing valves in positions marked in the drawings, so as to separate certain parts of the pipework. Existing control and check valves on radiator feeders will be replaced with new regulating/balancing valves. Existing ball valves on branches will be kept, because it does not affect flow in the piping.
Return pipe will be fitted with differential pressure controllers without additional power supply, with the option of precise continuous pressure difference setting. The feeding pipe will be fitted with valves to balance pressure in riser pipe, with linear properties and meter gauges and the option of setting reading on a display of hand-wheel.
These two valves are mutually connected with capillary pipe up to 1m length and as a pair balance pressure variations between certain branches.

F4.3.3 Technical description of electrical services

for energy efficiency improvement in ‘’VukoJovović’’ Primary School in Danilovgrad

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
School:	‘’VukoJovović’’ Primary School in Danilovgrad
Doc. origin:	Final Design of Electrical Services
Date:	17 October 2013

The purpose of reconstruction of Primary School ‘’VukoJovović’’ in Danilovgrad is implementation of energy efficiency measures in the building, in line with the Design Brief and results of Detailed Energy Audit Report.
The execution of electrical works, as part of overall measures for energy efficiency improvement, is related to:

- Power supply and electrical installation for boiler room and new heating equipment
- Installation of energy efficient lighting systems
- Replacement of lightning protection system

Apart from the measures that directly affect energy efficiency improvement, implementation of measures aimed at increasing comfort and working conditions in the building is also planned. Complete existing electrical installations are made of cables with two wires (cables are without protective conductor PE) and therefore replacement of complete electrical installations is envisaged.

POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND NEW HEATING EQUIPMENT

Replacement of boilers and heating system optimization in the school is proposed as one of the measures to improve energy efficiency in Primary School ‘’Oktoih’’ in Podgorica. It is envisaged to mount new distribution RT-KO board in place of the existing one. This board will be supplied with existing cable N2XH-J 5x6 mm2 mm2from main distribution board GRT and it will provide electrical supply to new heating equipment, lighting and general consumption (burner, circulation pumps, air convectors, axial fan, water softeners, general consumption and lighting and cabinets for automatic control).

Cabinets for automatic control of operation of new heating equipment shall be delivered within the scope of heating services. Inside the boiler room, power supply is envisaged using electrical cables type PP-y and cross section 3x1,5 mm2; 3x2,5 mm2, 5x2,5 mm2 and 5x4 mm2 through rigid installation conduits OBO Betterman or similar.
The proposed electrical power supply from existing main distribution board GRT does not affect total power consumption, and the existing cables are preserved.
It is envisaged to install inner circle of deep galvanized tape Fe Zn 25x4 mm2 on prefabricated tape carriers for potential equalization JUS N.B4.925 P, connected to the existing output from foundation grounding unit.

Within this circle, each conductive element shall be connected inside the boiler room using yellow-green conduit P/F 1x16 mm2.

Near the underground fuel tank, it is necessary to mount cabinet or pillar for discharge of static electricity, which shall be connected by tape Fe/Zn 25x4mm to the existing grounding unit of the building.

INSTALLATION OF ENERGY EFFICIENT LIGHTING SYSTEMS

Replacement of old and non-functional lamps within the facility is envisaged. The newly designed lamps will make it possible to reach the illumination level of more than 300lx, which is consistentwithEuropean standards forparticular uses for schools and as required by DetailedEnergy Audits. The selectedlamps are withbright parabolicgrid, of exceptionalphotometricproperties andwith onelight source(T16 1x54W) 840 (neutral whitesource colour), with an electronicballast for whicha photometriccalculation was prepared in specialized lighting software program. As analternative, it is possible to install lamp type 2x28W, with a bright parabolicgrid and T16840 tubes (neutralwhite sourcecolour) with electronicballast. The proposedlampshave slightly higherinstalled power, and about the samephotometricproperties, so theDesigneroptedforthe model1x54W. However, as the requirements were met and confirmed by photometric calculation inboth cases, the other solution is also possible. When positioningthe newly designedlamps, special attention was paid to theexistingelectricfeeders, so that thereconstructionis not expected to involve any extraworkfor the relocationof existinglightingin order to keepthe designed array. For this purpose it is planned to move one power outlet in eachclassroom. Switches for lamps remain the same.
For the purposes of lighting the blackboard, two lamps are envisaged per each classroom (where there is only one board, only one lamp will be installed), i.e. lamps with parabolic asymmetric grid 1x80W grid, with an electronic pre-connection device and a lamp of 840 T16 colour. Power supply for these lamps will come from the nearest junction box, to be switched on from any of the existing command centres in the classroom or from the gate in case of centralized solution.
In the toilets, luminaries with IP 54 protection degree shall be installed with 1x28WT5840 lampswith electronicballastandopalprotector, controlled by occupancy sensor and in the hallways 2x28W T16 840 with high frequency electronic ballast with PMMA BIVERGENZ dark light diffuser or similar technology which eliminates glare.
Within the gym, light fittings with special net cover for mechanical protection are envisaged with fluorescent tubes 4x80W, also with electronic ballast and tubes T16840.
In the new boiler room, luminaries with IP 65 protection degree shall be installed with 2x35WT16840 and these luminaires are commanded locally with one way switches and on-wall installation.
Bearing in mind type of the building, emergency escape and anti-panic lighting system is designed according to the EN 1838, LED 5W, 1h light fittings. Light fittings which are envisaged enable safe escape from the building with luminance level on the escape route 1 lx and anti-panic luminance of 0.5 lx. in case of total black out. For supply of emergency lights, cables PP-y 3x1,5 mm^2 shall be installed from the nearest switchboard.

REPLACEMENT OF LIGHTNING PROTECTION SYSTEM

Together with the new ETICS (‘’Demit’’) thermal facade and new waterproofing and thermal insulation of the flat roof, it is envisaged to replace existing obsolete lightning protection system. Existing grounding system in »B« type scheme is made of galvanized strip Fe/Zn 25x4 mm, laid down in foundations of the building and it will remain the same.
Existing grounding units in foundations of the building shall be used for new lightning protection system and grounding of metal gutters. New thermal insulation of the flat roof has to be applied in combination with the new waterproofing layer of the roof.
All necessary material and works for reception and descending conduction systems shall be procured in line with enclosed Bill of Quantities for replacement of lightning protection system, and fully executed according to valid standards, rules of practise and approved Final Design documentation.

New lighting protection installation shall be tested for continuity of receiving system, conductors and grounding system with its connectors and for resistance of grounding electrode of lightning installation. The tests shall be done according to regulation on low voltage electrical installations.

NEW ELECTRICAL SERVICES IN THE BUILDING

Low voltage cable connection

The building is powered from nearest power station NDTS 10/0,4 kV, by means of PP00-y 4x120 mm2 cable, which ends in KPO (cable connection board) mounted on the building facade, as shown in annexed drawings. Cable is laid in the trench together with a strip Fe/Zn 25x4 mm, which is connected to existing output of the building foundation grounding unit. Main distribution board GRO, located in doorkeeper's office, is connected to KPO by cable N2XH-J 4x35 mm2 + N2XH-J 1x35 mm2.

Distribution boards and power supply cables

Measuring equipment of electrical energy consumption shall be installed in main measurement and distribution switch board, marked as GRO (existing measuring equipment shall be kept). Measuring is according to TP2 ED direct 10-60A (low voltage, three phase, two tariff, +A).
GRO is planned for recessed wall installation, dimensions of 950x800x205mm (L×H×B), degree of protection IP54, IK09 protection class II, with cables coming from the top side, similar to Univers ZB23W manufactured by Hager. GRO board shall be with door wings, lock and openings covered by ''plexiglas'' (PMMA), for easy reading of metered consumption.
GRO is located in doorkeeper's office. It is divided in sections: measuring section, main switching elements section with fuses and section for manipulation and distribution field. Power supply of all consumers in the building is provided from GRO: N2XH-J and NHXMH-J cables shall be laid for power supply to other distribution boxes in the building, from which electricity shall be supplied to final consuming points and for power supply in the ground floor, as shown in annexed drawings.
New junction boxes shall be wall recessed type, ready-made with a lock, similar to panels manufactured by Hager. These junction boxes shall be divided in properly dimensioned sections with fuses and switches and distribution sections. All new junction boxes shall be made according to enclosed drawings and Bill of Quantities.

Electrical installations for general consumption and power supply of heating equipment

For the purposes of power supply for general consumption and power supply of heating equipment, appropriate number of single phase and three phase outlets and connecting points is foreseen, in line with the purpose of this building. Outlet arrangement is planned according to equipment arrangement. In the case of any changes of equipment arrangement, position of the outlets should align with these changes.
Modular type of installation accessory is foreseen. Electrical installations for general consumption shall be made of conductors type NHXMH-J 3x2.5mm2 and NHXMH-J 5x2.5mm2. Cable shall be laid in walls/ceilings and covered with plaster.
Installation heights, on which the outlets shall be executed (with number of current circuit), are marked on the drawings annexed herewith.
The protection from indirect contact is made by system of protection TN-S and with using single phase protection devices with differential current and automatic switch function.

Electrical installations of interior lighting

Appropriate lighting installation is foreseen in all rooms of the building and in line with the purpose and conditions for mounting of lighting fixtures. Luminaries with appropriate level of protection are selected according to the purpose and position of rooms. The proposed luminaries are specified on the drawings and in Bill of Quantities. The light sources must be energy saving with designed power and luminous flux.

Luminaries in rooms are locally controlled with ordinary switches and two way switches, while the control of luminaries in hallways is centralized and shall be done from reception desk at entrance of the building. The switches shall be modular type with decorative mask. The switches shall be mounted at height of 1.2 meters from the finished floor level. Electrical installation shall be made of conductors type NHXMH-J 3x1.5mm2 and NHXMH-J 4x1.5 mm2. Cables shall be laid in walls/ceilings and covered by plaster.

Emergency lighting

Emergency lighting is planned according to the purpose of the building. It is planned to be installed in entrance hall, stairs and stair halls.
Planned emergency light fixtures are envisaged for 1h autonomous operation in case of power cut.
Emergency lighting fixtures shall be part of separate electrical circuit, powered by NHXMH-J 3x1,5mm2 cables, laid in walls/ceilings and covered by plaster.
Anti-panic light fixtures with Ni-Cd batteries and AC adapter are planned in all corridors and stairways. These luminaries are envisaged for 1h autonomous operation in case of power cut and they are directly connected over fuse to the nearest junction box. These luminaries shall provide a minimum level of light for safe evacuation.
Type of luminaries, method of installation and class of insulation for electrical equipment and materials shall be in line with nominal voltage levels and environmental conditions

F4.3.4 Technical description of sanitary (water supply and sewerage) services

in"VukoJovović" Primary School, in Danilovgrad

INTRODUCTION

Investor:	Ministry of Economy of Montenegro, Energy Efficiency Sector
Project financed by:	KfW ENTWICKLUNGSBANK
Consultant:	FICHTNER GmbH&Co. KG
Sub-Consultant:	KOPRING PMC, Podgorica
School:	P.S."VukoJovović", Danilovgrad
Doc. origin:	Final Design of Water Supply and Sewerage Services
Date:	17 October 2013

Apart from the measures that directly affect energy efficiency improvement in "'VukoJovović'' Primary School in Danilovgrad, in terms of water supply and sewerage services, it is envisaged to reconstruct toilets in the main school building and in the gym.
The reconstruction of water supply installations implies replacement of indoor pipes network made of zinc-plated steel pipes. The replacement shall be performed from an entry point of pipeline into the building, so that the complete replacement of network is foreseen in the renovated toilets.
In addition to replacement of water supply installations, a replacement of sanitary units and replacement of sanitary sewerage installation have been also foreseen. The existing sewerage outputs from the building and exhaust pipes to the manholes shall be used and are not subject to any changes.

DESCRIPTION OF EXISTING SITUATION

Sewerage Installations

The existing toilet sewerage installation, in ''VukoJovović''Primary School in Danilovgrad, is predominantly manufactured of cast iron pipes, sealed by hemp with cast iron plug. Conversation with the school staff and visual review of visible parts of installations led the Employer / Employer's Representative to conclusion that sewerage installation is obsolete and it needs to be reconstructed. Since the exact position of sewerage installation is not known, nor it's condition in the walls and beneath the floors and the As-built Design does not exist, drawings of the new sewerage installation have not been prepared. The contractor shall provide the routes and drawings of new sewerage installation, after revealing existing installation in walls and floors of the sanitary facilities planned for reconstruction. Before the commencement of the works, the Contractor will submit the necessary drawings to the Supervision engineer for approval. The Estimated Bill of Quantities was prepared on the basis of previous experience and similar scope of reconstruction works of sanitary rooms in other schools within this project.

Water Supply Installations

The water supply installations are constructed of zinc-plated steel pipes. There are no visible points of leakages, but after long term use, one may expect an incrustation on the inner surface of the pipes.

As in the case of sewerage installations, the As-built Design of water supply installations does not exist and the exact position of pipes is not determined. Conversation with the school staff and visual review of visible parts of installations led the Employer / Employer's Representative to conclusion that water supply installation is obsolete and it needs to be reconstructed.Since the exact position of water supply installation is not known, nor it's condition in the walls and beneath the floors and the As-built Design does not exist,

drawings of the new water supply installation have not been prepared. The contractor shall provide the routes and drawings of new water supply installation, after revealing existing installation in walls and floors of the sanitary facilities planned for reconstruction. Before the commencement of the works, the Contractor will submit the necessary drawings to the Supervision engineer for approval. The Estimated Bill of Quantities was prepared on the basis of previous experience and similar scope of reconstruction works of sanitary rooms in other schools within this project.

WATER SUPPLY INSTALLATION

Solution Concept

The water supply installation is designed in accordance with standard solutions except that water supply pipes are envisaged to be manufactured of polypropylene (PP) to withstand the operation pressures of 10 bars and mutually joined by fusion process. The cold water has to be connected to the existing water connections to the assumed positions according to visual toilet preview and then distributed to the outflow point.
Hot water is not foreseen in new toilets.
Installation is equipped with required switch valves enabling an independent operation of each water supply branch. In front of each outflow, point installing of an adequate switch valve is foreseen to allow for intervention in case of a failure or replacement of sanitary equipment.
Water supply pipes are laid into the wall. Thermal insulation of the pipes is not necessary since polypropylene is a poor conductor of temperature.
Upon completion of work, water supply installations shall be checked for test pressure of 12 bars. After the testing, it is necessary to perform rinsing and disinfection of complete water supply installation Disinfection must be performed by a certified firm issuing adequate written certificate.

Analysis of water requirement

Water requirements do not change in regards to the present needs and do not affect the size of connection to the school building.

Available quantities of water

Available quantities of water do not change in regards to the existing state.

Quality of water at spring sources

Since the building is connected to the public water supply system, the quality of water has to be guaranteed by the public local PE “Vodovodikanalizacija”, Danilovgrad.

Procedure of preparing drinking water

Since the building is connected to the public water supply system, the quality of water shall be guaranteed by the public local PE “Vodovodikanalizacija”, Danilovgrad.

Solution for transport and water distribution to final user

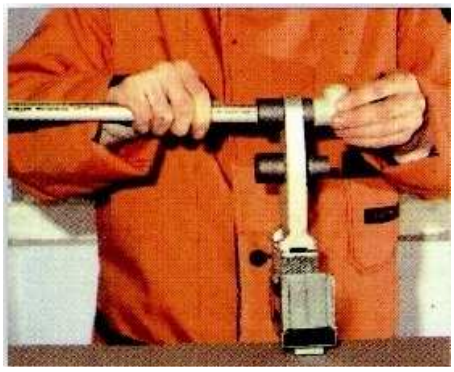
Water is distributed through water supply installations. No hydraulic calculation is necessary because the quantity of water does not change, and the position of outflow points does not change significantly.

Stages of construction of the system

It is not necessary to schedule any stages throughout reconstruction of the toilets.

Materials used in constructing the water supply system

Assembling of PP water supply pipelines for interior installation implies installing PP lines in the sanitary facilities and distribution in the bathrooms. The pipe length is not supposed to exceed 2m, works include bringing pipes to the bench from the distance of max.50m of horizontal or vertical route, taking measure, cutting pipes, installing with all necessary cross-sections of welding by poly-fusion weld. Welding is performed in the following way:
Pipes and cross-section pieces to be welded must be cut under straight angle and cleaned from dirt and grease. The parts to be welded are placed at the welding unit simultaneously (thorn and bushing) to the limit stop.



When the welding temperature is achieved, which can be shown either by the lamp or timer, depending upon the type of the welding unit, the elements are taken off the unit and impress into each other. They are retained in that position without movement until they get cold. It is very important not to exceed the limit of depth of inserting one element into the other.

Other specifics, manual instruction with human resources

This water supply installation has no need for any specific maintenance. There are no specific requirements for personnel either and the complete installation can be maintained by ordinary team of plumbers.

Conditions and approvals

Since the project is intended for rehabilitation of the existing toilets without changing the quantity of water, no conditions are required for changing the connection to the community network.

SEWERAGE INSTALLATION

Solution concept

The existing sewerage installations are predominantly made of cast iron pipes. The newly designed sewerage installations, consisting of PP sewerage pipes for interior installations, together with fittings and all required equipment for proper network operation, shall be connected to the existing one, as it is foreseen. The connection of new designed sewage to the existing installations shall be performed by means of transitional sewage fittings, from PP to cast iron pipes and stainless steel pipe straps with rubber gaskets.
Pipes bottom decline of the main bathroom sewage line is J=2%.

SANITARY EQUIPMENT

The existing sanitary equipment in toilets shall be replaced with the new one as per specification given in the Estimated Bill of Quantities. Lavatories are equipped with wall taps for cold water. Concrete lavatories in the school toiletsshall be retained and repaired by coating them with new ceramics.

F4.4. Technical requirements for works execution

A4.4.1 Technical requirementsfor execution of building and trade works

EARTHWORKS

Prior to earthworks, the Contractor is obliged to clear the land where the pavement is to be built.
Digging and backfilling must be performed exactly as planned.
Any damages caused by the Contractor due to its own fault, incompetent or inadequate work, fails to secure endangered sections should be remedied and put into proper state at his own expense.
Re-digging is not permitted. If the Contractor re-digs – digs dipper then envisaged in plans, he is obliged to remedy re-dug part at his own expense, using his own material and labour force.
Excavated soil is removed from the construction site to a landfill set by relevant authorities.
Sub-base should be placed immediately upon completion of certain previous works, so as to enable undisturbed execution of other works, removal of excavated soil from the construction site and achieve full and even compression.
Sub-base envisaged in the designed and calculations from BoQ must be made of natural mixture of pure gravel in envisaged layers, measured in compressed state.
Sub-base compression should be also done mechanically, and where that is not allowed or not possible, hand standard ramming should be applied.

MASONRY

Material used for brick-walling must be of high class and must be in line with valid JUS or corresponding MEST standards.

- Brick and other brick ware: B.D1.011 Do D1.015/79, B.D1.030/79, B.D1.016 and B.D1.017/84.
- Lime: B.C1.020/81.
- Cement: B.C1.009 & B.C1.011/82.
- Sand: B.B8.040/82 & B.B8.042/84.
- Gypsum: B.C1.030.

Water used for mixing mortar must be clean, without organic compounds which could have negative impact on quality of mortar and must be aligned with provisions of JUS U.M1.058, or corresponding MEST standard.

Bricklaying
Brick lying must be performed by skilled, qualified labour force and fully in line with valid technical regulations and average civil engineering trade norms.
Bricking must be performed exactly as in plans, with straight joints in fully horizontal lines without pieces smaller than ¼ of the brick and such pieces must not be placed one next to other in a wall.
Vertical and horizontal joints need to be fully filled with mortar, no cavities. Thickness of mortar in the joints cannot exceed 10 to 12 mm. External joints should be left empty at 15 to 20 mm depth for achieving better bonding with mortar for walls plastering. Mortar that leaks from the joints needs to be removed with trowel while still fresh and wipe that spot with burlap.

During brick walling, it is necessary to make sure:

- to build bricks bonds set by the Employer / Employer's Representative consistently and acceptably along the entire length of the wall,
- when necessary, to cut the brick mechanically
- the joints are completely horizontal, i.e. vertical with continuous width of the joint.

Dry installation will be used for indoor joinery.

The calculation and paying shall match general requirements for construction and specialist's trade works, valid average civil engineering norms and adequate items in the BoQ calculated per m3 for massive walls and m2 for partition walls, unless set differently in the specialist's trade works.

CONCRETE WORKS

All concrete and reinforced concrete works shall be completed in line with the "Rulebook on technical measures and requirements for concrete and reinforced concrete".
Concrete production and installation, by rule, is mechanically driven.
Hand concrete installation is allowed in exceptional cases only and upon receiving approval from the supervisory body and only in case of small amount and structures which are not load bearing.
Hand installation includes good compacting into layers and knocking on the formworks, and mechanical is performed using adequate vibrators.
All used material must meet technical requirements set out in "Rulebook on Technical Measures and Requirements for Concrete and Reinforced Concrete" and provisions of relevant international standards, whereby for:
* aggregate,
* cement,
During concrete installation, concrete mass needs to be installed quickly, before the concrete starts settling.
In case of concrete mass segregation during transportation, the same shall be manually mixed to again turn it into homogenous mass.
Upon completing concrete installation, concrete needs to be protected from heat and sun by its curing with water for minimum three days, and also the concrete needs to be protected from wind and frost, which shall not be paid for additionally but is included in the work item.
Unit price includes all work, tools, materials with storing, transportation within and outside the construction site, protection and curing the concrete, workers' wages and all other fees and costs according to the price structure.

PLASTERING

Material used for plastering must be of good quality, i.e. repair of damaged parapet walls and jambs must be done in quality manner, with expert preparation according to valid technical regulations and DIN standard.
Lime fully in accordance with the JUS standard B.C8.042-1970, or corresponding MEST standard.
Cement fully in accordance with the JUS standard B.C8-024, or corresponding MEST standard.
Sand fully in accordance with the JUS standard B.B8-039, or corresponding MEST standard.
Mortaring should be applied in two layers, with total thickness of 15-20 mm, as follows: first layer should be consisted of mortar with rough, sharp and sifted sand, the second one, final layer with fine sand, after the rough layer has settled well. After mortaring, the surfaces should be flat, smooth and without wrinkles, cavities or bulges. The edges must be straight, and corners at walls and ceiling joins right and sharp, so that the item is ready for installation of new PVC with blind frame and aluminum window bench.

CARPENTRY WORKS

The carpentry works should be performed using dry and healthy timber without dropping knags and other faults. Second class arbutus whitewood should be used completely in accordance with the standards published in the "Official Gazette OF Montenegro". All the works should be completed in good quality as per Employer / Employer's Representative's requirements and Supervisor's instructions.
Timber and joint materials for construction of supporting roof structures, completely matches PTP for wooden structures. Timber used for roof and its parts must be dry, healthy and a good quality one. Cut

timber should be whitewood, except on the roof parts which are exposed to outdoor conditions, where pine timber must be used.

This item also implies complete works, materials, transport, auxiliary scaffold, production of patterns for profile drawings, cross-cutting, assembling, positioning of all elements, bitumen coating of walls at supporting points, etc.
Unit price for wooden structure includes the following items: complete materials, works, tools, external and internal transport, scaffold, earnings, taxes and all other corresponding costs.

ROOF TILLING

All the covering works should be performed using good quality and first class roofing cover, with proper certificates, whereat the works have to be completed professionally and in a good quality, using corresponding means for fixing to the roofing structure. Metal-sheet covering should be mounted over previously placed slats (described within carpentry works), with lap joints and screw fixings through the waving metal-sheets ridge.

FAÇADE DOORS AND WINDOWS REPLACEMENT (PVC and AL JOINERY)

PVC joinery
PVC material for window profiles must be quality. Testing must be conducted in line with relevant European norms (EN 12207), tightness to water penetration (EN 12208) and resistance to wind blows, at least in line with European norms (EN 12210) and DIN standards (DIN 53455, 53453, 53460, 52612, 53479A, 53753, 53381, 16830).

Purchase and installation of façade doors and windows should be carried out in accordance with provided sketches and drawings, which are composite part of this Design.
PVC joinery must provide total heat transfer coefficient for windows of Umax 1.5 W/m²K. Window profiles (thickness 3.5mm) must be made of minimum 5-chamber profiles, with thermo-break and reinforced with galvanized steel U profiles, thickness minimum 1.5mm. The profiles must be fully in line with RAL quality standard. Heat transfer coefficient for package of profiles with metal reinforcement (in line with DIN EN 12412-2) is less than 1.4 W/m²K.

High quality PVC hard profiles have to be resistant to UV radiation, cracking, distortion and other deformations. Raw material used for production of PVC profiles must not be made of recycled materials. Strong reinforcement of basic PVC cross cut sections must be made of stainless steel attached to frames and leaves, as well as reinforcement of all angles and connections for permanent preservation of set geometry of windows.

Infill is made of double layer of low-emission glass, with heat transfer coefficient solar factor g≤65% defined in technical description of foreseen works, with hermetically sealed argon or dry air between two glasses. The sealing should be provided by epoxy rubber (according to EN 410 and EN 673, Ug=up to 2.0 W/m² K).

Entire PVC joinery must be installed in line with annexed schemes, in colour as requested by the Employer/Employer’s Representative.

The joinery must be fitted with high-quality exchangeable gaskets, high-quality shackles made of nickels and AL-alloys, knobs, i.e. locks with keys. Envisage minimum two weather seal strips along the frames and sashes. All window openings need to have metal supporters with a break as protection for wrong handling and sudden wind blows.

Natural air-streaming at closed window is envisaged through for that purpose specially installed elements in the window frame type “Regel air”, or in some other way, in line with DIN and EU norms. Number and size of these elements depend on the size of the window – given minimum per 2 pieces.

Ventilation opening must guarantee safety to strong wind blows, fully in line with valid EU norms - 9A/E750 (EN 12208). This mechanism should be either self-regulating or with manual opening/closing. Elements must not be installed in fixed windows and fan lights.
Regardless which option is selected, the system should provide natural ventilation without jeopardizing the safety, not to permeate outdoor noise above permissible limits, as well as not to permeate humidity or water. At the same time, it should enable moisture drainage in order to reduce and eliminate humidity in the rooms. This system should also ensure a minimum of room ventilation and in such a way prevent room humidity condensation, and at the same time provide energy efficiency savings.

The profiles should be equipped with holes and channels for condensation drainage with compulsory fitted covers on the external side of drainage holes. The covers should be involved in the complete profiles system and made of same materials as profiles themselves, as well as protected against dismantling due to atmospheric conditions.

Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.

Windows need to be installed through previously installed blind frames, fixed with anchors into the walls, i.e. existing structure. Polyurethane foam or such should be used for sealing space between walls and window frames. After sealing, jambs need to be painted so as to conceal tightening material and put surface of the side in proper state.

The windows should be installed in such a way that external sides have to be in the same plane as the removed ones. Where necessary, a lining should be placed on its external side. They are placed along the entire window width and skylights over newly built thermal facade. External drip edge should be provided, with elaborated details of its fixing to the frames. External ready-made galvanized plastic-laminated steel metal sheet sills are installed on the external side of the PVC windows. Drip should be fixed in such a way to prevent water penetration between the wall and window bottom. Prior to production, all measures of openings and sills should be inspected in-site and recorded in construction log.

On the internal side of the window, where it is necessary, place PVC window sills along the entire length of the window, depth depending on the existing parapet.

Quality certified shackles ensure opening according to given scheme.

For windows exceeding 2.2 m, window sashes are opened using “tilt and turn” mechanism on rail with opening using a handle that turns by 360 degrees. “Tilt and turn” mechanism is operated via steel rail on a spindle that allows opening on “tilt and turn” up to minimum 20 degrees. Special attention must be paid to shackles for “tilt and turn” windows to ensure it is heavy-duty and quality with adequate number of “scissors” depending on the size of the window leaves.

Special attention should be paid to highly installed windows which must be equipped with high quality accessories and provide good quality opening system within lower opening area. Handling with these openings should be enabled by a lever or similar device. All “tilt-and-turn” opening items which are not suitable to be handled from the floor level should be equipped with special handle system, placed at the level of max. 1,5 m distance from the floor.

Supplier is obliged to submit drawings of cross section of the profiles from requested material as well as sample of the profiles, fittings, accessories and glass, including pieces of raw profiles for which valid certificate from relevant institution was obtained.
Prior to production, it is necessary to prepare and install entire typical window. After elimination of all

possible complaints, it will be verified in records and admitted by the Employer/Employer's Representativeor the Supervisor.

All the windows and doors that should be glazed previously should be installed and set, cleaned, especially the grooves and felts. Glass used for glazing has to be the first class quality. Structure of doors, "tilt", "turn" and "tilt-&-turn" windows should be in the "EUROGROOVE" system, so the fittings of all known manufacturers can be matched.

Unit prices include horizontal and vertical transportation, disassembling and assemblage of doors and windows, accessories, fittings and hardware, cleaning of floors, glass and possibly other objects upon completed works, as well as possible installation, removal and disassembling of scaffold and samples preparation.

The Contractor should provide a 10 years guarantee for profiles, sealing epoxy rubber and complete window.

Aluminum joinery

Facade aluminumdoors/windshields shall be produced as the existing (single and double leaf doors opened outwards) with fan lights as the existing, with thermally insulated glass, on three hinges.

For installation of doors, quality certified metal window support needs to ensure opening in line with set scheme and installation of self-closing mechanism, cylinder lock with three keys and floor rubber stoppers.Entrance portals into buildings, envisaged to be replaced with new facade aluminumjoinery, shall be fitted with thermal-break, double glazing system and heat transfer coefficient as defined in the technical description of foreseen works.

Depending on the size of the opening, where it is necessary, big windows/doors elements should have additional reinforcement/stiffening of the profiles.

Include everything from the description: purchase of material, production, transportation and installation with hinges and blind frame, as well as aluminumsill of required length. Measures should be taken onsite.

The item includes production and assemblage of aluminum structure fitted with thermo-break, heat transfer coefficient as defined in the technical description, aluminum jalousies, metal supporters, required hanging and closing set. Opening is done as shown on graphical annex – joinery scheme. The item should also include installation aluminum bench (sill) of required length. Profiles to be in colour according to Employer's/Employer's Representative's request.

Selection of facade joinery colour or possible change in details (elevation) can be determined Employer/Employer's Representative or Supervisor, including previous Employer/Employer's Representativepermission.

All the doors and windows must be certified with adequate metal supporters that meet valid standards and regulations.
A supplier has to submit the following attests and certificates for all the doors and windows

- Systematic window testing, in line with14351-1 and B 5300
- Certificate for air permeability. EN 12207 - Class 4
- Certificate to water resistance EN 12208 - Class E 900 A
- Wind resistance EN 12210 - Class C5
- Mechanical requirements EN 12400 - Class 2
- Certificate for sound protection up to class 5
- Certificate for heat energy transfer coefficient DIN EN 12412-2
- Glass Certificate EN 673
- Fittings Certificate V ENV 1627-1630, resistance class 3

Joinery delivered at the construction site shall be property wrapped. All possible damages during transportation or during its installation need to be repaired, if minor, or replaced with new products. These expenses will be covered by the Contractor. The Contractor is responsible for the joinery till the day of the works handover to the Employer/Employer's Representative.
Calculation is made per piece of installed element, required hinges and finishes.

The Contractor shall cover all exposed aluminum surfaces, etc. during transportation and installation with protective coating against damages, stains, abrasions, wet cement and such.
When possible, all the parts shall be delivered at the construction site in plastic bags or some other protective coat.

Aluminum parts shall not be stored to allow them rubbing one against another or against some other metal surface. The Contractor shall replace each aluminum piece that gets damaged during the transportation, prior or after the installation, on his own expense.
Prior to handover, the Contractor shall remove protective material and clean aluminum. Special attention shall be attached to protection from mortar, lime and dispersion paints.

The Contractor is obliged to prepare shop drawings for all members, doors, windows with all the nodes and details that need to be installed, and to align the drawings with the design. The Bidder is also advised to provide typical drawings for angles of typical windows and doors and other catalogue and presentation material. Upon preparation of shop documentation for certain structures, Supervisor's approval needs to be obtained. In the process of production of joinery, the Supervisor shall be allowed to carry out inspection during the production process.

Prior to starting major production of joinery, it is necessary to prepare and install typical widow complete with ironmongery set, which will be recoded and accepted by the Employer/Employer's Representative or the Supervisor, after removal of all possible complaints.

Also, the Contractor is obliged to provide the Supervisor and the Employer/Employer's Representative with samples of aluminum profiles, seals, glass glue and other, as well as certificates for all the materials to be installed.
Issuing of shop drawings, aligning with the design, delivery of samples and certificates shall not be paid additionally but constitute part of contractual obligations.

The Contractor is also obliged to check dimensions of openings for doors and windows prior to production and to compose a report signed by both parties.

Upon completion of works, the Contractor shall remove remaining material from the construction site, temporary supporting structures, all the debris and waste material and leave the construction site clear. These works shall not be paid for additionally, but are covered with the item's price.

Should material sustain deformations during the usage of equipment or within the period of warranty validity, the Contractor shall remove the same on his expense.

Calculation is done as per measure unit of finished member, with bearing structure, fill, bonding and sealing material, transportation, protection and other fees.

IRONMONGERY

All the metalwork items have to be performed and installed in professional and good quality manner, by skilled labour force using proper tools and materials, all in accordance with valid standards and technical

regulations for performance of these types of works. Only items performed in a good quality manner and materials shall be taken into account.

Certificates cannot be older than a year since the day of issuing certificates to the day of commencement of the works.

All the ironmongery items have to be performed in accordance with each corresponding Final Design scheme and installed on the places and positions provided within the Design.
The items should be performed using standard steel profiles or sheet metal steel extruded rectangular profiles of various dimensions, other types of rectangular profiles and other materials, which are either provided or not within items description but need to be installed. Ironmongery items need to be installed as indicated on drawings from the design.

Prior to production start, the Contractor is obliged to provide construction drawings and details to the Employer/Employer's Representative and the Supervisor, as well as to perform its inspection and synchronization with other construction, specialist's trade and insulation works.
All definitely performed construction drawings and details have to be signed by the Employer/Employer's Representative and the Supervisor.

In respect to ironmongery items, the Contractor shall start their production upon signing of construction works drawings and details.

The calculation should be carried out as per piece of each metalwork item, as well as per m2 or m1, according to each corresponding item description.

All the ironmongery items, except those supplied by other deliverers, should be made in the Contractor's ironmongery workshop. The finished items should be treated with a real minium lead and anti-corrosion coating, as pointed out within corresponding item description. In such a protective state, the items should be transferred to the construction site. After the installation, ironmongery should be painted twice with enamel coating, which will be also taken into a unit price, if not otherwise specified within the item description.

SHEET METAL WORKS

Each work in positions of this section is envisaged as fully completed with all the necessary binders, packing piece "screw anchor", filling piece and other installation parts. It is mandatory to use materials that fit standards defined in the Official Gazette of Montenegro.
All works must be conducted as per regulations using adequate sheet metal type, thickness as per each point of each position of the cost estimate. Iron parts that are in direct contact with the sheet metal need to be coppered or coated in red lead, and painted with double layer of oil-based paint for metal. When using concrete, brick or mortar base, it is mandatory to apply bitumen roofing felt beneath the sheet metal.

Calculation of the amount of performed works, unless indicated differently in the cost estimate, is done per m2 or m1, of completed, finalized and placed (installed or assembled) sheet metal elements.
The following is included in the price of sheet metal works unit: entire installed material with waste, with required works, tools and all forms of transport, social contributions, as well as all expenses related to these works, according to regulations and legally set requirements for establishing and forming cost structure.

Installation of aluminum sheet "solbank" (sill)
Where required by the Design, on the outside of new widows, pre-painted aluminum sheet "solbank'' (sill) should be installed (must be anchored), d=0,70 mm.
When installing hood mould, lateral sides need to be resting against the wall, and damages on facade remedied. Hood mould needs to be anchored using minimum two anchor bolts in the field. Anchor bolts can be direct or indirect, as agreed with the Employer / Employer's Representative.

Make sure that the minimal distance between the outdoor hood mould and the facade is 25mm, and also that on one facade, these are in approximately same vertical level. Take the measures on site.
The colour is white, unless the Employer/Employer's Representative has different requirements, which needs to be done in agreement with the Employer / Employer's Representative.

CERAMIC WORKS

These general conditions represent integral part of description as per individual items and are related to the floor tiling with all types of ceramic tiles both inside and outside of the building. Ceramic tile works must be performed in good quality, engaging corresponding and skilled workers, and in accordance with valid standards and technical regulations for performance of these types of works.
All the materials which will be built in within the building should be brand new and meet the existing standards for quality and dimensions.
- The edges must be sharp, straight and parallel,
- Tiles must not contain any dissoluble salts or harmful ingredients,
- Visible tiles surface should be without cuts or bubbles,
- Colour has to be monotonous,
- Water absorption should be within the limits foreseen in standards for corresponding types of tiles.

PVC small crosses should be used to determine joint width between ceramic tiles. Walls tilling must be done with sufficiently wide joints. Horizontal joints go across the entire girth while vertical are placed using a device that ensures their verticality (ex. “plumb-bob”). Also, all the edges need to be completely vertical.
For flooring of the interior of the building, ceramic tilling is performed after plastering all the rooms, installation of window and door frames and ironmongery, and after installation of all types of mains and their testing.
When preparing floors for tiling in cement mortar, the base must be clean and flat, on a level that ensures installation of required thickness of cement mortar 1:3 ratio, minimum 2 cm and maximum 3 cm.
Laying tiles on the floors must be flat without waves and corrugations, with completely horizontal surfaces or elevated where it is foreseen by the design.
In order to protect completed tile floors, any transportation or movement is forbidden.
After tile lying, the walls and floors have to be grouted using special mixture for these purposes. Prior to beginning of works, the Contractor is obliged to supply the Employer / Employer’s Representative and Supervisor with all material samples and certificates for the approval.
Calculation should be as per m2 of finished floor area or wall. Openings up to 0,50 m2 which shall not be tilled, where tilling is done around them, shall not be deducted. All corners and aluminum transition strips should be calculated as well.
Unit price should include complete works, transportation and supplies of needed bonding, built in and auxiliary materials, presentation of samples and certificates, small basis repairs, required scaffold, tools, protection against damages up to the Employer/Employer’s Representative’s acceptance, cleaning etc.

PAINTWORK

All the paintwork needs to be performed professionally and in quality manner, using materials that meet technical regulations, norms and standards (possible some other regulations) in the premises where these types of works are envisaged in the construction documents.
Materials can be installed an applied only on those areas which are appropriated for such treatment with their physical-chemical and mechanical properties.
Materials need to be of best quality. For these materials, the contractor is obliged to provide attest on completed testing.
Prior to beginning of works, the Contractor is obliged to deliver to Client certificate for all the materials that are being installed. Certificates need to be issued by organizationsauthorized for this type of works and cannot be more than 1 year old from the day of their issuing until the beginning of works on the building.
The Employer/Employer’s Representativehas the right to verify quality of the material the Contractor is using on the account of the contractor. For that purpose, the Contractor is obliged to provide the Employer/Employer’s Representative with sufficient amount of material the Client wishes to test.
If the testing shows that the disputed material does not meet requested and agreed quality, the Contractor is obliged to eliminate poorly performed works and to perform the works using more quality material at his expense.
The calculation will include only quality performed works.

Ready-made, materials produced in factories need to be used according to instruction from the manufacturer.
Beginning and the end of paintwork will be carried out in line with the construction site timesheet, and the Contractor is obliged to participate in preparation of the same.
The guarantee validity period will be defined in the contract.
On the dried preparation, walls need to be skimmed, and then place semi-dispersion paint, if the room was painted before in this paint, using the same colour as in the rest of the room.
Skimming is performed with two layers of plaster, using required scaffold.
Painted areas need to be clean, without brush marks and paint roller. Colour and the tone need to be even, without blotches. Colour needs to cover the surface fully. All the tails of painted areas need to be even and in regular shape, as well as joints with the doors and windows, and such.
Painting can be done manually or with a compressor. In case of multiple paint layers, previous layer needs to be completely dry when placing another layer.
When doing paintwork, contractor is obliged to protect the furniture that might be damaged due to workers' negligence. Scattering of paint and other material on floors is forbidden.

FACADE WORKS

All the facade works need to be performed professionally and in quality manner, using materials that meet technical regulations, norms and standards.
For the materials that are not covered by standards, the Contractor is obliged to supply appropriate certificates obtained from authorized institute for the purpose they are meant to be used. The materials can be installed and applied on those areas which are appropriated for such treatment with their physical-chemical and mechanical properties.
Decorative anodized mortar (mono-component) mortar on the base of acryl resin and adhesive, mineral aggregates and additives, by previously applying a substance to neutralize the foundation, adhering technical regulations and requirements will be used for facade finishes. Prior to coating, cracked or damaged parts of the facade need to be removed, all the damaged spots fixed, and lightning rod cables, vertical rain gutters, air/conditioning units removed to place the facade without any hindrances.
Scaffold for execution of works should be included in the price calculations.

Preparation prior to system installation:
It is necessary to ensure firmness of the base and absorption since dirty, wet and non-bearing base must be remedied prior to works. Internal plastering and floor coating must be dry prior to execution of works. Works that need to be performed depending on the base: abrading of smooth surfaces, removal of bubbling with dry brushing, drying and protection of wet surfaces, removal of mould and algae with algae remover, cleaning of settled mortar and coating with flexible and cement-free adhesives, brushing of dusty base, pressurized cleaning, washing with water and drying, removal of lime mortar and coating with equalizer coat, removal of remains of mortar mechanically, filling of joints between bricks with cement mortar, cleaning of the joints upon filling with foam, cleaning of the paint with water and drying.

Preparation prior to system installation:
It is necessary to ensure firmness of the base and absorption since dirty, wet and non-bearing base must be remedied prior to works. Internal plastering and floor coating must be dry prior to execution of works. Works that need to be performed depending on the base: abrading of smooth surfaces, removal of bubbling with dry brushing, drying and protection of wet surfaces, removal of mould and algae with algae remover, cleaning of settled mortar and coating with flexible and cement-free adhesives, brushing of dusty base, pressurized cleaning, washing with water and drying, removal of lime mortar and coating with equalizer coat, removal of remains of mortar mechanically, filling of joints between bricks with cement mortar, cleaning of the joints upon filling with foam, cleaning of the paint with water and drying.

Weather conditions:
Temperature at which façade system is installed must range between 5° and 25°C. When the weather is hot, installation of material on sunny side should be avoided. The base needs to be cooled with even spraying of

clean water during duration of heat. Façade system must not be installed when it's raining. Finishes must not be installed when the base is wet. When the weather is cold, work needs to be suspended which prevents damages that may arise as result of freezing.

FAÇADE SCAFFOLD

Erection of adequate scaffold is required for execution of described works aimed at implementation of energy efficiency measures.
Facade scaffold should be placed fully in line with valid regulations and Health & Safety measures. The scaffold must be statically stable, anchored to the structure and properly grounded. It is used throughout the execution of works. Platforms or scaffold used primarily need to ensure safety of workers, and then ensure quality execution of required works.
Depending on how equipped the Contractor is with specialized equipment, basically, it is possible to use different platforms and scaffolds for execution of works
Note: In line with the level of his equipment and works technology, prior to execution of facade works, the Contractor is obliged to provide the Supervisor with the Design for installation of selected type of scaffold, for Supervisor's verification and approval.

INSULATION WORKS

Under insulation works, installation of thermal insulation and waterproofing is considered. Prior to insulation installation, all the pad surfaces should be checked and confirmed for any cracks, proper slopes, as well as thoroughly cleaned.
All the insulation foils should be placed, overlapped and fixed in accordance with regulations and manufacturer's instructions. Thermal insulation should be placed in accordance with professional regulations, without free space between the boards, pad or structure, including the waterproofing,and according to applicable regulations.
Good quality materials with corresponding certificates should be used, where manufacturer's instructions have to be fully complied during the installation procedures.
For the materials that are not covered by the standards, the Contractor is obliged to supply appropriate certificates obtained from authorized institute for the purpose they are meant to be used. The materials can be installed and applied on those areas which are appropriated for such treatment with their physical-chemical and mechanical properties.
Thermal panels with B1 flammability class (DIN 4102 B1 highly flammable, non-combustible and self-extinguishing) should also be used. Thermal panels and vertical breaks of 50 cm width along the entire facade must be installed, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows), in the area of floor slabs. These breaks should be made of pressed mineral wool reaching A1 flammability class.
The price needs to include procurement of required material, its transportation and installation costs.

FLOORING WORKS

This type of works includes all types of floor coating glued to previously prepared base and consists of:
- parquet
- other materials with specific properties.

Laying of these floor coatings is done including gluing to the prepared cement screed base or cement flooring plaster MB-20, on top of which smoothing mass is placed prior to laying floor coat.
Prior to laying floor coat, the base needs to be well inspected, cleaned and washed.
Glue must be certified, with verified quality, and must provide firm and permanent bond between the base and floor coat.

Installed material must meet applicable standards.At point where two different types of floors meet (parquet-ceramics, etc.) at the same level, brass strip along the meeting point must be placed which is paid additionally.

MISCELLANEOUS WORKS

All the works have to be carried out as per description for each position, according to general and specified description, i.e. design elaborate, schemes and details included in the same.
Material applied in all these types must be aligned with the provisions of applicable standards.
Following has been included in the price per unit of measure: entire building material with wastage, work, tools, coating, scaffolds with amortization coefficient, backing, fees, all types of transportation, social contributions, taxes and all other expenses related to these works and legally set requirements for establishing and determining the cost structure.

A4.4.2Technical requirementsfor execution of works and installation of thermal-technical (heating) services

GENERAL

- The Contractor is obliged to place all installations in quality manner and in line with approved design documents, abiding valid technical and legal regulations and submitted technical requirements.
- Work must be executed in line with these requirements and JUS.M.E6.011 “Technical Requirements for Installing Heating Installations” or applicable MEST standard.
- The Contractor needs to coordinate execution of heating system installations with the execution of other works and services to avoid confusion and damaging of installations.
- The Contractor is obliged to provide an introduction and maintenance manuals for the users of all newly installed devices and installations.

HEATING BODIES AND DEVICES

- Heating bodies can be: radiators, convectors, calorifiers, pipe water radiators - registers made of smooth pipes, as well as other heating bodies of modern design. If during the installation process, certain heating bodies are replaced with other types, Investor’s approval is required.
- For all the heating bodies being installed, it is necessary to acquire quality attest and operating properties, attest issued by renowned institutions.
- Heating body needs to be installed independently on consoles in the parapet wall of a window, in exceptional cases differently when required due to construction reasons or due to the very heating body. If a mask is placed below the heating body, it needs to ensure best possible air flow and it needs to be easily removable.
- Sanitary and hygiene requirement for installation of heating bodies are related to accessibility and easy inspection of all the segments and elements of heating bodies to ensure their cleaning.
- Installation and construction requirements are as follows:

  - Size of the heating body must not exceed dimensions of windows or window niche, i.e. size of the area where it is being placed;
  - Avoid excessive bending when connecting heating bodies to vertical riser;
  - Heating bodies need to be installed horizontally.

- All heating bodies need to be properly installed, if necessary levelled and centred. Vibrations generated during operating of the equipment must not spread onto the building or adjoining equipment.
- Installation of heating bodies – appliances needs to be such that they are easy to remove, i.e. separate from the network.
- Installation of standard products needs to be carried out in line with instructions issued by the equipment manufacturer and the installation scheme, and they need to be placed in positions defined with these technical documents.
- Pumps are delivered together with the three-phase asynchronous power engine with the caged rotator, fully enclosed construction and are envisaged for 380V, 50 Hz power, with casted base with elastic flange for direct coupling of the pump and power engine, and adequate star breaker – triangle.
- Electrical installations can be made of OG conductor using adequate waterproofed elements and fittings, and based on the design that needs to be prepared using data and guidelines contained in this Elaborate.
- If radiators are used as heating bodies, during their installation, following requirements need to be met:

  - Distance between the rear side of the radiator and the wall needs to range between 20 and 70 mm, depending on the type of the radiator;
  - Radiator needs to be placed at 100 – 150 mm above the floor, depending on the height of parapet;

- If radiator is placed in a niche or there is a board above the radiator, then maximal distance between the upper part and the niche, i.e. lower edge of the board needs to be 70 to 120 mm

- If consoles are used for radiator installation, they need to be placed in such way that the radiator rather leans against them than hangs on them. Number of consoles is basically set according to following criteria: 2 consoles for radiator with 10 ribs, and one console per next 10 ribs. Number of holders needs to be by 1 lower than the number of consoles.
- Seek to install radiators from the same producer in a building whereby the width and the height of the radiators are the same.
- After forming radiator batteries with required number of ribs, the same need to be washed well under a jet of water to eliminate internal dirt.
- After completing installation and after successful pressure testing, radiators need to be removed, cleaned from rust or dirt and protected with paint. Radiators are painted when they are installed again at radiator temperature of at least 50°C. Special colours and lacquers resistant to high temperature are used for painting the radiators. It is not recommended to use different metal (copper) paints as they reduce coefficient of surface radiation, and at the same time lower heat emission.
- It is also possible to use electric heating bodies that have appropriate attests.

PIPE NETWORK

- All pipes part of horizontal and vertical piping need to be attested and need to meet the JUS C.B5.221, i.e. JUS C.B5.225 standards, or applicable MEST standard.
- Diameters of pipes used for hydronic heating need to be:

DN 10	Ø17.2 x 2.35 mm
DN 15	Ø 21.3 x 2.65 mm
DN 20	Ø 26.9 x 2.65 mm
DN 25	Ø 33.7 x 3.25 mm
DN 32	Ø 42.4 x 3.25 mm
DN 40	Ø 48.3 x 3.25 mm
DN 50	Ø 57 x 2.9 mm
DN 65	Ø 76.1 x 2.9 mm
DN 80	Ø 88.9 x 3.2 mm
DN 100	Ø108 x 3.6 mm
DN 125	Ø133 x 4.0 mm
DN 150	Ø159 x 4.5 mm

- Horizontal piping needs to be hanged against the mezzanine floor or leaned against the wall consoles. In positions where this is requested by the design solution, it is possible to place piping into floor channels with light inspection manhole lids placed at 8-10 m distance. Prior to closing the channels, they need to be cleaned and piping needs to be protected from corrosion and adequately insulated.
- The pipes must not be firmly immured into the building structure; instead, there always needs to be enough room to allow for pipes' undisturbed operating due to changes caused by temperature.
- Vertical piping and connections to heating bodies need to be placed freely against the wall. On vertical piping, right behind the connections to horizontal piping, it is necessary to install gaskets and straight valves, and above them discharge faucets.
- At the junction point of the heating body connector with the vertical piping, the connector needs to have adequate horizontally placed crossover.
- If installed, vertical supply raiser is always on the left side and it needs to be fixed with adequate number of pipe clips.
- Deaeration, if possible, needs to be central, with deaeration network via deaeration or expansion vessels.
- In positions where vertical raisers go through mezzanine structure, piping needs to be wrapped in corrugated fibreboard, except near wet knots where bigger diameter pipe bushing is placed to allow free pipe movement. In floor, these bushings need to be 5cm raised above the floor.

- Compensation pipes need to be envisaged on piping over 30 m length.
- Pipes, i.e. horizontal return and distribution network need to be placed with set drop of 2 – 4 mm/m (and heating body connectors minimum 20mm/m) to achieve good deaeration of the entire installation, to ensure connection with the atmosphere in the direction indicated in the graphics, and if the direction is not indicated, then in the direction of fluid movement through the piping.
- Pipes are welded, unless separable connection is required, which is achieved using flanges in places where pipes are being connected to gate valves and other fittings or other parts of network that need to be separable (dividers – collecting piece, tanks, etc.). Welding needs to be well processed achieving sufficient thickness without reducing the cross section of the pipe. Welding needs to be top class. Pipe welding to installations under pressure must be carried out only by attested welder with the minimal welding coefficient K = 0,8.
- When welding pipes, following works need to be performed:

  - Filing (chamfering) of the edge of pipes that are being connected. Pipes with less than 3mm wall thickness, are welded without chamfering the edges. For pipes with wall thickness bigger than 3mm, the chamfering angle needs to be 60 - 70°;
  - Cleaning of seams from dirt and corrosion;
  - Removing cinder from welding and protecting them from corrosion using basic tincture.

- When using flange to connect piping and fittings, klingerit gaskets must be used.

Standard pipe diameter	Maximal distance	Minimal diameter of bearing bar
13 mm	1.5 m	10 mm
25 mm	2.1 m	10 mm
38 mm	2.7 m	10 mm
50 mm	3.0 m	10 mm
75 mm	3.7 m	13 mm
88 mm	4.0 m	13 mm
100 mm	4.3 m	16 mm
130 mm	4.9 m	16 mm
150 mm	5.2 m	20 mm
200 mm	5.8 m	22 mm
250 mm	6.7 m	22 mm
300 mm	7.0 m	22 mm
360-510 mm	4.6 m	25 mm

- Parts of pipe that are not designed to emit heat or those that could freeze need to be insulated with quality insulation. Insulation must be such to avoid damaging when pipes expand. This particularly refers to horizontal distribution and return network. It is necessary to abide JUS.ME2.170 regulations or applicable MEST standard.
- Pipes placed enclosed in flute, floor and passages through walls and mezzanines need to be protected from corrosion. Connectors to the heating bodies, which cannot be less than 30 cm long, when passing through walls and building elements, need to be protected from corrosion and damages at the penetration positions, ferrules and such. At the penetration points, connector to the heating bodies through walls needs to be placed on both sides of rosette.
- Consoles and shackles which support the piping need to ensure its free movement caused by heat dilatations, without the possibility of creating dentations. Consoles and abutments need to be installed into the walls with cement mortar, not plaster.

- Rust needs to be carefully removed from all the pipes and fittings and other metal pieces, after completed installation and adequate prescribed testing, and these need to be protected with adequate base tincture. After that, piping in the wall can be wrapped with corrugated fibreboard, insulated or painted with oil lacquer colours. Used paint needs to cover the surface well, to be smooth and to be able to sustain operating temperature. Choose colour in line with supervisory body. Painting needs to be performed in line with DIN-2043 and DIN 2404 standards or applicable MEST standard.
- When installing gaskets, faucets and valves, spindle with wheel needs to be placed on horizontal ducts. Access needs to be ensured to all fittings in case of possible interventions.
- Heating fluid flow needs to be marked with arrows on the entire installed fitting.

SPECIAL REQUIREMENTS FOR BOILERS

- It is necessary to provide space to accommodate boiler.
- When conducting testing with cold water pressure of a plant, pressure for testing needs to be by 50% higher than the operating pressure. The pressure needs to be maintained within 5 minutes period, after which it is lowered to the highest allowed operating pressure. This pressure needs to be maintained for the whole time during the testing.

  Testing shall be deemed successful if:
  - No cracks were observed on the plant,
  - No leakage is noticed,
  - No visible shape deformations are observed that would remain upon completed testing.

  Testing shall be deemed unsuccessful if even the smallest leakage is spotted at the welding.

- It is strictly prohibited to pour cold water into hot boiler.
- In all other segments, regulations indicated by the equipment supplier need to be adhered to.
- The entire plant needs to have automatic operating and control of all devices provided.
- Prior to putting the plant into trial operating, it is necessary to provide all the instructions for handling the plant, and these need to be visibly prompted in glass frame at danger positions.
- With procurement of mechanical power tools for work, the Contractor is obliged to give the user attests for these tools.

POWER INSTALLATION

- Electric engine needs to be delivered together with adequate blocker rings and fuses.
- Electrical commands at the switchboard need to contain all required fuses and block rings.
- Devices for metering amperage and electricity voltage also need to be installed on the board together with operating and malfunction signals. All required relays and other elements that belong to automatics and plant control devices, or a part of equipment that forms connection between the automatics and electric engine need to be installed into the control panel.
- Constructor in charge of mechanical installations is obliged to ensure electrical connecting and putting into operation all the engines and other electrical appliances that are composite part of the air condition installation, i.e. its delivery
- Each heating, ventilation and air condition system unit with electric engine will be delivered and assembled together with the engine and facilities, and best delivered from the equipment manufacturer.
- Bearings need to be oiled at all times, adjusted and envisaged for 100,000 hours of operating, with 5 year guarantee.
- Choose engines for work with speed in line with special requirements and dimension them to ensure maximal efficiency for certain dimensions and application. Operating equipment of engine with characteristics that do not include overloading should be dimensioned for acceptable loads.
- Electricity and engine voltage are determined based on local conditions. Basically, it is possible to assume that 50 Hz of alternating current at 420 or 380 V is provided.

MOUNTING

- The Contractor is obliged to install entire equipment envisaged by the design in a way indicated in the graphics, technical description, in line with these technical requirements and special conditions for installation of individual equipment according to instructions issued by the equipment manufacturer.
- The Contractor is obliged to provide his professionals and assisting workers, tools, machines, instruments and everything else necessary for the installation.
- Assemblage includes entire installation for heating and venting, connecting with pipes with heat substation (plant room), connecting with water and sewerage connectors, which will be introduced into the substations (plant rooms) by constructor in charge of water supplying and sewerage network works.
- Works on setting foundations for engines, pumps, ventilators are a part of installation delivery and the Contractor is obliged to execute these works.
- All masonry works required for fastening the holders, bearers, clamping rings for the channel, ventilator and other installation elements are also obligation of the contractor in charge of placing installations.
- Prior to drilling holes in the wall or concrete, approval from authority in charge of supervising construction works is required, i.e. ask to execute the construction works and give instructions how to execute it. After the installation of elements, the Contractor is obliged to plug all the holes in a way appropriate for the type of installed elements.

TESTING

- The Contractor is obliged to conduct full technical testing of equipment, piping and fittings in line with JUS.ME6.012, or applicable MEST standard, including:

  - Tightness testing
  - Dilatation testing
  - Thermo-technical testing.

- Prior to testing, following needs to be undertaken:

  - Thorough inspection and cleaning of installed equipment
  - Provide access and lighting for all the parts that undergo the testing
  - Provide solid tightness on all ducts and fittings
  - Secure all ducts that are not used at blind flanges
  - Tightening of all elements
  - Washing of the entire system
  - Installation of throttle shutters (if envisaged in the design)
  - Fill the system with water.

- Tightness testing is done at pressure:

  $P_i = 2 + H_{st} + H_p$ (bar)
  where:
  Hst – is statistic plant pressure
  Nr - pump strain
  Testing is deemed successful if tightness does not appear within 6h as per paragraph 4.2 of JUS.ME6.012, or provisions of applicable MEST standard.

- Thermo-technical testing is carried out to establish functionality and trim of the plant.

  When conducting thermo-technical testing, following is checked:
  - Proper operating of fittings

- Heating equability of heating bodies
- Reaching projected technical parameters (temperature, pressures, temperature differences, pressure difference, etc.)
- Proper operating of metering and regulation tools
- Whether installed system covers projected amount of heat
- Maximal capacity of generator and heat exchanger
- Capacity of heat generator and exchanger for hot water
- Achieving projected degree of usefulness for heating systems with electric boiler.

All the tests need to be carried out in line with paragraph 6.1 - 6.5 of JUS.ME6.012, or provisions of applicable MEST standard.

- At the end of piping testing of each part of the system, that part needs to be carefully washed until the water flowing out of system is clean.

A4.4.3 Technical requirements for execution of works and installation of electrical services

GENERAL

The Contractor is obliged to comply with following general technical requirements for execution of electrical services, as listed below:

1. All electricalinstallations haveto be placed in accordance with the attachedplans, these conditions and still valid JUS, or other applicable MEST standards, for execution of lowand high voltage installations, i.e.to be executed according to the Regulations oftechnical standards for low voltage electrical installations("Official Gazette of Federative Republic of Yugoslavia" No. 53/88, 54 /88 and29/95).

2. Before the start of works, the Contractor is requested to review the Design documentation thoroughly and forward the remarks, if any, to the Employer/Employer's Representative or to the Supervisor in timely manner.

3. Before commencement of the works, the Contractor is obliged to conduct on-site inspection of the building, and if finds out that the certain modifications, as result of construction changes, are required, the Contractor should advise the Supervisor accordingly, and obtain the necessary approval for any changes.

4. On the basis of the received Design documentation, the Contractor shall commence the works only after review and obtained approval from the Supervisor.

5. All installation materials and equipment which will be used for construction of installations have to be in accordance with relevant standards and first class quality. Any material that fails to meet these conditions mustnot be used.

6. When performing these works, effort has to be made to minimize any damage to already executed works and existing structures. Also, activities have to be coordinated in order to avoid mutual interference in the different phases.

7. According to the applicable Law on Construction of Montenegro, during the works, the Contractor shall maintain a proper construction log, with all the information required for keeping this log, and all claims and statements, both by the Supervisor and Contractor, and should be registered in the construction log.

8. The Contractor has to prepare all the required by-laws regarding health and safety measures and advise the workers of the conditions and sources of hazards and risks, and protection measures.

9. The Contractor is obliged to determine the job positions with special work conditions, if such positions exist.

10. All places, where required by the regulations, have to be clearly marked with warning notices:
    -the amountof voltage,
    -use of specificequipment,and
    -otherimportant information.

11. For interventions in transformer stations, distribution boards and installations, the qualified person is obliged to apply the protective equipment and all other means of protection.

12. The Contractor shall provide a warranty to the performed works, from the date of technical acceptance of the building. All malfunctions and defects, occurred in this period, either due to use of poor materials or poor workmanship, should be eliminated by the Contractor without any expenses.

13. Upon completion of the works, the Contractor shall perform the necessary tests and obtain relevant certificates.

14. Devices and equipment for electrical installations have to be suitable for operation of installations at the rated voltage of electrical installations.Electrical equipment has to withstand running currents during normal operation and under emergency circumstances, during the time allowed by characteristics of the protective devices. Electrical equipment, when switched on and off, should have no harmful effect on other equipment. Equipment, including wires and cables, shall be set so that it can easily be checked, maintained and handled, providing free access to each point of connection. The foregoing also applies to equipment installed in the casing.

15. Name plates and other devices that are used for identification should be placed on electrical appliances to indicate their purpose. Controls and signalization elements should be placed at easily accessible and visible places.

16. Insulated conductors and cables should be laid and marked so as to be easily recognizable for tests, repairs or replacements. The protective conductor (PE) or protective-neutral conductor (PEN) will be identified by the combination of green and yellow, and the neutral one (N) by light blue colour. These coloursshouldn’t be used for any other marking. Labelling can be done at the end of the conductor near the circuit, especially when the conductors are not insulated.

17. Protective devices should be placed and marked so that its associated circuit can be easily identified. The protective device should be installed in the switch gear and control gear assembly / switchboard /.

18. Plans, diagrams or tables of low voltage electrical installations should be placed at the points with more circuits, to indicate the nature and composition of circuits and characteristics for recognizing protective devices, switching on and off, and the place of their installation and insulation.

19. In the switchgear and control gear assembly / switchboard /, electrical equipment of the same type of current and voltage should be installed and grouped so that no mutually harmful effects may occur.

20. The Contractor is obliged to provide an introduction and maintenance manuals for the users of all devices and installations.

21. The Contractor shall have specialized engineer for low voltage items.

WIRING

1. The connections ofwires andotherelectrical equipment must be made so as to be safe andpositioned in such a way to enable permanentchecks.The connections should be secured by appliances whichcorrespond the conductormaterialand itscross section. The connection should beaccessibleafterremovingthe coverorpartition with tools, and access shall havea minimumdegreeof protectionIP2X, according to JUSN.A5.070 standard or applicable MEST standard.

2. Insulated conductors and cables should not be joined in installation pipes and channels. They can be joined only in the installation boxes, cable connectors or switchgear and control gear assembly, and points of connection shall be isolated using the isolation level that suits the type of electrical distribution. Exceptionally, in the prefabricated concrete walls, joining can be made in boxes, wall jacks, provided that the depth of the box allows accommodation of compounds of the same circuit.

3. The point of connection between electrical installations or the point of connection between electrical distribution and electrical equipment should be executed so that the electrical distribution is not exposed to the pulling or twisting forces. If the effect of force cannot be avoided, a relief system should be provided.

4. The connections should be performed so that there is no reduction in cross section, or damage of wires and insulation. The ends of electrical distribution, particularly inlets and outlets, as well as places where electrical installations penetrate through the walls and electrical equipment, should be permanently sealed.

5. If there are other non-electrical installations close to electrical distribution, space between them should be sufficient to enable maintenance if one doesn't endanger the other one. Minimum permitted distance is 30 mm. If there are heating installations near electrical distribution, pipes with hot air or a chimney, electrical distribution should be thermo-insulated or insulated by screens or to be placed outside the impact of thermal effect.

6. Wiring should not be placed under any non-electric installations exposed to condensation or other liquids. Electrical distribution shall not be placed in the same trucking, pipe or the like, with other non-electric installations. Ifit cannot be avoided, protection against indirect contact by automatic disconnection of supply or use of insulation for Class II equipment shall be provided and adequate protection should be set against harmful impacts of other installations. Metal parts of electrical distribution, which are exposed to condensation, shall be protected against corrosion inside and outside and the condensate drain has to be provided.

7. If the electrical distribution is placed on the walls, the minimum allowable voltage between elements of electrical distribution and the wall is 5 mm. Electrical distribution for lower voltages shouldn't be placed in the same lining or tube, or close to electrical distribution with higher voltages unless there is an insulation barrier between the two distribution systems, that can withstand test voltage of high voltage electrical distribution. In the same installation tube or channel, conductors of single circuit can be laid, except for conductors of control and auxiliary circuits.

8. Wiring should be set so that in case of failure the environment is not endangered. Junction boxes for cables or wires that are placed under the plaster shall be made of insulating material or metal lined with insulating casing and feedthrough made of insulating materials. For attaching electrical distribution, it is possible to use the tools and apply procedures that do not cause any deformation or damage to insulation, such as plastering, clamp rings of insulating material adapted to the form and cross-section of cable, gluing or nailing using nails with washers made of insulating material.

9. Cables laid directly under the plaster and in the walls should be covered along the entire length with minimum of 4mm thick plaster. Exceptionally, covering by plaster is not necessary if cables are laid in the cavities of walls and ceilings made of concrete or similar materials which neither burn nor help in burning.

10. Installation cables and conductors laid in pipe installation in the walls or cables laid directly in mortar and under mortar shall be vertical and/or horizontal and in parallel to the edges of the room. If laid horizontally, cables are laid at a distance of 30-110 cm from the floor and 200 cm from floor to ceiling. If laid vertically, cables and wires are laid at a distance of at least 15 cm from the edges of windows and doors. The cable routes for feeding of electricity to the fixed water heaters should be aligned with the heater axis. It is permitted to lay cables and installation conductors in slant position in ceilings, but not in the walls.

11. The cable laying in the wall is permitted if the cable is insulated with thermoplastics with filling and coatings, if it is installed on the wall clamps and if it has additional mechanical protection from the

floor to a height of 2 m. Junction boxes and other accessories that are attached to the wall with the laying of cables, shall have sealed conduit bushing and the degree of protection of minimum IP 5X specified for wet rooms, and an adequate level of protection established for the other rooms.

12. Cables with no filling, such as PP-R cable, can be laid only in dry areas, and under plaster, in the wall and ceiling cavities made of concrete and similar non-combustible material not covered by mortar. These cables shouldn’t' be laid as bunched cables, placed in trunking or below the gypsum-cardboard panels, regardless of the manner in which those are fixed and shouldn't be placed on combustible materials not even when covered with plaster.

DISTRIBUTION BOARD

1. Distribution boards of closedorhermetictypes are mounted at 1.7 mabove the floor, and openboardsat 2.5mabove the floor. Distribution boxes in installations should meet thefollowing requirements:
   - Exterior of the cabinet must not affect the concept of interior design;
   - They should be built into the wall, or mounted on thewall;
   - Electricity meters shall beseparatedfrom the rest ofbuilt-inequipment;
   - Doors must be fitted with a lock and key;
   - Allclampson built-in equipment shall beaccessiblefrom thefront.Innormal operationall theclamps andaccessoriesthat areenergizedshallbeshieldedfromcontact.

2. Parts under voltage of the control or distribution block shall be 20 mm away from housing, and smaller distance is allowed only if insulated walls are applied.

INSPECTION ANDTESTING

Anyelectricalinstallations,duringinstallation orwhen completed, but priorto delivery to the user, should beinspectedand tested. During the inspectionand testing, the safety measures should be undertaken to protect the staff, including protection of electrical and other equipment from damages. If the electrical installations are replaced, they have to be alsochecked andexaminedwhether the electrical installations are inaccordancewiththe Regulation clauses.

A4.4.4 Technical requirements execution of works and installation of sanitary (water supply and sewerage) services

PREPARATORY WORKS

General
Preparatory works for construction of water supply and sewerage installations are divided into preparatory works for interior water supply and sewerage and preparatory works for exterior water supply and sewerage.

Preparatory works for interior water supply and sewerage.
Preparatory works for interior water supply and sewerage are divided into nine categories depending on the number of outlet points in the structure, according to the following classification:

- Structure up to 50 outlet points,
- Structure from 50 to 100 outlet points,
- Structure from 100 to 200 outlet points,
- Structure from 200 to 300 outlet points,
- Structure from 300 to 400 outlet points,
- Structure from 400 to 500 outlet points,
- Structure from 500 to 700 outlet points,
- Structure from 700 to 1000 outlet points,
- Structure over 1000 outlet points.

Preparatory works include the following:

- Mobilization of team to the construction site, with tools,
- Storage of tools and materials in the warehouse,
- Examination of technical documents,
- Getting to introduce the construction building
- Introduction of assembly groups into the works.

Calculation for preparatory works for interior water supply and sewerage is made per construction building.

Preparatory Works for Exterior Water Supply and Sewerage
Preparatory works for exterior water supply and sewerage are divided into four categories depending on the length of pipeline, as follows:

- Structure up to 500 m’ pipeline length,
- Structure from 500 m’ to 1000 m’ pipeline length,
- Structure from 1000 m’ to 2000 m’ pipeline length,
- Structure from 2000 m’ to 3000 m’ pipeline length.

Preparatory works include the following:

- Mobilization of team to the construction site, with tools,
- Storage of tools and materials in the warehouse,
- Examination of technical documents,
- Site visit,
- Introduction of assembling groups into the works.

Calculation for preparatory works for external water supply and sewerage is made per construction building.

EARTH WORKS

General

During the design preparation, soil should be timely examined and data on soil tests entered in the records. Before commencement of earth works, the terrain should be cleared from shrubs, trees and roots. If the top soil is to be used later on, these should be cut into pieces up to 15 cm thick, and piled up as cones with their roots downwards; they need to be watered daily and preserved until reuse.

All earth works are divided into 7 categories of soil, namely:

Category I: loose, light (soft) soil, i.e. pure sand, incoherent gravel, humus, fine, loose loess and soil similar to the one without internal cohesion. Only the most necessary excavation and removal by shovel is performed, and if required (aided) with spade;

Category II: fertile soil, softer subsoil and sandy soil, light sandy clay – clayey sand, compacted sand and fine-grained gravel, i.e. in the soil with weaker internal cohesion. Excavation is performed by spade;

Category III: hard and ductile soil, subsoil, coarse-grained semi-coherent gravel, pastures soil with boulders and naturally moist clay with low sand contents. Excavation is performed by spade and picks (mattock, navy pick, etc.);

Category IV: rocks of transient weathering formations, marl and humus shale, soft and weathered lime stones, soft sandstones, conglomerates and breccias with weaker link by phyllites, mica schist and rich in mica, chlorite-schist and quartz shale. Excavation is performed by tommy bars, wedges, picks (mattocks) and occasionally explosives;

Category V: soft rock (medium strength), i.e. hard sandstone, conglomerate, limestone, hard volcanic tuffs, shaly gneiss and all fissures, strongly intersected with massive rocks, etc. Breaking is performed by tommy bars, wedges, picks, with occasional use of explosives (gunpowder);

Category VI: hard but brittle rock, i.e. solid massive limestone, marbles, dolomites, sandstones and conglomerates in thick layers and well cemented; in most magmatic rocks, garnet, syenite and diorite magma; in gneiss, in bedded quartzite, etc. Breaking only by explosives (dynamite);

Category VII: very strong and ductile rock, i.e. fresh basic and ultra basic magmatic rock, such as: granite, porphyry, basalt, quartzite, pyroxenite, numerous gabbros, some diorites, massive amphibole, etc. Breaking only by explosives (dynamite).

TABLE OF SOIL PROPERTIES

Soil category	Soil name by categories	Tools particularly used for excavation and breaking	Loading coefficient / temporary volume increase	Permanent volume increase in % of autochthonous soil
I	Loose soil	Shovel	1.15	0-2 %
II	Common soil	Spade	1.20	2-4 %
III	Hard soil	Heavy spade and pick	1.25	3-5 %
IV	Friable rock	Pick and mattock	1.30	4-7 % and more
V	Soft rock	Gunpowder	1.40	8-10 % and more
VI	Hard rock	Dynamite	1.50	10-15 % and more
VII	Very hard rock	Dynamite	1.50	10-15 % and more

Soil categories are taken into cost estimate at preliminary prices, but their real categorization is assessed only during execution of works.

Before commencement of digging, it is necessary to survey the profiles for the purpose of calculation. Regarding excavation from borrow areas, the method of excavation is determined so as to provide regular shape of excavation.
Borrowed areas at the shortest transportation distance are to be used first.
Calculations for excavated earth are made according to previously surveyed profiles, after determining by leveling that excavation is executed to the required depth.

Manual Bulk Excavation for all Width Trenches and Non-Wide Range Excavations

Description of Works
Excavation should be done by means of hand tools, provided that excavation sides are cut straight, and excavation bottom flattened to the required elevation with ± 5 cm accuracy.
Excavated earth should be thrown at 1m distance from trench edge. For depths over 2m, excavation should be done gradually and thrown away by shovel or from platform to platform.

Method of Calculation
The method of calculation should be per 1 m³ of excavation, calculated per layers of 0-2, 2-4, 4-6 and 6-8 m in depth. The norms are given both for work in naturally moist soil, and in wet soil, as well as soil with veins. In case of surface water protrusion into the excavation, the contractor is obliged to remove the water by available means at his own expenses. The term “excavation in wet” implies excavation in case of groundwater protrusions. Category of earth and excavation shall be determined by Supervisor at the site. The norms include works among braces and relocation of wooden working scaffolds (platform), used for transfer of excavated material.

Backfilling and Compacting

Description of Works
This item implies spreading of delivered material by shovel and compaction to the required compactness. During backfilling, the worker is obliged to spread by shovel the material from delivered pile, and to backfill the material to the distance of 3 m. Transportation of material is not included.

Method of Calculation
Calculationshould be made per 1 m3 of spread material. The norms are divided into the following 5 categories:

1. Manual compaction of earth in 10cm layer, by compactor weighing 10kg of the required compactness,
2. Manual compaction of earth in 20cm layer, by compactor weighing 10kg, of the required compactness,
3. Manual compaction of earth in 30cm layer, by compactor weighing 10kg, of the required compactness,
4. Manual backfilling and covering without compaction.
5. Machine compaction by vibrating plate.

Planning

Description of Works
Planning implies terrain planning with ± 3 cm accuracy with average excavation of 0.05 m³/m² and transport of excessive material to the distance of 50m.

Method of Calculation
Calculationshould be made per 1 m² of planned surface. Geodetic works required for planning are not included in the norms.

Machine Excavation by Dredger

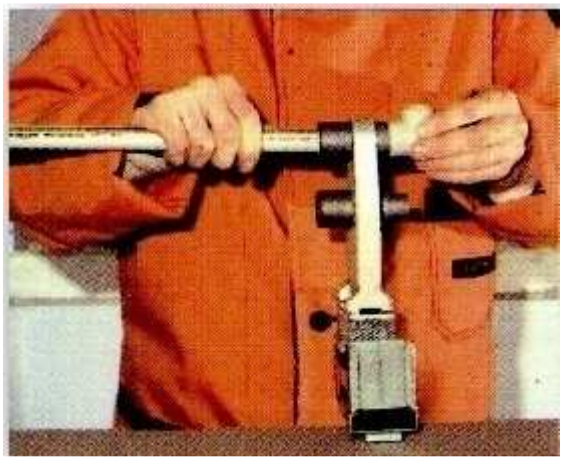
Description of Works
Machine excavation by dredger implies excavation with direct loading onto transport vehicle. No excess excavation i.e. excavation below the required level, is allowed.

Method of Calculation
Calculation of machine excavation should be made per 1 m³ of excavated subsoil. Unit price includes costs of hiring a dredger.

ASSEMBLING WORKS

Assembly of PP Water Supply Pipes for Interior Installations

Description of Works
Assembling of PP water supply pipes for interior installation includes assembly of PP pipes in sanitary facilities and distribution in the bathrooms and pump station. This implies pipe length which does not exceed 2 m', bringing the pipes to the stall from the distance of maximum 50 m of horizontal or vertical route, measuring, cutting of pipes, assembly with all required fittings by semi-fusion welding.
Welding is performed as follows:
Pipes and fittings to be welded should be cut at the right angle and cleaned from dirt and grease.
Parts to be connected are at the same time placed on the welding machine (mandrel and bushing) to the stop beads.



When welding temperature is achieved, as indicated either by switching off of the lamp or by timer, depending on the type of welding machine, the elements to be welded are removed from the apparatus and pressed into each other. They are held motionless until cooled.
It is very important not to surpass the depth limits of insertion of one element into the other.

Transport
PP pipes for interior water supply installation are stored at any flat place. Pipes should not be bended, but laid down at their entire length.
At low temperatures, below 0°C, pipes might be damaged at the strong mechanical impacts.

Although the PP pipes have UV stabilizers, they should not be stored on the sunshine for more than 6 months.

Method of Calculation

Calculation should be made per 1 m' and that implies the following:

- Vertical and horizontal transport of material to the distance of 50 m (any longer distances shall be separately calculated);
- Works with ladders or simple scaffolds up to the height of 3.00 m;
- Works in previously dug and marked trench, up to 2.00 m deep.

Assembly of PP Drains and Fittings for Indoor Plumbing

Description of Works

The item on assembling of PP drains and fittings for indoor plumbing includes distribution of pipes from stockpile up to 50 m away to the point of assembly, and assembling of pipes. Manual distribution and assembly are implied for all sections.

Pipes shall be assembled as follows:

- If the pipe is laid in the ground or earth, it is laid in the 40cm wide trench with minimum depth according to the following table:

Pipe section (mm)	Minimum trench depth (cm)
dia 150	50
dia 125	45
dia 100	40
dia 75	35

- Pipe must be laid down into the trench at its entire length, on sand without any coarse pieces of rocks;
- Trench is completely backfilled by sand and compacted by manual compactor weighing 10kg up to required compactness;
- When connecting pipes, the socket needs to be cleaned, rubber gasket formed in the shape of heart and inserted in the socket, bevel end of another pipe lubricated with sliding agent (potassium soap) and, by gentle turning, the bevel end of the other pipe inserted in the socket to the end and then pulled out to the marked stopper, if there is one, and if not, by approximately 5mm;
- PP pipes can be also assembled outside of the trench and then laid down in it;
- Laying of side pipes in the earth shall be performed at minimum decline of 2.5°. In case of vertical pipelines, fixing is done by clamps at 1m or 2m distance
- When laying pipes on the wall, fixing is done by free clamps at maximum distance of 10 x d (d - outer pipe diameter);
- Between pipe and clamp, a strip for protection against possible damage to PP pipe should be placed. Immobile saddles embrace the pipe and create one solid point, and free saddles enable changes of pipe lengths;
- PP drains and fittings can be directly concreted or bricked-in, but previously it is recommended to wrap the fittings in corrugated cardboard. Particular lengths of pipes in that case should not exceed 1m. Concrete or covering layer, in that case, should be at least 1.5 cm over the apex of the largest diameter pipe;
- Change-over ofPP pipes to cast iron pipes for interior sewerage is done by means of relevant change-over piece.
- Toilet connection is made by connection piece with rubber gasket;
- Roof ventilation can be made with one or more ventilation caps. Mounting of ventilation cap is independent from roof pitch. Openings on ventilation cap should be 0.3 to 0.5 m above the roof. Vertical pipelines with diameter up to dia 100 mm are performed without reduction in cross section, and larger ones may be reduced to this dimension. Ventilation cap is introduced through the roof and

inserted in the pipe. For protection of ceiling against moisture, ventilation cap should be trimmed with lead or sheet metal;

- Passage through ceilings should be executed so as to ensure waterproofing to moisture, and sound insulation. Since PP and concrete do not bond together, when mounting on mortar or concrete, one protective polyester tube through which the PP pipe passes should be incorporated in the ceiling, and the space between PP pipe and protective polyester tube should be filled with cold putty.

Transportation

PP pipes can be transported by any means of transport. During transport, the pipes should be laid at their entire length on loading surface. If the pipes extend out of the truck, they need to be protected against obtaining bumps.

No objects with sharp edges can be transported together with pipes. During loading and unloading, the pipes should not be thrown.

PP pipes and fittings should not be dragged on the ground. At low temperatures, PP pipes are sensitive to impact, so they should be handled with care in winter season.

During storage, maximum stacking height is 2m. The socket and canted end of adjacent pipe should be next to each other. Pipes should not be exposed to sunshine over a longer period of time. When exposed to sunshine for long time, PP pipes fade but do not deteriorate in quality.

Method of Calculation

The item on assembling of PP water supply pipes includes distribution of pipes from stockpile up to 50 m away to the point of assembly, and assembly of pipes. Manual distribution is implied.

The calculation should be made per 1 m' of pipe. The unit price of assembly includes marking of channel route before excavation, taking over of excavated and levelled trench, control of pipes before laying, laying of pipeline with levelling of specified gradients, cutting of pipes as required, various works for connection of pipeline and assembly and placement of various supports. The unit price of labour includes engaged labour force and all required materials.

Assembly of stop valves on cold water distribution system

Description of Works

The item on assembly of stop valves on cold water distribution system includes distribution of material from the stockpile to the point of assembling, wrapping in oakum and assembling stop valve.

Method of Calculation

Assembly of stop valves on cold water distribution systems is calculated per 1 piece. This implies labour to the height of 3m using ladders or simple scaffolds. If scaffolds need to be constructed or if the works are executed at height above 3m, the unit price shall be increased by costs for hard labour conditions.

Assembly of Sanitary Equipment

Description of Works

Assembly of sanitary equipment assumes horizontal or vertical transportation of material up to 50m distance, unpacking, preparation for assembling (inspection of fittings, etc.), assembling of fittings or devices as required, cleaning of service outlets for water supply and sewerage system from various deposits and oakum, preparation and cutting of connection pipes, preparation of sealing material, drilling of various holes for plugs, fitting of connections to water supply and sewerage system, if required by adhesion, soldering or welding.

Transportation

Sanitary appliances are transported by all means of transportation. During loading, unloading, storage and handling in general, sanitary appliances should be handled with care to prevent damage.

Method of Calculation
Assembly of sanitary appliances should be calculated per 1 piece of assembled device. The unit price includes works on ladders and inspection of sanitary appliances after installation, with checking of all service outlets for water supply and sewerage systems and elimination of any possible leaks.

FINISHING WORKS

Pressure Tests of New Water Supply System

Description of Works

- Pressure tests are limited in time, with pressure above the nominal one. Tests are divided into: short tests (I, II, III), preliminary tests, main tests and complete tests. If a pipeline cannot be tested at once, it must be tested per sections. In that case, connection points between sections must be tested to impermeability by complete test;
- Tests are performed mostly on sections up to 500m long. If there is high difference in heights, it is necessary to select the sections lengths so as to ensure that at least operating pressure is achieved during testing at the highest point;
- Before pressure tests, pipeline must be anchored at all points of route changes and branching. It is necessary to take into account the test pressure and carrying capacity of surrounding soil to pressure and sliding. Pipeline shall be backfilled or, in case of interior installation, fixed in the wall, provided that all connection points are left visible. Pipeline shall be filled with clean water, and all air must be released from it. Pipeline filling is performed from the lowest point. Pump for pressure rise should be placed at position protected against accidents. During the tests, no works or staying in the trench is allowed, to prevent accidents if the pipes are broken.
- Only checked pressure gauges shall be used for testing. They should have a scale which enables reading of 0.1 bar pressure changes. Two gauging instruments are recommended, one of which is a control pressure gauge. Pressure gauge should be mounted at the lowest point of test section. In addition to pressure, quantity of water added due to thermal and elastic expansion of pipeline shall be measured as well;
- During the tests, the plumbing fitter should be present in order to do any repairs if necessary.
- If there are any points on test sections where leakage at connections is noticed (drops, jets, etc.), the tests should be stopped and that test section emptied. The water should be removed from the leakage points. The tests should be repeated after repair of defects;
- Pressure tests shall be recorded in a report, one copy for the Client and one to be held by the contractor.

Short Test I
This test is done on short pipelines (e.g. household connections of low sections, up to 15m long). The tests are related to inspection of pipeline and connections under operating pressure.

Short Test II
Tests are done on pipelines up to app. 30m long (e.g. longer household connections). Pipeline is put under pressure equalling 1.5 x operating pressure. After 30 min, the test begins, without any pressure rise during that period if the pressure has dropped during those 30 min. After the beginning of test, the pressure in pipeline during each 5 min must not drop by more than 0.2 bars. Test takes 60 min.

Short Test III
This test is done on pipelines without interconnecting elements (connections, fittings) over 30m in length. Pipeline is put under pressure of 1.5 x the operating pressure. After 2 hours, the pressure which has dropped in that period should be raised to 1.3 x the operating pressure. After another two hours, the test begins, without pressure uplift. After the beginning of test, pressure drop of 0.2 bar an hour can be expected. Test takes 30 min for each started 100m of pipeline, and no less than 2 hours.

Preliminary Tests
These tests are done on pipeline sections with interconnecting elements (connections, fittings) up to 500 m length. The air should be released from pipeline. The air which remains in the pipeline will be removed by water during the previous tests. Pipeline expands depending on material it is made of, and increase in pipeline volume should be taken from pipe material manufacturer's tables. Test pressure is 1.3 x the operating pressure. Preliminary test takes at least 12 hours. At regular time intervals (e.g. every 2 hours) the pipeline shall be replenished with water up to test pressure (for maximum volume increase, refer to pipe material manufacturer's tables). Close to the end of preliminary test, pressure drop should be 0.1 to 1.2 bars per hour, every 2 hours after the last pressure rise, even if pipeline is impermeable at all points depending on type of material and temperature changes.

Main Test
If no leaking is found during preliminary tests on pipes, connections and fittings, and if pipeline volume during preliminary tests grows as described, it is allowed to proceed with main tests, without pressure lowering. Test pressure is the same as at the end of preliminary test. Recommended duration of test is 30 min for each 100m, and at least 2 hours. Also during the main tests, it is important to pay attention to pipeline expansion, which is not completely finished yet. It is recommended that the main test should start not earlier than 2 hours after the last pressure rise in previous test. Testing is over if there is no pressure drop exceeding 0.1 to 0.2 bars per hour and if there are no leaking points.

Complete Test
This test is related to connection points between test sections. Short tests and main test should be completed. Connection points must not be covered. Test pressure is 1.3 x the operating pressure. The test takes 2 hours.

Method of Calculation
The calculation should be made per m' of particular pipeline section. The unit price includes preparation of pipeline for trial, mounting of plugs in interior installation, placement of test pump at working place, pipeline filling with water, marking of leakage points, repair of leakage points, taking minutes of pipeline testing and pipeline emptying after testing.

Testing of Sewerage Installation

Internal Sewerage
Close all openings on plumbing, except the highest and lowest ones. At the lowest point of installation, a hose for filling the installation with water is mounted. After the installation fills up to the highest point, the opening is closed and installation recharged with water up to test pressure of 4m water column over the highest opening. After 30 min, the required water quantity is measured in order to achieve the test pressure again. Obtained water quantity is calculated over to 24 hours and if it is lower than 0.005 l/m', the installation is in proper condition.

Method of Calculation
Testing of sewerage installation should be calculated per pipeline sections per m'.

Rinsing and Disinfection of Water Supply Installation

Contamination of water supply might be originated from filthiness of pipes or incorporated parts, and from infiltration of impurities (sand, earth, mud, polluted water from trench, etc.) during execution of works on pipeline laying.
Therefore, in order to conduct the process of rinsing and disinfection in the simplest and most efficient way, it is required to pay attention and use as much as possible clean pipes and fittings, undertaking all measures during pipeline laying for prevention of protrusion of impurities and other foreign particles into the pipeline itself.

During suspension of works on laying, the pipe ends should be plugged by wooden plug. This also prevents entrance of various small animals (mouse, rat, weasel, hedgehog, cat, etc.) into the pipeline.
Disinfection of interior surfaces of new or reconstructed pipelines is much more difficult than disinfection of contaminated water, because chlorine must protrude through organic matters, which are present inside of the pipe walls.
To obtain good results, pipelines should be previously cleaned and thoroughly rinsed.

Washing
Pipeline washing should be approached upon completed tests at test pressures.
Only proper potable water may be used for washing. Efficient washing is enabled only if minimum water velocity is 1.5 m/s.
Method of washing depends on the number of outlets. In gravity pipelines, washing should be done from the top downwards.
The water released during washing must not cause any damage. If there is no solution for this in the Design, the Supervisor is obliged to provide solution on-site.
Washing should be continued until the water at the outlet is completely clean.
During the washing, it is necessary to perform occasional controls of the water quality at the outlet, and as soon as muddy water stops running out, i.e. when completely clear water appears, washing is finished. If this takes less than 20 min, washing should be continued until this time, so that the used water quantity for washing reaches approximately triple volume of the washed section, in compliance with common practice.
Required quantities of water for washing (min norms) should be calculated as follows:

- Up to dia 150 3 to 5 – times the volume of washed section,
- Over dia 150 2 to 3 – times the volume of washed section.

Disinfection
To ensure that after completed washing all remaining organic substances and all organisms are destroyed, and that pipeline is of such quality that water which flows preserves its bacteriological safety, it shall be necessary to disinfect these facilities.
To enable complete disinfection, water with certain dose of chlorine needs to stay in the pipeline for about 24 hours.
Disinfectant shall be prescribed by sanitary service of *PE Vodovodikanalizacija* (Municipal Water Supply and Sewerage Company), in compliance with sanitary local inspection. Control of washing and disinfection should be performed solely under management of a responsible, qualified and authorized Representative of sanitary service of the company.
Chlorine dose for disinfection should be within the range of 30-200 mg/l. It is believed that 30-50 mg/l would be sufficient.
In this specific case, the dose shall be prescribed by authorized Representative of sanitary inspectors who are fully responsible for disinfection and any possible consequences.
Lower contents are recommended when chlorine stays in contact for 12-24 hours.
Normal time for chlorine action is 3-12 hours. Higher chlorine doses are used when it is known that pipeline contains organic substances which cannot be eliminated by washing, or when it is necessary to shorten the time of disinfection.
Minimum time of disinfection should be 30-60 min. Chlorine could be added through initial hydrant or special purpose service outlet. Water is released to downstream hydrant, until chlorine is clearly felt.
Parts of pipeline which are not subject to disinfection must be disconnected from the rest of the pipeline which is subject to disinfection.
Responsible officer of sanitary service should provide protection of workers who are engaged in disinfection, since chlorine is a health hazard if not handled with care.
Responsible officer should also ensure (by public notice or alike) that no one should use the water intended for disinfection.
Executed chlorination must be recorded in a report, verified by the person who controlled the disinfection.
Upon expiry of this time, chlorine contents shall be checked. If determined that water contains about 10mg of chlorine per one litre of water, it is indicator of successful disinfection. In that case, all pre-chlorinated

water from pipeline and tank chambers should be released. When releasing the pre-chlorinated water, care should be taken not to release it over agricultural crops, because it will destroy them.
If check-up of chlorine contents shows that there is about 5 mg/l or less chlorine in the water, it means that the disinfection needs to be repeated.

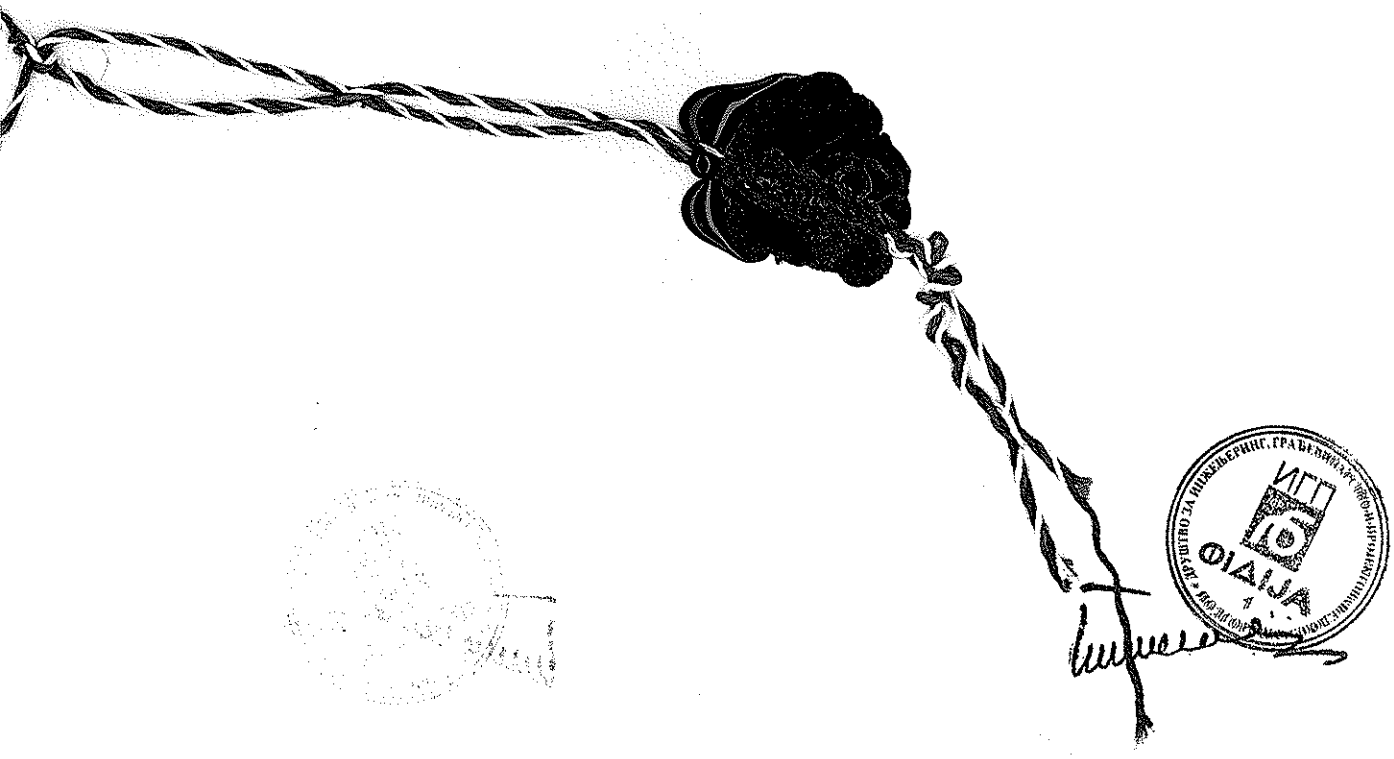
Rinsing
Rinsing is done by the same procedure as washing of pipeline. Rinsing is done using potable water with chlorine contents of 0.5 mg/l. Rinsing lasts until determined at the outlet that chlorine content in the water is 1 mg/l or less.
Upon completed rinsing, pipeline and tank chambers are ready for proper operation.

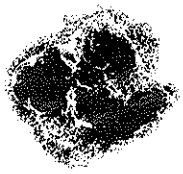
Waters quality test
In the case of refurbishment of the piping in the school's toilets performing and payment of the water quality test is Contractor's obligation.

G. Contractor´s bid

Name of Contract: . Energy Efficiency Programme in Public Buildings, Tender for educational
buildings of **Cluster IV**
Educational building 1:
Primary School "Branko Božović", Podgorica
Educational building 2:
Primary School "Oktoih", Podgorica
Educational building 3:
Primary School "Vuko Jovović", Danilovgrad

Commercial Envelope





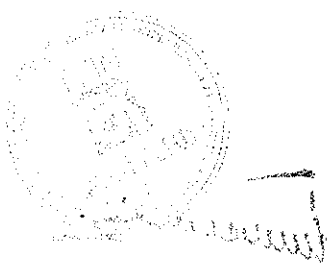
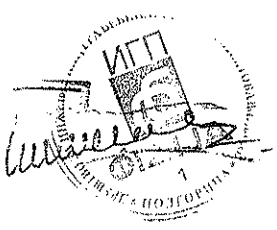




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Form of Bid



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A1-8 Form of Bid

- Single Stage Bid -
[*See paragraph 3.2.1.2 (1) of the Instructions to Bidders*]

Date: ***September 01, 2014.***

Loan/Credit No.:*German Financial Cooperation Funds via KfW-Development bank*

KfW No.: **[KfW No: BMZ Nr 202080554)**

Name of Contract: . Energy Efficiency Programme in Public Buildings, Tender for educational
buildings of **Cluster IV**
Educational building 1:
Primary School "Branko Božović", Podgorica
Educational building 2:
Primary School "Oktoih", Podgorica
Educational building 3:
Primary School "Vuko Jovović", Danilovgrad

To:

Ministry of Economy
Directorate for Energy Efficiency
Rimski Trg 46
81000 Podgorica
Montenegro

Phone: **+382 (20) 482 238**
Fax: **+382 (20) 234 081**
E-mail: **sandra.sipcic@ee-me.org**
Attention: **Mrs Sandra Sipcic**

Ladies and/or Gentlemen,

Having examined the Bid documents, including Addenda Nos. ***(Ref. No.: BMZ Nr. 202080554),*** the receipt of which is hereby acknowledged, we, the undersigned, offer to perform construction works under the above named Contract in full conformity with the said Bid documents for the sum of:

2.042.200,67(two million forty two thousand two hundred euros and 67/100)
(amount of foreign currency [EUR] in words)

Building and trade works..... 1.558.652,56EUR

Thermo-technical (heating) services..... 287.912,82 EUR

Electrical services..... 152.793,26 EUR

Sanitary (Water Supply and Sewage) services..... 42.842,02 EUR
for definite works *(amount in figures)*

There of

745.594,67 (Seven hundred and forty-five thousand five hundred and ninety-four euro and 67/100) *for* ***Educational building 1****: Primary School "Branko Božović", Podgorica (amount of foreign currency [EUR] in words)*

628.361,18 (Six hundred twenty-eight thousand three hundred and sixty-one euro and 18/100) *for* ***Educational building 2:*** *Primary School "Oktoih", Podgorica (amount of foreign currency [EUR] in words)*

668.244,82 (six hundred sixty-eight thousand two hundred forty-four and 82/100 euros) *for* ***Educational building 3:****Primary school "Vuko Jovović", Danilovgrad (amount of foreign currency [EUR] in words)*

or such other sums as may be determined in accordance with the terms and conditions of the Contract. The above amounts are in accordance with the price schedules attached herewith and are made part of this Bid.

We undertake, if our Bid is accepted, to commence the Facilities, and to achieve Completion within the respective times stated in the Bid documents.

If our Bid is accepted, we undertake to provide an advance payment security and a performance security in the form and amounts, and within the times specified in the Bid documents.

We agree to abide by this Bid for a period of 180 days from the date fixed for submission of Bids as stipulated in the Bid documents, and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

Until a formal contract is prepared and executed between us, this Bid, which consists of this letter and Attachments through hereto, together with your written acceptance thereof and your notification of award, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest, or any Bid you may receive.

Dated this **September , 01** day of **2014**

.....
(signature)

In the capacity of

General manager IGP "Fidija" d.o.o. Podgorica
(position)

Duly authorized to sign this Bid for and on behalf of

Joint venture IGP "Fidija" d.o.o. Podgorica-"Bombeton" d.o.o. Cetinje
(name of Bidder)

GROUP A5.1.1 **BILL OF QUANTITIES** ***o f building and trade works for energy efficiency improvement in "Branko Božović" Primary School in Podgorica***	*Investor:*	**Ministry of Economy of Montenegro, Energy Efficiency Sector**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Sub-consultant:	**KOPRING PMC, Podgorica**
	Facility:	**Primary school "Branko Božović", Podgorica**
	Documentation:	**Final Architectural Design**
	Date:	**September, 2013**

	GENERAL TERMS
1	Works to be conducted according to applicable technical regulations, standards and required standards applicable for construction of such facilities.
2	Use materials with a quality certificate that meet required standards.
3	Apply measures promptly for safety of the facility and works, equipment and investment material, workers, passengers, traffic and surrounding facilities.
4	Obey technical documentation, based on which a building permit was granted.
5	Position unit price comprises all expenses for works, materials, transport, cleaning of the facility after construction, tax liabilities, profits and all other non mentioned expenses for the completion of works under documents of the Agreement, technical regulations and applicable average standards in the construction industry.

Item	Description of Item	Unit of measure	Quantity		Unit price (€)		Amount (€)
SCHOOL AND GYM							
1	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings, vertical and horizontal gutters. Flashings have different developed widths and they are made from galvanized, coloured steel metal sheet with double interlock system, d=0,68mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price comprises all works, materials and debris transportation to the town landfill. Calculation is based on a m1 of dismantled flashing, gutters, and their supporters.						
	-horizontal rainwater channels, developed width up to 66cm.						
	Calculation per m1.	m1	367,86	x	1,00 €	=	**367,86 €**
	- vertical gutters, dim.15x15cm, developed width up to 66cm, with dismantling of top-gutter cisterns.						
	Calculation per m1.	m1	180,36	x	1,00 €	=	**180,36 €**
	-gable edges flashings, developed width up to 41-50cm.						
	Calculation per m1	m1	204,04	x	1,00 €	=	**204,04 €**
	-flashing of the small parapet wall on the RC cantilever slab and in the roof parapets of the dressing rooms, developed width up to 34-40cm.						
	Calculation per m1.	m1	93,09	x	1,00 €	=	**93,09 €**

	-flashing sill, developed width 41-50cm.						
	Calculation per m1.	m1	666,04	x	1,00 €	=	**666,04 €**
1.02.	Repair of damages in the parapet walls d=20cm and more, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing new PVC joinery with blind frame, and ready made galvanized plastic-laminated steel metal sheets d=0,70 mm or PVC sills. The unit price comprises all works and materials.						
	Calculation m1.	m1	536,99	x	5,00 €	=	**2.684,95 €**
1.03.	Repair of jamb damages d=20 cm, caused by dismantling of the facade joinery. Surfaces shall be treated with lime cement mortar 1:2:6, previously sprinkled with low density cement mortar, to prepare the item for installation of new PVC joinery with blind frame, ready made galvanized plastic-laminated steel metal sheets d=0,70 or PVC sills. The unit price comprises all works and materials.						
	Calculation per m1.	m1	1.620,68	x	5,00 €	=	**8.103,40 €**
1.04.	Dismantling and re-installation of lighting, and other facade devices and equipment. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility.						
	Calculation per piece.	pc	14,00	x	35,00 €	=	**490,00 €**
1.05.	Production and installation of flashings of the small parapet wall on the RC cantilever slab made of ready made plastic-laminated galvanized steel metal sheets=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 60cm. The item includes surface preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the design and sample selected by the Employer / Employer's Representative.						
	Calculation per m1.	m1	297,11	x	14,00 €	=	**4.159,54 €**
1.06.	Production and installation of the parapet sills, made of ready made plastic-laminated galvanized steel metal sheets=0.7mm. Developed width up to 50cm. The item includes surface preparation and complete binding following the regulations. Undertake the entire procedure in compliance with the design and color and sample selected by the Employer / Employer's Representative.						
	Calculation per m1.	m1	536,99	x	13,00 €	=	**6.980,87 €**

1.07.	Production and installation of the horizontal and vertical gutters of 150/150 mm square section, made of ready made plastic-laminated galvanized steel metal sheets=0.7mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material.						
	Calculation per m1.	m1	548,22	x	16,00 €	=	**8.771,52 €**
1.08.	Purchase and installation of profiled standard flexible, vertical and horizontal expansion joints at wall-to-wall contact, for dilatation width of 5 cm, fully in line with technology of the manufacturer.						
	Calculation per m1.	m1	57,20	x	11,00 €	=	**629,20 €**
1.09.	Setting up "Demit" thermal facade. External thermal insulation of the facade reinforced concrete (hereinafter RC) and brick walls will be conducted with expanded EPS polystyrene, having heat transfer coefficient of λmax = 0,037 W/mK, thickness 8 cm, produced by the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade walls at the level of the ground floor (all parapets in the ground floor, pillars and parts of the full wall) will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=8cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK.						
	Thermal boards with B1 flammability class (DIN 4102 B1 highly anti-flammable, non-combustible and self-extinguishing) to be used. Install panels and vertical breaks of 50 cm width along the entire facade, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.						
	Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the facade opening. Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:						
	*first layer – refined mortar based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene boards will be filled with polyurethane foam.						

ИГП ФИЛИЈА

	Reinforcing mesh with adequate overlapping and extra protection at the facade openings and corners is placed in a fresh layer of this mortar. In case additional mechanical anchoring is required, impact bolt through the reinforcing mesh shall be used 24 hours after applying this layer.						
	* reinforcing mesh, * second layer of mortar, apply same procedure as with the first layer. This mortar is laid to well- dried first layer and polished with a screed afterwards, * contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar,						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour defined by the Employer / Employer's Representative, while the entire procedure will be conducted according to the design details.						
	Before setting up the thermal plates, generally the following works shall be conducted: * All works on the flat roof, including sheet metal works, * Replacement of façade joinery, * Placing the entire envisaged installation in the facade, * Planed partial or total closing of the openings, building new parapets,						
	*Covering and protection of all non-treated surfaces – glass, stone… *Control and testing of the existing facility surface, including: Use impregnation- basic coating at the most critical points of the facility. When the basic coating dries out, set up the EPS cube of 5x5x5 cm by using polystyrene adhesive. Once the adhesive completely settles, minimum 3 days after the working conditions are adequate, try to separate the cube manually.						
	If in the process of separating expanded polystyrene only the adhesive separates and not parts of the basis - the basis is sufficiently strong, solid and stable.						
	If in the process of separating expanded polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.						
	If in the process of separating expanded polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough, and shall not withstand new layer of thermal insulation.						

	Use the reinforcing mesh or angle profiles for the window corners and jambs. Facade ends along the plinth must have U-profile strip, adjusted to the thickness of thermal-plate.						
	Before setting the plates, thoroughly clean the facade surface from dust, greasy deposits and mortar. At heights over 8 meters, plates need additional anchoring with appropriate bolts.						
	During the works on the facade, surface, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortar shall not be applied in the event of heavy wind, rain or fog.						
	The unit price comprises the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Treatment of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be in line with the appropriate EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention.						
	NOTE: The existing ventilation openings on gym lateral facades have to be closed, before the installation of the ETICS.						
	EPS	m2	1.544,13	x	23,00 €	=	**35.514,99 €**
	XPS	m2	1.521,07	x	28,00 €	=	**42.589,96 €**
	Hard Pressed mineral wool	m2	142,04	x	32,00 €	=	**4.545,28 €**
1.10.	Setting up "Demit" - thermal facade on the ceiling of facade bay and part of ceiling of connecting part between main school building and gym hall locker rooms. Use expanded polystyrene EPS, d=10 cm. The process is identical to item 1.09.						
	Calculation per m2	m2	33,80	x	24,00 €	=	**811,20 €**
1.11.	Wall plinth lining up to 60cm height by extruded polystyrene boards XPS d=5cm, including bonding of joints with mesh and adhesive. Upon fastening of boards to fix the angular profiles with mesh.						

	For finishing treatment use ready mixed marble based mortar in the part of the plinth which is not already covered with stone, created on grain ("Kulie") as splash guard (as indicated on the drawings) of 2,2mm grains. The kind and colour to be selected by the Employer / Employer's Representative. The finishing treatment comprises complete materials and works. The unit price comprises complete removal of the existing mortar plinth, because it is peeling off from the substructure.						
	Calculation per m2.	m2	98,70	x	27,00 €	=	**2.664,90 €**
1.12.	Lining of concrete elements for shading of screen walls by expended polystyrene boards EPS d=2cm. The lining shall be done along perimeters of all concrete elements, including fastening of joints with mesh and adhesive. Upon fastening of boards to fix the angular profiles with mesh.						
	For finishing treatment use mosaic plaster "Kulie" of 2,2mm grains. The kind and colour to be selected by the Employer / Employer's Representative. The finishing treatment comprises complete materials and works.						
	Calculation per m2.	m2	437,75	x	21,00 €	=	**9.192,75 €**
1.13.	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned (RC- sun shading elements, roof's cantilever slabs, cornices-rainwater channels, ceiling of the main entrance canopy, stack). Type and colour will be selected by the Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, and if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	*Contact coating made of the emulsion of synthetic resins and water-glass used for impregnation of the set reinforced mortar.						
	*Top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This layer shall be made in fine grained and smooth structure, painted in colour determined by the Employer / Employer's Representative, fully in line with the Design details.						

	The openings shall be protected with PVC foil. The unit price comprises the purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.						
	Calculation per m2	m2	310,46	x	9,00 €		**2.794,14 €**
	THERMAL INSULATION OF FACADE WALLS						**131.444,09 €**
2	**THERMAL INSULATION AND WATERPROOFING OF THE ROOF**						
2.01.	Removal of existing thermal insulation and waterproofing from the flat and impassable roof, reaching concrete floor in following layers (data from the existing designs: - waterproofing 4+2+1, 1,5cm - cement glazing 1:3, 2cm - sloping layer, 4-20cm - roofing paper, - "Heraklith boards", 3cm -roofing paper. The unit price to include all the work and debris dumping at the town landfill, up to 5 km distance.						
	Calculated as per m2.	m2	236,09	x	9,00 €	=	**2.124,81 €**
2.02.	Removal of the existing roof cover from cantilever boards from canopy over main entrance and locker rooms entrances made of waterproofing insulation completely up to the concrete structure. The unit price comprises all work and transportation of debris to a town landfill up to 5km distance.						
	Calculated as per m2.	m2	97,07	x	9,00 €	=	**873,63 €**
2.03.	Removal of the existing roof cover from the main school building made of painted trapezoid sheet metal, cement mortar of 2-3cm and roof battens completely up to inclined concrete structure. The unit price comprises the complete works and transportation of detritus to the local waist depot up to 5km distance. Calculation as per m2 measured along inclined area.						
	Calculated as per m2.	m2	1.818,48	x	4,00 €	=	**7.273,92 €**
2.04.	Installation of horizontal waterproofing and thermal insulation on the impassable flat roofs. The following layers are applied onto prepared base:						

	a) layer for pressure equalization of steam permeable and water impermeable foil, b) steam barrier made of post bituminous Al foil with fibre glass splint, c) Thermal insulation made of extruded polystyrene panes XPS d=10cm, having heat conductivity coefficient of λmax = 0,033 W/mK (measured over the already installed foil),						
	d)layer for detachment of PVC foils, e) layer for inclination of lightweight concrete d=5-16cm, at inclination 1%, f) layer for pressure equalization of steam permeable and water impermeable foil, b) steam barrier made of post bituminous Al foil with fibre glass splint,						
	g) Waterproofing made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is placed freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing.						
	h) Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel.						
	Calculation is based on a m2 of the roof basis. The unit price comprises all required material following the description from a) to h), including the making of a required cove and installation of the edge perforated metal sheet drips with vertical seam (gravel holder).						
	Calculated as per m2.	m2	250,31	x	54,00 €	=	**13.516,74 €**
2.05.	Construction of waterproof insulation on canopy over main school entrance, locker rooms entrance and cantilever slab on inclined layer of lightweight concrete d=3-8cm, made of cold bitulith coating, and hot bitumen coating or bitumen construction products, and two layers of waterproof bitumen strips. One strip is made of Al foil splint whilst the other one of glass fibre splint. Each strip has d = 4 mm thickness. The first layer is freely coated over hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Waterproofing shall be constructed on the walls, at minimum 15cm height. Special attention shall be paid to the joints between horizontal and vertical waterproofing construction.						
	Calculated as per m2.	m2	82,85	x	18,00 €	=	**1.491,30 €**

2.06.	Protect waterproofing on eaves which is not protected with gravel, with "Krovoplast" or similar coating with equal or better technical characteristics. The unit price comprises complete work and material, following the description.						
	Calculated as per m2.	m2	82,85	x	6,00 €	=	**497,10 €**
2.07.	Construction of suspended ceiling in the classrooms on the first floor and in the psychologist's office on the ground floor at 3,10m height, using gypsum boards "Knauf" d=1,25cm on the metal structure made of zinc-plated steel profiles.						
	After lining the gypsum boards, to all joints shall be fixed with fixing strips. All areas shall be skimmed two times after required preparations. For finishing treatment to use semi-dispersive paint, double painted using a colour as per the Employer / Employer's Representative's choice including use of proper scaffolds.						
	Calculation per m2	m2	882,58	x	19,00 €	=	**16.769,02 €**
2.08.	Repair (additional roofing) of double pitched roof over gym hall, made of painted trapezoid sheet metal (including all sealing materials), approximately 5% of total roof area at the places where the existing roofing is damaged. The construction price comprises removal of the existing covering, possible replacement of overaged purlings, flashing next to attics and ridge. The price comprises complete works, materials and transportation of detritus to the depot up to 5km distance.						
	Calculated as per m2. 461.90x5%	m2	23,09	x	35,00 €	=	**808,15 €**
2.09.	Covering of roof with polyurethane composite panels.The thickness of panels shall be d=80mm, heat conductivity coefficient λmax = 0,025 W/mK, with standard modular width of 1000mm, fastened to the rectangular profiles 60/40/3mm, at 60-150cm distance over existing reinforced concrete inclined slab. The upper metal sheet is of unique trapezoid shape d=0,5mm, whilst the bottom is standard one SNVs d=0,5mm.						
	After mounting of composite panels to perform flashing of all wall valleys, gable edges and gutters using all required bits and pieces (stainless steel screws, washers, and EPDM gaskets). The price comprises the complete works and materials, as per above description.						
	Calculated as per m2.	m2	1.818,42	x	43,00 €	=	**78.192,06 €**
	THERMAL INSULATION AND WATERPROOFING OF THE ROOF						**121.546,73 €**
3	**REPLACEMENT OF FACADE JOINERY**						

3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per piece of dismantled joinery.						
	195/254	pc	7,00	x	15,26	=	**106,85 €**
	80/80	pc	12,00	x	5,44	=	**65,25 €**
	195/140	pc	2,00	x	11,39	=	**22,77 €**
	95/95	pc	3,00	x	6,46	=	**19,37 €**
	85/75	pc	12,00	x	5,44	=	**65,25 €**
	95/200	pc	14,00	x	10,03	=	**140,36 €**
	195/100	pc	22,00	x	10,03	=	**220,57 €**
	195/200	pc	11,00	x	13,42	=	**147,67 €**
	195/150	pc	80,00	x	11,73	=	**938,02 €**
	195/80	pc	40,00	x	9,35	=	**373,85 €**
	205/50	pc	4,00	x	8,67	=	**34,67 €**
	60/100	pc	4,00	x	5,44	=	**21,75 €**
	195/180	pc	4,00	x	12,74	=	**50,98 €**
	205/160	pc	2,00	x	12,41	=	**24,81 €**
	195/180	pc	1,00	x	12,74	=	**12,74 €**
	195/170	pc	10,00	x	12,41	=	**124,05 €**
	95/150	pc	14,00	x	8,33	=	**116,57 €**
	195/80	pc	57,00	x	9,35	=	**532,74 €**
	190/200	pc	1,00	x	13,25	=	**13,25 €**
	160/220+50	pc	4,00	x	14,61	=	**58,46 €**
	60/270	pc	3,00	x	11,22	=	**33,65 €**
	127/270	pc	1,00	x	13,49	=	**13,49 €**
	187/220+50	pc	1,00	x	15,53	=	**15,53 €**
	275/270	pc	1,00	x	18,52	=	**18,52 €**
	570/40	pc	1,00	x	20,73	=	**20,73 €**
	165/320	pc	1,00	x	16,48	=	**16,48 €**
	215/340	pc	2,00	x	18,86	=	**37,72 €**
	305/300	pc	3,00	x	20,56	=	**61,69 €**
	570/300	pc	1,00	x	29,57	=	**29,57 €**
	535/300	pc	2,00	x	28,38	=	**56,76 €**
	305/300	pc	1,00	x	20,56	=	**20,56 €**
	575/300	pc	1,00	x	29,74	=	**29,74 €**
	195/245	pc	1,00	x	14,95	=	**14,95 €**
	195/80	pc	1,00	x	9,35	=	**9,35 €**
	160/205	pc	1,00	x	12,41	=	**12,41 €**
	100/205	pc	1,00	x	10,37	=	**10,37 €**
	195/210+50	pc	1,00	x	15,46	=	**15,46 €**
	345/205	pc	1,00	x	18,69	=	**18,69 €**
	345/80	pc	1,00	x	14,44	=	**14,44 €**
	345/250	pc	1,00	x	20,22	=	**20,22 €**
	165/180	pc	2,00	x	11,73	=	**23,45 €**
	295/300	pc	1,00	x	20,22	=	**20,22 €**
	305/250	pc	1,00	x	18,86	=	**18,86 €**
	535/250	pc	1,00	x	26,68	=	**26,68 €**
	565/250	pc	1,00	x	27,70	=	**27,70 €**
	310/113-220	pc	1,00	x	16,41	=	**16,41 €**
	195/280	pc	1,00	x	16,14	=	**16,14 €**
	190/230+100	pc	1,00	x	17,67	=	**17,67 €**
	180/335	pc	1,00	x	17,50	=	**17,50 €**
	195/240	pc	1,00	x	14,78	=	**14,78 €**
	195/230+40	pc	1,00	x	15,80	=	**15,80 €**
	180/220	pc	1,00	x	13,59	=	**13,59 €**
					-		

3.02.	Dismantling of the existing windows on the gym, made of iron mongery, glazed with double profiled glass. This item includes transportation of removed joinery to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery.				-		
	670/300 pc 4 675/300 pc 4				-		
	Calculation per m2	m2	161,40	x	4,25	=	**685,68 €**
					-		
3.03.	Production and installation of the facade PVC joinery. The unit price comprises everything from description: purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: -production and installation, -6-chamber PVC profiles, -heat transfer coefficient up to U = 1.81 W / m² K, -minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, -double low-emission glass 4 +16 +4 mm, -fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with ventus mechanism, in line with drawings - joinery schemes,				-		
	- include PVC sill of required width in the item, - PVC profile colour - white.				-		
	1. 195/254	pc	7,00	x	479,10	=	**3.353,69 €**
	2. 80/80	pc	12,00	x	137,62	=	**1.651,50 €**
	3 i 3'. 195/140	pc	2,00	x	257,90	=	**515,79 €**
	4. 95/95	pc	3,00	x	132,00	=	**395,99 €**
	5. 85/75	pc	12,00	x	115,63	=	**1.387,60 €**
	6. 95/200	pc	14,00	x	204,78	=	**2.866,89 €**
	7. 195/100	pc	22,00	x	293,29	=	**6.452,44 €**
	8 & 8'. 195/200	pc	11,00	x	457,45	=	**5.031,92 €**
	9 & 9'. 195/150	pc	80,00	x	342,83	=	**27.426,62 €**
	10 & 10'. 195/80	pc	40,00	x	158,38	=	**6.335,06 €**
	12. 60/100	pc	4,00	x	136,66	=	**546,62 €**
	13 & 13'. 195/180	pc	4,00	x	376,87	=	**1.507,48 €**
	14 & 14'. 205/160	pc	2,00	x	300,28	=	**600,56 €**
	15. 195/180	pc	1,00	x	380,62	=	**380,62 €**
	16 & 16'. 195/170	pc	10,00	x	363,83	=	**3.638,34 €**
	17. 95/150	pc	14,00	x	167,91	=	**2.350,78 €**
	19. 190/200	pc	1,00	x	370,19	=	**370,19 €**
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3.04.	Production and installation of the facade aluminium joinery. The unit price comprises everything from the description: purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Measures shall be taken on site. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - plastic coated aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2,80 W/m²K, - aluminium jealousies if necessary, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - AL sill of required width shall be envisaged within the item, - profile colour - natural aluminium.							
	A1.	160/220+50	pc	2,00	x	508,12	=	**1.016,23 €**
	A2.	60/270	pc	3,00	x	185,76	=	**557,27 €**
	A3.	127/270	pc	1,00	x	280,34	=	**280,34 €**
	A4.	187/220+50	pc	1,00	x	577,26	=	**577,26 €**
	A5.	277/270	pc	1,00	x	563,43	=	**563,43 €**
	A7.	165/250	pc	1,00	x	438,55	=	**438,55 €**
	A8 & A8'.	215/250	pc	2,00	x	561,83	=	**1.123,65 €**
	A9.	305/250	pc	3,00	x	765,53	=	**2.296,60 €**
	A10.	570/250	pc	1,00	x	1.374,35	=	**1.374,35 €**
	A11.	535/250	pc	2,00	x	1.341,38	=	**2.682,77 €**
	A12.	305/300	pc	1,00	x	776,94	=	**776,94 €**
	A13.	575/250	pc	1,00	x	1.382,33	=	**1.382,33 €**
	A14.	195/245	pc	1,00	x	602,46	=	**602,46 €**
	A15.	195/80	pc	1,00	x	373,95	=	**373,95 €**
	A16.	160/205	pc	1,00	x	502,05	=	**502,05 €**
	A17.	100/205	pc	1,00	x	289,79	=	**289,79 €**
	A18.	195/210+50	pc	1,00	x	663,31	=	**663,31 €**
	A19.	345/140	pc	1,00	x	544,94	=	**544,94 €**
	A20.	345/80	pc	1,00	x	245,83	=	**245,83 €**
	A21.	345/180	pc	1,00	x	735,37	=	**735,37 €**
	A22.	165/180	pc	1,00	x	239,55	=	**239,55 €**
	A23.	295/300	pc	1,00	x	965,87	=	**965,87 €**
	A24.	305/170	pc	2,00	x	522,28	=	**1.044,56 €**
	A25.	535/170	pc	1,00	x	1.097,04	=	**1.097,04 €**
	A26.	565/170	pc	1,00	x	1.089,20	=	**1.089,20 €**
	A27.	310/33-140	pc	1,00	x	349,51	=	**349,51 €**
	A28.	670/300	pc	4,00	x	1.818,60	=	**7.274,41 €**
	A29.	675/300	pc	4,00	x	1.825,85	=	**7.303,40 €**
	A30.	195/280	pc	1,00	x	481,49	=	**481,49 €**
	A31.	190/230+100	pc	1,00	x	724,15	=	**724,15 €**
	A32.	180/335	pc	1,00	x	698,83	=	**698,83 €**
	A33.	195/240	pc	1,00	x	444,73	=	**444,73 €**
	A34.	195/230+40	pc	1,00	x	679,69	=	**679,69 €**
	A35.	180/220	pc	1,00	x	475,98	=	**475,98 €**

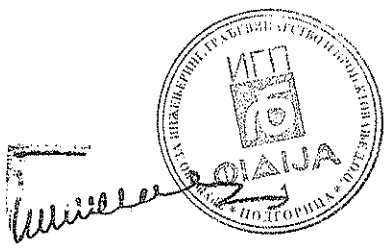
3.05.	Production and installation of the windshield aluminium joinery. The unit price comprises everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - plastic coated aluminium construction system without thermal break, -glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	A36. 160/220+50	pc	2,00	x	619,51	=	**1.239,02 €**
3.06.	Purchase of materials, processing, manufacture and mounting of Al window jalousie for mechanical and sun protection on two windows of janitor's apartment. Jalousies shall be equipped with mechanical handling and high quality mechanism, hinges and opening fittings as per details and drawings of joinery. This item also involves all required works for its installation (proper mounting, needed wall chases, required plastering and painting, and edge flashings (if necessary). The profiles are in tone selected by Employer / Employer's Representative. Measures to be taken onsite. Calculation per piece of installed jalousie, fully in line with the description. The unit price shall include dismantling of the old jalousies and its transportation to the town landfill.						
	3 195/140	pc	1,00	x	344,63	=	**344,63 €**
	3' 195/140	pc	1,00	x	344,63	=	**344,63 €**
3.07.	Wall-up of the openings on the first floor, after removal of facade joinery. The wall-up shall be performed by "Ytong" blocks d=25cm, of 625/250/200mm size, in thin layer mortar. Connections with the existing walls to be achieved with anchors Ø10 in each raw. The unit price comprises the complete works, materials and scaffold.						
	Calculated as per m3	m3	33,12	x	145,00 €	=	**4.802,40 €**

3.08.	Plastering of interior walls made of "Ytong" blocks at the places where openings are walled-up by use of flexible mortar 1:3:9 in two layers with previous spraying by lean cement mortar. The first layer shall be roughly applied, however the second one has to be smoothly floated. The unit price comprises the complete works, materials and scaffold.						
	Calculation per m2	m2	132,50	x	9,00 €	=	**1.192,50 €**
3.09.	Plastering of facade walls made of "Ytong" blocks at the places where openings are walled-up by use of flexible mortar 1:2:6 in two layers with previous spraying by lean cement mortar. The first layer shall be roughly applied, however the second one has to be smoothly floated. The unit price comprises the complete works, materials and scaffold.						
	Calculation per m2	m2	132,50	x	10,00 €	=	**1.325,00 €**
	NOTE: Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.						
	NOTE: Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.						
	TOTAL FOR REPLACEMENT OF FACADE JOINERY						**118.430,99 €**
4	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
4.01.	Construction of a new top layer of 10 cm thick reinforced concrete MB20 over the old pavements around building. The surface of the existing pavement shall be thoroughly cleaned before pouring. The new pavement has to be strained into fields of approx. 1.5m2. Expansion joints shall be filled up with a bituminous joint filler. Areas to be treated shall be determined on the site with the Employer / Employer's Representative. The unit price shall include the construction of storm water grooves, and all ancillary works, materials and formworks.						
	Calculated as per m2.	m2	210,00	x	14,00	=	**2.940,00 €**
4.02.	Supply and installation of smooth wooden boards for covering the expansion joints inside the building, along the walls and ceilings. Boards shall be 2,5cm thick and 15cm width. After installing, boards shall be varnished (process: filling and grinding, primer, grinding, two layers of synthetic resin paint).						
	Calculated as per m	m	42,75	x	16,00	=	**684,00 €**

4.03.	Removal of the external emergency stair case metal structure at rear side of the facility (kindergarten entrance) and it's refitting after installation of the ETICS facade. After installation, stair case shall be connected to the grounding installations.						
	Calculated as per lump sum	lump sum	1,00	x	480,00	=	**480,00 €**
4.04.	Production and installation of protective bar for skylight above the garage door at the ground floor. The protective bars are made of steel box profiles 60*60mm which form frame, with external dimensions 200*112cm, grill (stretched metal of approximate dimensions of a rhomb cca 85*35mm) as infill. The grille is welded to angle profiles L30*30 and then fitted into the frame so that L profile is visible on the external side. The unit price shall include dismantling of the old protective bars and its transportation to the town landfill. The entire structure is anchored, appropriately protected and painted in some of the standard colors, selected by the Employer / Employer's Representative with previous approval obtained from the building users.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	15 195/70	pc	1,00	x	195,00 €	=	**195,00 €**
4.05.	Removal of existing protective bars from the facade before replacement of joinery and its refitting, upon new joinery is installed. Cleaning and scraping. The bars have to be painted two times by anti corrosive primers, plus another two layers with final paint, colour selected by the Employer / Employer's Representative. All the joints have to be welded, protected against corrosion and painted.						
	1 dim. 195/255cm	pc	1,00	x	75,00 €	=	**75,00 €**
	17 dim. 95/150cm	pc	3,00	x	65,00 €	=	**195,00 €**
4.06.	Production and installation of meshes manufactured from ropes. Meshes shall be attached on ceilings / walls over the windows in the gym, as a glass protection. Before installation meshes shall be sampled and approved by Employer / Employer's Representative.						
	opening A28 dim. 670/300cm	pc	4,00	x	245,00 €	=	**980,00 €**
	opening A29 dim. 675/300cm	pc	4,00	x	250,00 €	=	**1.000,00 €**
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						**6.549,00 €**
5	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
	RECONSTRUCTION OF SANITARY FACILITIES						

5.01.	Removal of the existing floor tiles from the toilets, including all sub-layers to the existing waterproofing, taking out, loading and transport to a defined location up to 5km distance.						
	Calculation per m2	m2	136,98	x	6,00 €	=	**821,88 €**
5.02.	Removal of the existing ceramic wall tiles with undercoat layer from the walls in sanitary facilities. Taking out, loading and transport to a location up to 5km distance. The unit price comprises possible usage of the scaffold. Calculation as per m2 of the floor area.						
	Calculation per m2.	m2	312,26	x	6,00 €	=	**1.873,56 €**
5.03.	Removal of existing rotten plaster from the walls in sanitary facilities and dressing rooms, removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m2.	m2	99,45	x	5,00 €	=	**497,25 €**
5.04.	Scraping of the old paint from the internal ceilings and walls in the sanitary facilities, removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting. The unit price comprises usage of the scaffold.						
	Calculation per m2	m2	142,77	x	1,00 €	=	**142,77 €**
5.05.	Scraping of old oil based paint from the internal walls in the dressing rooms using gas burner, removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2	m2	111,71	x	2,00 €	=	**223,42 €**
5.06.	Dismantling of the existing joinery- doors of the sanitary facilities, including transportation to the town landfill or their hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery. 70/205 pc 6 75/205 pc 17 90/205 pc 1 95/205 pc 10						
	Calculation per m2	m2	65,30	x	4,00 €	=	**261,20 €**
5.07.	Making of the scrimmed cement screed for a sloping layer in the toilets. The unit price comprises installation of the mesh (1kg/m2) with and overlap 5cm (1,08 m2/m2). Floated coat is used as finishing layer. Screed thickness shall be 4 cm.						
	Calculation per m2	m2	136,98	x	13,00 €	=	**1.780,74 €**

5.08.	Setting up of horizontal waterproofing in the toilets, on different floors , in the following layers (from the bottom up): - bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos.						
	Put the waterproofing at least 10 cm up the wall. Calculation is based on a m2 of the basis (section pulled up the walls is included in the unit price). The unit price comprises all works and materials, in line with the description, including the cleaning and surface preparation for a quality installation of a new waterproofing.						
	Calculation per m2	m2	136,98	x	19,00 €	=	**2.602,62 €**
5.09.	Installation of vertical waterproofing on walls in the shower booths, from floor to the height of shower booths partition walls, h=2,40 m using "Texaspenetrat" or similar coating with equal or better technical characteristics to protect waterproofing. The unit price comprises all the material as described, as well as cleaning and preparation of the base for quality installation of new waterproofing.						
	Calculation per m2	m2	21,76	x	16,00 €	=	**348,16 €**
5.10.	Plastering of internal toilet walls with cement mortar 1:3 in two layers with the previous spraying of cement slurry to prepare the wall for ceramic tiles. The unit price comprises all necessary works, materials with battens, transportation and usage of the scaffolding.						
	Calculation is based on a m2 of the plastered wall, without the openings.	m2	160,08	x	10,00 €	=	**1.600,80 €**
5.11.	Tiling the toilet walls with the class I ceramic tiles, while the size, colour and tone will be selected and sample approved by the Employer / Employer's Representative. Line the tiles in layer of adhesive, placing them "joint to joint" manner by pointing the joints using pointing plaster. Ceramics will be placed up to the ceiling height, h=3,50 m- ground floor and up to the height of 2,86 m-first floor. Coating of the jambs and niches is included in the item unit price and it won't be calculated separately.						
	Calculation per m2	m2	616,48	x	25,00 €	=	**15.412,00 €**



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5.12.	Floor tiling in the toilets and other premises with the class I anti-slip tiles. The size, colour and tone will be selected and sample approved by the Employer / Employer's Representative. Line the tiles in the waterproof adhesive layer in "joint to joint" manner, by using pointing plaster. In the toilets, where there is a grate in the floor, sloping toward the grate is at least 1% (regulate the sloping with the cement screed thickness).						
	Calculation per m2	m2	136,98	x	26,00 €	=	**3.561,48 €**
5.13.	Polishing and painting of the ceilings in sanitary facilities and dressing rooms. The Employer / Employer's Representative will select the tone of semi dispersed distemper. This item includes scraping, gypsum plastering, neutralization, impregnating, pre-painting, and correction with the toned dispersive filler or pointing plaster. Final painting shall be done in double layer. The unit price comprises all material, work and necessary scaffold.						
	Calculation per m2	m2	142,77	x	5,50 €	=	**785,24 €**
5.14.	Production and installation of internal single leaf PVC compact door. The unit price comprises everything from the description: purchase of materials, manufacturing, transport and installation of fittings and blind frame. Measures shall be taken on site. Calculation is based on a piece of the installed joinery.						
	70/205	pc	6,00	x	226,00 €	=	**1.356,00 €**
	75/205	pc	17,00	x	233,00 €	=	**3.961,00 €**
	90/205	pc	1,00	x	248,00 €	=	**248,00 €**
	95/205	pc	10,00	x	254,00 €	=	**2.540,00 €**
	PAINTING OF WALLS AND CEILINGS						
5.15.	Striping off the decayed plaster from the walls and ceilings, with detritus removal, loading and transporting to the city landfill, within 5 km range. This item also includes use of façade scaffold. Calculation per m (2, 5% of total area).						
	Calculation per m2	m2	333,66	x	3,00 €	=	**1.000,98 €**
5.16.	Scraping of old oil based paint from the internal walls in corridors in the school, using gas burner, removal and loading of the debris onto a truck, and its transportation to a landfill up to 5 km distance. This item includes all required pre-works for new painting and using of the scaffolding.						
	Calculation per m2	m2	954,63	x	2,00 €	=	**1.909,26 €**

5.17.	Plastering parts of existing walls and ceilings and treatment of damaged surfaces (5 % of total area) with cement-lime plaster 1:2:6, previously treating the walls with cement milk. Rough first layer and the second one has to be floated, with the use of scaffold. Plastered surfaces have to be smooth with no breaks and bumps, while edges have to be sharp and straight.						
	Calculation per m2	m2	333,66	x	9,00 €	=	**3.002,94 €**
5.18.	Scraping and skimming existing walls and ceilings on the ground floor with emulsion putty. All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Inspect and flatten with putty minor damages and cracks. All the surfaces must be finely glassed, then flattened with putty for the second time, using required scaffold.						
	Calculation per m2.						
	- lobby, corridors						
	ground floor						
	walls	m2	580,60	x	3,30 €	=	**1.915,98 €**
	ceilings	m2	407,40	x	3,30 €	=	**1.344,42 €**
	upper floor						
	walls	m2	457,96	x	3,30 €	=	**1.511,27 €**
	ceilings	m2	305,01	x	3,30 €	=	**1.006,53 €**
	- classrooms and the other rooms						
	ground floor						
	walls	m2	1.451,19	x	3,30 €	=	**4.788,93 €**
	ceilings	m2	897,27	x	3,30 €	=	**2.960,99 €**
	upper floor						
	walls	m2	1.152,10	x	3,30 €	=	**3.801,93 €**
5.19.	Purchase of material and treatment of walls with double layer of oil based paint up to the height of 1,5 m. Colour will be selected by the Employer / Employer's Representative.						
	Calculation per m2.						
	- lobby, corridors						
	Ground floor	m2	435,44	x	5,50 €	=	**2.394,92 €**
	upper floor	m2	422,85	x	5,50 €	=	**2.325,68 €**
	- gym	m2	175,68	x	5,50 €	=	**966,24 €**
	- classrooms						
	Ground floor	m2	594,84	x	5,50 €	=	**3.271,62 €**
	upper floor	m2	719,34	x	5,50 €	=	**3.956,37 €**
5.20.	Treatment of interior walls in the area higher than 1,5 m and ceilings on the ground and the upper floor with double layer of semi-dispersed paint, in colour selected by the Employer / Employer's Representative. The unit price includes usage of scaffold.						
	Calculation per m2.						
	- lobby, corridors						
	walls	m2	1.038,65	x	2,20 €	=	**2.285,03 €**
	ceilings	m2	712,41	x	2,20 €	=	**1.567,30 €**
	- classrooms and other rooms						
	walls	m2	2.603,29	x	2,20 €	=	**5.727,24 €**
	ceilings	m2	897,27	x	2,20 €	=	**1.973,99 €**

	CONSTRUCTION OF CANOPY						
5.21.	Construction of canopy at the side entrance in the main school building but being used as the entrance to the Kindergarten. The canopy shall be constructed used rectangular metal profiles 40/60/3mm, 120cm length and height and support of 40cm, with mounting of purlings made of same profiles. The structure shall be anchored into existing concrete structure using "Hilty" screws m12 and required anchored plates, completely as it is shown on detailed drawing. The structure shall be protected by steel primers and then painted by "Metal ruster" in colour selected by Employer / Employer's Representative's. The unit price comprises complete works, structure and joining bits and pieces. Quantity of metal structure is approximate.						
	Calculation per kg	kg	47,60	x	4,00 €	=	**190,40 €**
5.22.	Covering of canopy with painted Al trapezoid sheets Al.Tr.40/230/0,7mm, with flashings along the walls and flashing of eaves with metal sheet of 33cm developed width together with all needed sealing materials. the price comprises complete works and materials.						
	Calculation per m2	m2	2,95	x	14,00 €	=	**41,30 €**
5.23.	Cleaning of the ground floor and the upper floor from debris and left material. Transportation of debris to a landfill. Cleaning of all windows and floors.						
	Calculation per m2	m2	2.560,82	x	1,25 €	=	**3.201,03 €**
5.24.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers and metal handrails of the staircases in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculated as per lump sum.	lump sum	1,00	x	850,00 €	=	**850,00 €**
5.25.	Painting of the external metal stairs and fence (stair treads, stair landings, poles and fence), on the connection part, next to the dressing rooms of the gym, using "Metal-rust" tone will be selected by the Employer / Employer's Representative. First, peel of old paint and corrosion and do the anti rust paint. The unit price comprises all materials and work with the use of necessary scaffold.						
	Calculation per m2	m2	76,17	x	9,00 €	=	**685,53 €**
	OTHER WORKS						

5.26.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative. Trees shall be planted on min 5 m distance and min 4 m distance from the buildings and 3m high. Dig a pit for planting throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of peat enriched fertilizer with 3 kg per tree. Having completed the planting of the seedlings trees shall be well watered.						
	Calculation per piece	pc	10,00	x	130,00 €	=	**1.300,00 €**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**91.995,99 €**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
6	LIST OF SPARE PARTS						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3,00	x	1,65 €	=	**4,95 €**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1,00	x	3,00 €	=	**3,00 €**
6.03.	Purchase and delivery mounted door rubber stopper.						
	Calculated as per piece	pc	2,00	x	1,65 €	=	**3,30 €**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2,00	x	15,00 €	=	**30,00 €**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high.						
	Calculated as per piece	pc	5,00	x	29,00 €	=	**145,00 €**
6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high.						
	Calculated as per piece	pc	5,00	x	25,20 €	=	**126,00 €**
6.07.	Purchase and delivery of spare amount of ceramic tiles I class. Calculated as per m².						
	wall	m^2	1,00	x	15,00 €	=	**15,00 €**
	floor	m^2	1,00	x	15,00 €	=	**15,00 €**
	TOTAL FOR SPARE PARTS						**342,25 €**

	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing hand over document.						
	SUMMARY OF COSTS						
SCHOOL AND GYM							
1	**THERMAL INSULATION OF FACADE WALLS**						131.444,09 €
2	**THERMAL INSULATION AND WATERPROOFING OF THE ROOF**						121.546,73 €
3	**REPLACEMENT OF FAÇADE JOINERY**						118.430,99 €
4	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						6.549,00 €
5	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						91.995,99 €
6	**SPARE PARTS**						342,25 €
	TOTAL price, VAT EXCLUDED						**470.309,05 €**
	VAT (19 %):						**89.358,72 €**
	TOTAL price, VAT INCLUDED						**559.667,76 €**



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GROUP A5.1.2 **BILL OF QUANTITIES** ***of thermal-technical (heating) services for energy efficiency improvement in Primary School "Branko Bozovic" in Podgorica***	***Investor:***	**Ministry of Economy of Montenegro, Energy Efficiency Sector**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Sub-Consultant:	**KOPRING PMC, Podgorica**
	School:	**Primary School "Branko Bozovic" in Podgorica**
	Doc. origin:	**Final Heating Design**
	Date:	**17 October 2013**

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: Siemens or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 10 m^3/h						
	Connector DN40						
		pc	1	x	1.220,00 €	=	1.220,00 €
2	Purchase, supply and installation of electronic flow gauge for light fuel oil.						
	Manufacturer: Aqua metro or equivalent						
	Type: VZO 4 RE						
	Nominal flow 25 l/h						
	Minimum flow 0.5 l/h						
		pc	2	x	440,00 €	=	880,00 €
3	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: Siemens or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	4.300,00 €	=	4.300,00 €
4	Software development and staff training.						
		pc	1	x	120,00 €	=	120,00 €
	TOTAL A - ENERGY MANAGEMENT						**6.520,00 €**
B - NEW HEATING SYSTEM							
B.I	**Dismantling of existing equipment and preliminary works**						

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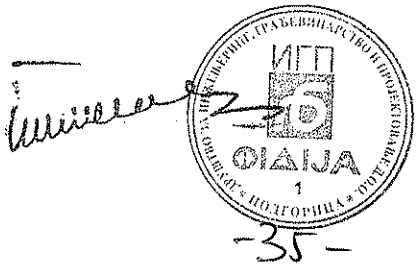
1	Dismantling of existing equipment in the boiler room (2 oil fired boilers, capacity of 290 kW, with burners, boiler pumps and funnel flues, expansion vessels, circulating pumps, valves, back-flow preventers, Y-strainers, air-release vessels, regulating/balancing valves, mixing valves, non-insulated pipes and other fittings). The item includes removal and transportation of the equipment to a suitable location.						
	Calculated lump-sum	pc	1	x	1.800,00 €	=	1.800,00 €
2	Cleaning existing below-grade light distilled oil tank capacity of 20m³, removal of sediments, dumping in set manner, replacement of suction group, maintenance service of safety valves and inspection of entire ancillary installation.						
	Calculated lump-sum	pc	1	x	1.200,00 €	=	1.200,00 €
3	Dismounting of existing air convectors in the gum, total of 8 wall mounted air convectors with supporting pipes inside the gym, as well as existing system for ventilation, which consists of uninsulated duct made of galvanized steel sheet metal length 25m with four grilles for air distribution, mounted at 7.5 m above the floor directly beneath the roof.						
	Calculated lump-sum	pc	1	x	600,00 €	=	600,00 €
4	Dismounting of all the radiators (total of 130 pieces, compact aluminium, steel panel and steel cast radiators) .						
	Calculated lump-sum	pc	1	x	960,00 €	=	960,00 €
5	Dismantling of heating branch for feeding expanded part of the school, set of pipes DN40, manifold branch 65 m. After dismantling of the branch, damages in the wall where brackets were dismounted need to be mended, as well as dismounting of set of pipes 20 m long where pipes of bigger diameter will be fitted.						
	Calculated lump-sum	pc	1	x	180,00 €	=	180,00 €
6	Flushing of the entire heating system in the school with the gym. Flushing steel panel radiators, total 20 pieces, width 60 to 122 cm, and flushing steel cast radiators, total of 21 piece with 14 to 20 ribs, axial height 60 cm. radiators are flushed to remove deposits settled over time.						
	Calculated lump-sum	pc	1	x	420,00 €	=	420,00 €

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7	Cleaning the surface of dismounted cast steel radiators, total 187 ribs, dimensions 600/160/60 mm, total external surface 60 m². After cleaning, radiators need to be painted with base paint and double layer of designated lacquer. Dismounted radiators will re remounted, and if required, resized to fit new dimensions.						
		m²	60	x	54,00 €	=	3.240,00 €
8	Reconstruction of floors and walls in boiler room, construction of two concrete bases for new boilers, dimensions 145x85x10 cm. Removal of existing damaged ceramic tiles and installation of new in total area of 60 m². Mending of openings in walls where installations are pulled through which will be removed.						
	Calculated lump-sum	pc	1	x	2.250,00 €	=	2.250,00 €
	Total B.I - Dismantling of existing equipment and preliminary works						**10.650,00 €**
B.II	**Boiler room equipment and fittings**						
1	Purchase, delivery and installation of compact three-pass steel boiler with cylindrical combustion chamber, for economic drive with slide water temperature in the boiler, for combusting light distilled oil type EL for heating systems with feed temperature (max. operating temperature) up to 110°C, with Therm-Control for operating without additional function for increasing return temperature, i.e. protection for the cold end of the boiler, of following properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Vitoplex 300 TX3A						
	Nominal heat capacity 180kW						
	Efficiency 96%						
	Permiss. operating pressure 4 bar						
	Flue outlet 200 mm						
	Dimensions:						
	length 2110 mm (with burner) width 825mm height 1350 mm						
	Weight with insulation 600 kg						
	Boiler water capacity 290 lit						
	Boiler body fully insulated with stiff insulation thickness 100 mm.						
	Scope of delivery: boiler with doors, cleaning aperture, virburator, counter-flanges with bolts and nuts, thermal insulation, inspection port for combustion chamber, virburator extraction tool.						

	Vitotronic 100 digital control - type GC1B is used for operating two-stage or modulating burners.						
	Oil filter with two manifolds MS 500 Si.						
	Boiler to be delivered in complete with two-stage burner Vitoflame 100. Burner to be ready-made set to nominal capacity of the						
	Vitotronic 300 contains: heating system on/off switch, test button, electronic maximal temperature limiter, temperature controller and safety temperature limiter, operating status and fault indicator, Optolink laptop connection, boiler water temperature button, domestic hot water temperature button, temperature regimes, pump shunt protection and switching onto economy mode. with water temperature sensor in boiler.						
	Boiler protective functions: Therm-Control, without additional function for protection of the cold end of the boiler, with illuminated push-buttons, simplified starting via sockets, flexible sanitary water control (alternative control of the system with water storage with three-way control valve), integrated diagnose system and switching to summer economy operating mode.						
		set	2	x	9.960,00 €	=	19.920,00 €
2	Purchase, delivery and installation of: cascade control unit Vitotronic 300-K (type MW1B) or equivalent, for cascade control of the system comprised of two to four boilers according to outdoor temperature, with two heating circuits with mixers and preparation of hot sanitary water, for system with two-stage or modulating burner, with display, illuminated push buttons, simplified starting through socket function, flexible DHW temperature control (alternatively, control of the system with water storage with three-way control valve), with digital built-in timer for daily and weekly programmes, integrated diagnose system, switching to, summer, economy, mode and fuel consumption						
	Automatic control includes: start switch, test service switch, external temperature sensor, electronic maximal temperature limitator and safety temperature limitator, operating mode and fault indicator, Optolink laptop switch, selector pushbuttons, option of setting water temperature in boiler, sanitary water temperature, temperature modes, pump shunt protection, switching to economic mode.						
		set	1	x	1.625,00 €	=	1.625,00 €

3	Purchase, delivery and installation of: console for cascade control unit mounting on the boiler room wall in the proximity of the boilers.						
		pc	1	x	33,00 €	=	33,00 €
4	Purchase, delivery and installation of: LON communication module is electronic printed circuit board for installation in Vitotronic 100 (type GC1) for data exchange with other heating circuit control units Vitotronic. LON external cable for data exchange between control units with socket connection RJ45, 7 m long.						
		pc	2	x	288,00 €	=	576,00 €
5	Purchase, delivery and installation of Vitoset membrane safety valve Type MS 1 1/4 or equivalent, with activation pressure of 3 bar. For closed heating installations thermal capacity up to 350 kW. Brass casing. Connection: G 1 1/4, Outlet: G 1 1/2						
		pc	2	x	210,00 €	=	420,00 €
6	Purchase, delivery and installation of throttle valve PN16 DN80 with motor with additional fitting of butterfly valve VKF 41, DN 40 bis DN 150.						
		pc	2	x	710,00 €	=	1.420,00 €
7	Purchase, delivery and installation of system temperature sensor (NTC 10 kOhm) for metering temperature on pipe, with connection pipe (5,8 m long) and plug.						
		pc	1	x	90,00 €	=	90,00 €
8	Purchase, delivery and installation of Vissmann Vitotrol 200A or equivalent, for remote control unit for heating circuits: - for setting daily temperature and heating program - with push button for party function and energy saving function - with LC display for indication of outdoor and room temperatures and operating states - with temperature sensor in room for activation via room temperature (only heating circuit with mixer).						
		pc	1	x	119,00 €	=	119,00 €



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9	Purchase, delivery and installation of self-supporting chimney system SCHIEDEL ICS 25 or equivalent, made of twin stainless steel wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature resistant material between sheet metals – Superwool. ICS chimney system includes all required elements: inspection port and boiler, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals.						
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS is made of stainless steel wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus.						
	All chimney elements are industrially produced in every detail as set out in technical documents for particular building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø200mm, total height 10.5 m						
	Furnace flue ICS25 Ø200 mm, developed length 2.2 and 1.8mm						
		set	2	x	1.820,00 €	=	3.640,00 €
10	Purchase, delivery and installation of the duplex circulation pump with electronic frequency controller used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, with following properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna 1 D 40-120 F						
	Flow: 17.6 m^3/h						
	Thrust: 4.5 m						
	Type of connection: Flanged DN40						
	Power supply: V=1~230V						
	Maximum current: I=0,19 - 2.1A						
	Transferred power: P=17 - 476W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
		pc	1	x	1.595,00 €	=	1.595,00 €

11	Purchase, delivery and installation of three-stage circulation pump for air convector heating, with following properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: UPS 40-50 F 250						
	Flow: 3.6 m^3/h						
	Thrust: 2.8 m						
	Type of connection: threaded 1 1/2"						
	Power supply: V=1x230V~						
	Maximum current: I=0,46A						
	Transferred power: P=75/100/105W						
	Pumps are delivered and installed together with joining and sealing material.						
		pc	1	x	430,00 €	=	430,00 €
12	Purchase, delivery and installation of compact water softener. Compact casing contains ion-exchange resin, automatically regenerated once its capacity is spent, with following properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Aquaset 500						
	Max. flow: 1,5 m^3/h						
	Amount of resin: 18 l						
	Softening capacity (for 18°dH) 3880 l						
	Salt consumption per regeneration: 3 kg						
	Operating pressure: 1,4 – 8 bar						
	Operating temperature: 4-40 °C						
	Connections 1"						
	Power supply 220V/50Hz						
	Dimensions						
	l: 432 mm, w: 324mm, h: 1060 mm						
	Unit is delivered with protective pre-filter which consists of casing with 25 microns protective mesh.	pc	1	x	1.715,00 €	=	1.715,00 €
13	Purchase, delivery and installation of membrane expansion vessel. Maximal permitted pressure is 6 bars, pre-set pressure is 3.5 bars, maximal permitted temperature is 120 °C.						
	Manufacturer: "Pneumatex", Switzerland or equivalent						
	Type: Statico SU 400.6						
	Volume: 400 lit						
	Dimensions:						
	diameter 620mm, height 1532mm, weight 62kg, connection 3/4"						
		pc	1	x	1.325,00 €	=	1.325,00 €
14	Purchase, delivery and installation of angle valve to be mounted in front of expansion vessel, with following properties:						
	Rated outlet: DN32						
	Operating pressure 4 bars						
	Operating temperature: -10°C do +220°C						

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	Overpressure calibration: 10% of set pressure						
		pc	1	x	455,00 €	=	455,00 €
15	Purchase, delivery and fitting of feeder and receiver pipes for radiator and air convector heating circuits following dimensions:						
	Diameter 219,1x4,5 mm						
	Feeder length 1200 mm Return pipe length 1100mm						
	Connections: DN50 x 1pc DN80 x 2pc R3/4" x 2pc R1/2" x 2pc						
		pc	2	x	540,00 €	=	1.080,00 €
16	Purchase, delivery and installation of three-way mixing valve, Viessmann Mixer 3 or equivalent, for constant control of systems with hot and cold water, for one way mixing for heating circuits, in the direction of feeder. Weldable. Feed temperature 120°C. Permitted operating overpressure 6 bar.						
	DN 65 PN6; Kvs=63.0						
		pc	1	x	338,00 €	=	338,00 €
	Electric drive for mixer Viessman for continuous control with typical curve selector, for wiring in the building, for flanged mixer, dimensions DN65 to DN100. * Voltage: 230V AC * Control: impulse * Torque: 3Nm						
		pc	1	x	472,00 €	=	472,00 €
17	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN80 PN6						
		pc	6	x	120,00 €	=	720,00 €
	DN65 PN6						
		pc	4	x	98,00 €	=	392,00 €
18	Purchase, delivery and installation of threaded ball valves, connection size:						
	DN50 PN6						
		pc	4	x	28,00 €	=	112,00 €
	DN25 PN6						
		pc	5	x	11,00 €	=	55,00 €
19	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets PN6, with following dimensions of connections:						
	DN80 PN6						
		pc	1	x	121,00 €	=	121,00 €

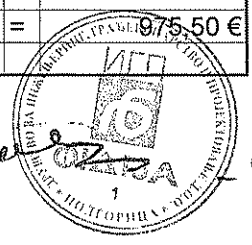
20	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets, with following dimensions of connections:						
	DN80 PN6						
		pc	1	x	165,00 €	=	165,00 €
21	Purchase, delivery and installation of threaded backflow preventer, connection size:						
	DN50 PN6						
		pc	1	x	28,00 €	=	28,00 €
	DN25 PN6						
		pc	1	x	10,00 €	=	10,00 €
22	Purchase, delivery and fitting of threaded Y-strainer, following dimensions of connections:						
	DN50 PN6						
		pc	1	x	54,00 €	=	54,00 €
23	Purchase, delivery and fitting of fixed facade aluminium weather louver, Hidria AZR-3 or equivalent, size 500x300mm, to be fitted in the boiler room doors (to allow undisturbed air flow for fuel combustion in the boiler).						
		pc	2	x	50,00 €	=	100,00 €
24	Purchase, delivery and installation of water gauge at fresh water feeder from the water mains into the softener, with flow control scale and number disk for total flow registration, connection dimensions 1".						
		pc	1	x	144,00 €	=	144,00 €
25	Purchase, delivery and installation of glass thermometer in brass casing and sleeve for fitting into the pipeline, metering range 0-120°C.						
		pc	5	x	40,00 €	=	200,00 €
26	Purchase, delivery and installation of pressure gauge complete with manometer flow-through valve, metering range 0-6 bars.						
		pc	6	x	12,00 €	=	72,00 €
27	Purchase, delivery and installation of automatic valve for water fill in the system, with block valve and ball backflow valve filter and manometer with following characteristics:						
	Connection dimensions 1"						
	Control range 0.3 – 4 bar						
	Maximal flow at inlet 16bar						
	Maximal temperature at inlet 50°C						
		pc	1	x	96,00 €	=	96,00 €

28	Purchase, delivery and assemblage of air-release vessels with overflow pipe and valve DN 15, made of black steel pipe, DN150 length 300 mm.						
		pc	6	x	30,00 €	=	180,00 €
29	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	5	x	12,00 €	=	60,00 €
30	Purchase and installation of PP-R water pipes for connecting equipment for chemical water treatment, for operating pressure of 10 bars with all required fittings. Pipes need to be fixed to walls with double pipe clips at every 1.5 to 2.0 m. Pipes on branching need to be insulated with "plamafleks" or equivalent material, to prevent condensation. Pipes are welded with butt welded joint. Pipe diameter is rated diameter of DN25.						
		m	10	x	6,00 €	=	60,00 €
31	Purchase and delivery of hose DN 20, with unions at ends, 6 m length, for filling and discharging the installation.						
		pc	1	x	18,00 €	=	18,00 €
32	Purchase, delivery and installation of: Pipe temperature sensor * Metering range : -50... +130°C * Metering element: NTC thermistor * threaded connecting: R 1/2" * Nipple length: 200 mm.						
		pc	4	x	90,00 €	=	360,00 €
33	Purchase of material and production of insulation for pipes, feeders and receivers and fitting in the boiler room using rock wool, thickness 50 mm in AL coating thickness 0.5 mm, complete with fitting material. Fire resistance flammability class A1 in line with SIST EN 13501-1 and JUS U.J1.050. Calculated as per m2 of insulation measured on the exterior of the pipe. The item includes fitting of thermal insulation on pipes in front of the gym that pass through unheated space, as well as sturdy waterproof covering of this pipeline.						
		m^2	36	x	48,00 €	=	1.728,00 €
	Total B.II - Boiler room equipment and fittings						**39.928,00 €**
B.III	**Installation of new heat emitters and reconstruction of pipe network**						

1	Purchase, delivery and installation of the hot water air convectors, to be mounted beneath the ceiling facing downwards, with following properties:						
	Manufacturer: "Hidria" Slovenia or equivalent						
	Mark: "UniKal" 250-2 WM						
	Thermal power at t=10°C inlet air and no, of runs 1350 o/min: 18.2kW						
	Heating medium: hot water 80-60 °C						
	Total air Flow: 3100 m^3/h						
	Dimensions: 640x705x515mm						
	Electricity power: 0.69 A						
	Electrical connection: 230V, 50 Hz						
	air convector weight with mixing box and filter: : 29+21+14 kg						
	Hot water connection : 1"						
	The item includes basic filter 60% class EU2, mixing box for fresh and used air with ratio setting, as well as connection duct made of galvanized steel sheet metal thickness 0.5 mm from the roof and connecting to the convector, duct size 400x400mm length 1m.						
		pc	4	x	1.010,00 €	=	4.040,00 €
2	Purchase, delivery and installation of flow controller - damper for fitting on fresh air intake from the ventilation turret to air convector, "Hidria" Slovenia RŽ 400x400mm or equivalent.						
		pc	4	x	85,00 €	=	340,00 €
3	Purchase, delivery and installation of on/off electric actuator for closing control jealousies with a switch "Belimo Joventa" Italia B6 J6 or equivalent. The item includes cables for connecting the actuator to the switch, 150m total length.						
		pc	4	x	105,00 €	=	420,00 €
4	Purchase, delivery and installation of monophase transformer five stage controller of number of revolutions for power of up to 2A, voltage 220V, 50Hz, Hidria Slovenia RMT2 or equivalent.						
		pc	4	x	144,00 €	=	576,00 €
5	Purchase, delivery and installation of room thermostat for switching the air convector fan on/off, together with relay, "Hidria" Slovenia RAA30 or equivalent.						
		pc	4	x	54,00 €	=	216,00 €
6	Purchase, delivery and installation of ON/OFF anti-frost thermostat, voltage 240V, load breaking current 2A, temperature control range -5 to 15 °C						
		pc	4	x	48,00 €	=	192,00 €

7	Purchase, delivery and installation of cables for feeding and connecting the air convector to control equipment and connecting to existing outlets for current convectors, 3x1.5mm² - 200m, 5x1.5mm² - 10m. Cable to be laid in OG hard PVC tube.						
		set	1	x	840,00 €	=	840,00 €
8	Purchase, delivery and installation of overpressure light aluminium facade jealousies "Hidria" Slovenia ANŽ-3 500x400mm or equivalent, for releasing surplus air from the gym.						
		pc	2	x	70,00 €	=	140,00 €
9	Purchase, delivery and installation of fixed façade aluminium jealousies, dimensions 400x400mm, for installation at the entrance into the duct towards air convectors, Hidria Slovenia AZR-3 400x400 or equivalent.						
		pc	2	x	57,00 €	=	114,00 €
10	Purchase, delivery and installation of inclined control valves in brass cone, dimensions and properties:						
	DN25, with drainage 1/4" Kvs=10,4						
		pc	4	x	51,00 €	=	204,00 €
11	Purchase, delivery and installation of threaded block-ball valves, in brass cone, dimensions 1" (DN25)						
		pc	8	x	15,00 €	=	120,00 €
12	Purchase, delivery and installation of bracket tray holders and bolts for mounting air convectors to the gym wall.						
		pc	4	x	12,00 €	=	48,00 €
13	Making opening in the wall for fresh air supply to hot water air convectors, size 40x40cm,and openings for transfer grill 50x40cm.						
		pc	6	x	30,00 €	=	180,00 €
14	Purchase, delivery and installation of cast ribbed radiators, painted with base colour and double layer of designated lacquer for radiators, following properties:						
	Manufacturer: Termik Zrenjanin or equivalent						
	Mark: 680/4						
	No. of channels: four-channeled rib						
	Height: 680mm						
	Rib width: 160mm						
	Axis separation: 600mm						
	Rib length: 60mm						
	Heating surface: 0,313m²						
	Water capacity: 1.36 liters						
	Rib weight: 7.05kg						
	Thermal power per rib at 90/70°C: 157W						

		pc	1200	x	18,00 €	=	21.600,00 €
15	Purchase, delivery and installation of brackets for heat emitters, complete, the item includes installation of new and existing radiators.						
		set	110	x	5,00 €	=	550,00 €
16	Purchase, delivery and installation of radiator cap, size 5/4"						
		pc	130	x	2,50 €	=	325,00 €
17	Purchase, delivery and installation of elements for reduction of radiator outlet diameter from 5/4" to 1/2".						
		pc	225	x	1,80 €	=	405,00 €
18	Purchase, delivery and installation of: manual deaeration for installation in radiator shutter that is released with special tool, outlet size 1/2", maximum operating temperature 100°C, maximum operating pressure 10bar, maximum gases release pressure 6bar, EPDM rubber for tightness.						
		pc	45	x	1,80 €	=	81,00 €
19	Purchase of material and installation of piping (for connecting boiler room equipment, production of new pipes for supplying air convectors in the gym and adjusting of the pipe network to the new heating system) made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, the item includes pipe painting, following dimensions:						
	Ø88.9x3.2						
		m	25	x	19,00 €	=	475,00 €
	Ø76.1x2.9						
		m	16	x	14,00 €	=	224,00 €
	Ø60.3x2.9						
		m	20	x	12,00 €	=	240,00 €
	Ø42,4x2,6						
		m	50	x	9,00 €	=	450,00 €
	Ø33.7x2.6						
		m	70	x	6,00 €	=	420,00 €
	Ø21.3x2.0						
		m	60	x	5,00 €	=	300,00 €
20	Joining, tightening material and brackets, elbows, branches and such are calculated as 50% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 50% of the previous item		0,5	x	1.951,00 €	=	975,50 €



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21	Fitting of part of piping in the gym made of steel seamless pipes dimensions DN40 dismounted from the branch that feeds the expanded part of the school, total length 70 m. The item includes tightening material, knees, welding material, painting, etc.						
	Calculated lump-sum	pc	1	x	1.010,00 €	=	1.010,00 €
	Total for B.III - Installation of new heat emitters and reconstruction of pipe						34.485,50 €
B.IV	**Installation of thermostatic radiator and balancing valves**						
1	Purchase, delivery and installation of thermostatic radiator valve, dimensions1/2" (shape of the valve to be determined on-side during installation). The item includes dismounting of existing valves on radiators that will be reused, total of 30 pc.						
		pc	110	x	12,00 €	=	1.320,00 €
2	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without having to remove protective cap. The thermostat has liquid sensor.						
	Temperature range from 8 °C to 26 °C						
	Closing time 24 min.						
		pc	110	x	19,00 €	=	2.090,00 €
3	Purchase, delivery and installation of radiator sub-valve, connection dimensions 1/2" (shape of the sub-valve to be determined on-site during installation). The item includes dismantling of existing sub-valves on radiators which will be reused, total of 30 pc.						
		pc	110	x	9,00 €	=	990,00 €
4	Purchase, delivery and installation of riser control valves with metering outlets in brass casing, presetting with digital reading (fitted on feeder of the manifold), size and properties:						
	DN50 PN6 - Kvs 33						
		pc	1	x	76,00 €	=	76,00 €
	DN40 PN6 - Kvs 19.2						
		pc	1	x	62,00 €	=	62,00 €
	DN32 PN6 - Kvs 14.2						
		pc	1	x	56,00 €	=	56,00 €

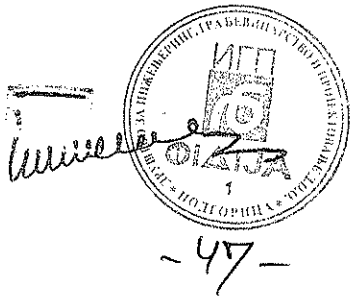
5	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
	DN50, Kvm 24.4						
		pc	1	x	337,00 €	=	337,00 €
	DN40, Kvm 12.8						
		pc	1	x	267,00 €	=	267,00 €
	DN32, Kvm 8.5						
		pc	1	x	215,00 €	=	215,00 €
6	Purchase, delivery and installation of threaded block-ball valves for separating certain manifolds of the pipe system, together with unions for connecting to pipes, connection size:						
	DN50, PN6						
		pc	4	x	26,00 €	=	104,00 €
	DN40, PN6						
		pc	2	x	20,00 €	=	40,00 €
	Total for B.IV - Installation of thermostatic radiator and balancing valves						5.557,00 €
B.V	**Preliminary and finishing works**						
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
	Calculated as per lump sum.	lump-sum	1	x	300,00 €	=	300,00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves and metering and balancing of the pipe network.						
	Calculated as per lump sum.	lump-sum	1	x	240,00 €	=	240,00 €
3	Training of personnel in charge of boiler operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.						
	Calculated as per lump sum.	lump-sum	1	x	240,00 €	=	240,00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.						
	Calculated as per lump sum.	lump-sum	1	x	180,00 €	=	180,00 €

5	Issuing of certificate and cut sheets for the entire fitted material and equipment, fitting framed and glazed scheme of connections at visible place in the boiler room.						
	Calculated as per lump sum.	lump-sum	1	x	180,00 €	=	180,00 €
6	Preparation of "As-built" design.						
	Calculated as per lump sum.	lump-sum	1	x	600,00 €	=	600,00 €
7	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with fire protection standards.						
	Calculated as per lump sum.	lump-sum	1	x	85,00 €	=	85,00 €
8	Repair of damages in walls after dismounting of the equipment at positions where new equipment will not be installed.						
	Calculated as per lump sum.	lump-sum	1	x	600,00 €	=	600,00 €
	Total for B.V - Preliminary and finishing works						2.425,00 €



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SUMMARY OF COSTS:		
A	**ENERGY MANAGEMENT**	6.520,00 €
B	**NEW HEATING SYSTEM**	
B.I	Dismantling of existing equipment and preliminary works	10.650,00 €
B.II	Boiler room equipment and fittings	39.928,00 €
B.III	Installation of new heat emitters and reconstruction of pipe network	34.485,50 €
B.IV	Installation of thermostatic radiator and balancing valves	5.557,00 €
B.V	Preliminary and finishing works	2.425,00 €
	TOTAL PRICE, VAT EXCLUDED	**99.565,50 €**
	VAT (19 %)	**18.917,45 €**
	TOTAL PRICE, VAT INCLUDED	**118.482,95 €**



GROUP A5.1.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Primary School "Branko Bozovic" in Podgorica*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
	School:	P.S. "Branko Bozovic" in Podgorica
	Doc. origin:	Final Electrical Design
	Date:	17 October 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	10,00				
	Works and material:	pc	20	x	15,00	=	300,00 €
1.2.	Delivery and laying of cables for recessed luminaries, to be installed in suspended ceilings, without placing switches, light bulbs and light fixtures. Electric circuit to be derived from the existing junction box in the classroom. The conductors are placed in PVC corrugated pipes of appropriate diameter, above the suspended ceiling. Installation to be performed in accordance with technical description. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	4,00				
	Works and material:	pc	106,00	x	6,00	=	636,00 €
1.3.	Delivery and laying of cables for light fittings above blackboard in classroom, without placing switches, light bulbs and light fixtures. Cables for light fittings in classroom connect to existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be executed in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Control for light fixture above blackboard shall be executed from existing control point. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	6,00				
	Works and material:	pc	27,00	x	9,00	=	243,00 €

1.4.	Delivery and laying of cables for lighting in the gym, without placing switches, light bulbs and light fixtures. Electric circuits to be derived from the existing switchboards of the gym. The conductors to be laid partly in the walls/ceilings and plaster or through rigid PVC pipes in walls. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	15,00				
	Works and material:	pc	15	x	22,00	=	330,00 €
1.5.	Delivery and laying of cables for antipanic lighting circuits, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	20,00				
	Works and material:	pc	28,00	x	29,00	=	812,00 €
1.6.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	548	x	5,00	=	2.740,00 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	113	x	60,00	=	6.780,00 €
1.8.	Delivery and mounting of recessed luminaries for installation in suspended ceilings 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	106	x	60,00	=	6.360,00 €
1.9.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries has to be mounted at 2.7 m height from floor level and 0.9 m from wall with board mounted on it. Works and material to be calculated per unit:	pc	27	x	80,00	=	2.160,00 €

1.10.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	74	x	60,00	=	4.440,00 €
1.11.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	6	x	55,00	=	330,00 €
1.12.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	23	x	55,00	=	1.265,00 €
1.13.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	2	x	55,00	=	110,00 €
1.14.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	33	x	60,00	=	1.980,00 €
1.15.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	15	x	50,00	=	750,00 €
1.16.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit:	pc	15	x	120,00	=	1.800,00 €
1.17.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	17	x	75,0	=	1.275,00 €
1.18.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	8	x	75,0	=	600,00 €

1.19.	Delivery and mounting of wall mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	1	x	75,0	=	75,00 €
1.20.	Delivery and mounting of fluorescent antipanic luminaries 8W, 1h with IP40 protection completely equipped with mounting gear and light source according to project of electrical installation. Works and material to be calculated per unit:	pc	6	x	50,0	=	300,00 €
1.21.	Delivery and replacement of worn-out switches (ordinary and serial) for lighting control in classrooms. Total for supply and installation of:	pc	12	x	6,0	=	72,00 €
	Total for lighting installation						**33.358,00 €**
2	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
2.1.	Delivery and laying of cables in PVC rigid installation pipes in walls and on galvanized cable trays in boiler room, for construction of electrical circuits for consumers in the boiler room. Works and material to be calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	101,00	x	1,90	=	191,90 €
	PP-Y 3x2,5 mm2	m	192,00	x	2,20	=	422,40 €
	PP-Y 5x2,5 mm2	m	51,00	x	3,00	=	153,00 €
	Cable tray PNK 100 mm	m	14,00	x	14,00	=	196,00 €
	Outlet three phase 3P+N+PE 16A/400V IP55	pc	3,00	x	11,00	=	33,00 €
	Outlet 2P+E / 230V/ IP 55	pc	6,00	x	9,00	=	54,00 €
	two way switch IP44 10A	pc	4,00	x	7,00	=	28,00 €
2.2.	Delivery and mounting of prefabricated wall mounted IP 55 switchbox in boiler room, marked as "RT KO", with dimensions to suit and completely equipped with following parts:						
	Disconnector switch INS 1-0, 40A, 3P	pc	1,00				
	Motor protection switch 0.4 - 0.63A	pc	1,00				
	Motor protection switch 1,6 - 2,5A	pc	1,00				
	Automatic switch 3p iC60N 16A 6 kA	pc	3,00				
	Automatic switch 1p iC60N 16A 6 kA	pc	9,00				
	Automatic switch 1p iC60N 10A 6 kA	pc	4,00				
	Cable bushings for cables PG 16	pc	14,00				
	Cable bushings for cables PG 13.5	pc	4,00				
	The price includes all material required for installation of this equipment.						
	Total switch box RT KO	pc	1,00	x	450,00	=	450,00 €
	Total for power supply and electrical installation for boiler room and heating equipment						**1.528,30 €**
3	**POTENTIAL EQUALIZATION INSTALLATION**						

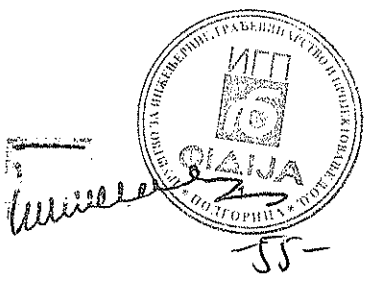
3.1.	Delivery and mounting of deep galvanized tape Fe-Zn 20x3 mm for potential equalization in boiler room, according to the installation layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	23	x	2,8	=	64,40 €
3.2.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	pc	23	x	3,0	=	69,00 €
3.3.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	pc	5	x	3,0	=	15,00 €
3.4.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	35	x	4,0	=	140,00 €
3.5.	Delivery and mounting box for discharge of static electricity. The box to be mounted at facade of the boiler room. To be installed within the box:						
	Disconnector switch 16A,250V SKX 12/21 0-1, Ex ed II CT6 Tep-EX	pc	1,00				
	P/F 25 mm2 with pliers for connection at end of the tendon	m	10,00				
		compl.	1,00	x	280,00	=	280,00 €
3.6.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	55,00	x	4,00	=	220,00 €
	Total potential equalization installation						**788,40 €**
4	**LIGHTING AND GROUNDING INSTALLATION**						
4.1.	Dismantling of existing lightning protection system.	lump sum	1	x	200,0	=	200,00 €
4.2.	Delivery and installation of lightning conductors and lightning system of round conductor which is made of Al with diameter 10mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	185,00	x	3,00	=	555,00 €
4.3.	Delivery and mounting of lightning conductor bracket. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	20,00	x	3,50	=	70,00 €

	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	90,00	x	3,00	=	270,00 €
	Lightning conductor holder for wall installation:	pc	70,00	x	3,00	=	210,00 €
	Holders for vertical mechanical protection of lightning conductors:	pc	20,00	x	2,80	=	56,00 €
4.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	16,00	x	3,50	=	56,00 €
	linking clamp strip-wire	pc	10,00	x	3,00	=	30,00 €
	linking clamp wire-wire	pc	45,00	x	3,00	=	135,00 €
	groove clamp	pc	80,00	x	3,50	=	280,00 €
4.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	10,00	x	14,00	=	140,00 €
4.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	5,00	x	6,00	=	30,00 €
4.7.	Delivery and mounting of wet-preventing clamp .Works and material to be calculated per unit:	pc	33,00	x	2,60	=	85,80 €
4.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	pc	1,00	x	70,00	=	70,00 €
4.9.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measure unit.	pc	30,00	x	5,00	=	150,00 €
4.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 from existing output of foundation grounding system to the new position of lightning down conductors and to the metal gutters which are not earthed. The price includes excavation and backfilling of ditch, dimensions of 0.4x0.8m.The tape shall be placed through the ditch from the nearest output of foundation grounding system. Works and material to be calculated per measure unit.	m	160,00	x	8,00	=	1.280,00 €
	Total for lighting and grounding installation						**3.617,80 €**
5	**SPARE PARTS**						
5.1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	4,0	=	8,00 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	4,5	=	9,00 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	4,2	=	8,40 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	4,0	=	8,00 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	6,0	=	12,00 €
	Total for spare parts:						**45,40 €**

6	**TESTING**						
6.1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	300,00 €	=	300,00 €
6.2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	450,00 €	=	450,00 €
	Total for testing:						**750,00 €**
7	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**650,00 €**	=	**650,00 €**

SUMMARY OF COSTS:

1	LIGHTING INSTALLATION	33.358,00 €
2	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	1.528,30 €
3	POTENTIAL EQUALIZATION INSTALLATION	788,40 €
4	LIGHTING AND GROUNDING INSTALLATION	3.617,80 €
5	SPARE PARTS	45,40 €
6	TESTING	750,00 €
7	PREPARATION OF MAINTENANCE DESIGN	650,00 €
	TOTAL PRICE, VAT EXCLUDED	40.737,90 €
	VAT (19%)	7.740,20 €
	TOTAL PRICE, VAT INCLUDED	**48.478,10 €**

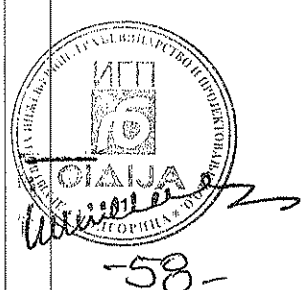


GROUP A5.1.4 **ESTIMATED BILL OF QUANTITIES** **on Indoor Water Supply and Sewerage Services**	*Client:*	**Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Local designer:	**KOPRING PMC, Podgorica**
	Facility:	**Primary school "Branko Božović", Podgorica**
	Documentation:	**Final Design of Interior Water Supply and Sewerage Services**
	Date:	**September, 2013**

	GENERAL TERMS
1	Works shall be performed in accordance with valid technical regulations, rules and obligatory standards complied with the construction of this type of buildings.
2	Installed material shall be in accordance with prescribed standards, i.e. with quality certificate.
3	Safety measures concerning buildings, works, equipment, investment materials, labor, passers-by, traffic and surrounding buildings, shall be undertaken in a timely manner.
4	Technical documentation regarding construction approval (Building Permit), shall be complied with.
5	All working costs, material, transport, facility cleaning upon works completion, taxes, profit and all other not mentioned expenditures, shall be incalculated in accordance with item unit price.
6	The following Table of quantities is only assumed on the basis of the Final Architectural Design. Since the exact

Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1.01.	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	pc	9,00	x	8,00 €	=	**72,00 €**
1.02.	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	pc	13,00	x	10,00 €	=	**130,00 €**
1.03.	Removal of existing toilet bowels with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	pc	2,00	x	14,00 €	=	**28,00 €**
1.04.	Removal of existing shower faucets, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	pc	4,00	x	12,00 €	=	**48,00 €**
1.05.	Removal of existing faucets above concrete lavatories, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						

	Calculation as per piece	pc	8,00	x	10,00 €	=	**80,00 €**
1.06.	Removal of existing showers, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	pc	4,00	x	15,00 €	=	**60,00 €**
1.07.	Removal of existing urinals, with siphon trap and with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation as per piece	pc	7,00	x	15,00 €	=	**105,00 €**
1.08.	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per m'	m'	103,60	x	3,00 €	=	**310,80 €**
1.09.	Removal of existing sewage installations, with belonging elements. Concrete floor smashing, excavation, removal, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per m'.	m'	76,70	x	5,00 €	=	**383,50 €**
1.10.	Removal of existing water heating cylinders, and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per piece	pc	2,00	x	25,00 €	=	**50,00 €**
	TOTAL REMOVAL WORKS						**1.267,30 €**
II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
2.01.	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. Installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dø20mm(DN15)	m	39,70	x	14,00 €	=	**555,80 €**
	dø25mm(DN20)	m	38,00	x	16,00 €	=	**608,00 €**



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2.02.	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dØ20mm(DN15)	pc	30,00	x	11,00 €	=	**330,00 €**
	dØ25mm(DN20)	pc	12,00	x	14,00 €	=	**168,00 €**
2.03.	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	pc	22,00	x	12,00 €	=	**264,00 €**
2.04.	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	77,70	x	2,00 €	=	**155,40 €**
2.05.	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works shall be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	77,70	x	1,00 €	=	**77,70 €**
2.06.	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations. The unit price shall be given as 15 % of the summarized unit price of previous items: 1-5, within this type of works.	lump sum	1,00	x	350,00 €	=	**350,00 €**
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**2.508,90 €**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
3.01.	Purchase and installation of PP sewage pipes for interior installations, together with all required sealing equipment for proper network operation. Pipe connecting shall performed by rubbers. Upon finished pipes assembling to rinse pipelines and performed distribution lines has to be waterproof tested. All chase cuttings and hole perforations within walls and structures, as well as bringing the walls back into original state shall be incalculated within the unit price. Calculation as per m1 of installed pipes.						

	DN50mm	m	54,50	x	16,00 €	=	**872,00 €**
	DN75mm	m	15,50	x	18,00 €	=	**279,00 €**
	DN110mm	m	32,90	x	20,00 €	=	**658,00 €**
3.02.	Purchase and installation of required supports and fixing saddles with rubbers for sewage pipelines: DN 50, DN 75, DN 110 mm. The pipes shall be anchored to the walls and interfloor structure.						
	Calculation as per m' of anchored pipe	m	50,50	x	4,00 €	=	**202,00 €**
3.03.	Purchase and installation of fittings for interior sewage installations, made of hard PP. All the fittings shall sealed by rubbers of corresponding diameter.						
	Calculation as per piece.						
	"Y" branch Ø 75/ 50	pc	6,00	x	4,00 €	=	**24,00 €**
	"Y" branch Ø50 / 50	pc	19,00	x	4,00 €	=	**76,00 €**
	"Y" branch Ø110 / 50	pc	4,00	x	4,00 €	=	**16,00 €**
	"Y" branch Ø110 / 110	pc	6,00	x	4,00 €	=	**24,00 €**
	"T" branch Ø 50/50	pc	1,00	x	4,00 €	=	**4,00 €**
	"T" branch Ø 110 / 110	pc	8,00	x	4,00 €	=	**32,00 €**
	Siphon arch trap 50	pc	17,00	x	4,00 €	=	**68,00 €**
	Elbow 45° / 110	pc	17,00	x	4,00 €	=	**68,00 €**
	Elbow 45° / 50	pc	61,00	x	4,00 €	=	**244,00 €**
	Elbow 90° /50	pc	39,00	x	4,00 €	=	**156,00 €**
	PP reducer 110/50	pc	3,00	x	4,00 €	=	**12,00 €**
	PP revision DN75	pc	4,00	x	4,00 €	=	**16,00 €**
	PP revision DN110	pc	7,00	x	4,00 €	=	**28,00 €**
	arch trap for squat toilette Ø 110	pc	13,00	x	4,00 €	=	**52,00 €**
	Double "T" branch Ø 110 / 110	pc	2,00	x	4,00 €	=	**8,00 €**
	Double "Y" branch Ø50 / 50	pc	4,00	x	4,00 €	=	**16,00 €**
3.04.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or similar. Calculation as per piece						
	Floor drain, type: "HL310NPr"	pc	18,00	x	24,00 €	=	**432,00 €**
3.05.	Purchase and installation of ventilation head HL900N or similar one. Calculation as per piece.						
	ventilation head HL900N	pc	8,00	x	33,00 €	=	**264,00 €**
3.06.	Excavation and ditch backfilling 40 cm wide, where underfloor installations shall be laid down, by manually compacted sand and making of concrete slab of 20cm thickness.						
	Calculation per m'	m	31,70	x	15,00 €	=	**475,50 €**
3.07.	Various unpredictable works as a result of revealing of the existing installations and adapting the ways of joining process of new installations to the existing ones. The unit price shall be given as 15 % of the summarized unit price of previous items: 1-5, within this type of works.	lump sum	1,00	x	550,00 €	=	**550,00 €**
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**4.576,50 €**
IV	**SANITARY EQUIPMENT**						

4.01.	Purchase and installation of toilet bowl completely made of ceramics, type "simplon", with plastic low mounted water tank, connection pipes, sealing and gaskets, including all other bits and pieces necessary for proper installation of the toilet bowl. Calculation as per piece.						
	Type: "Simplon"	pc	2,00	x	165,00 €	=	**330,00 €**
4.02.	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network should be connected by siphon trap of Ø100. Water tank should be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette should be ordered as per designer's decision. Calculation as per pieces.						
	Squat toilette	pc	13,00	x	155,00 €	=	**2.015,00 €**
4.03.	Purchase and mounting of shower bath, 70x70cm. The shower bath shall be mounted and connected with outflow siphon trap of 5/4", with plug and chain, including chrome plated hot and cool water tap with rise up shower. The shower bath colour shall be purchased as per Employer / Employer's Representative choice. Calculation as per shower bath piece.						
	dimensions 80x80cm	pc	4,00	x	135,00 €	=	**540,00 €**
4.04.	Purchase and mounting of cool water tap over the concrete lavatory, with sealing and gaskets including all other bits and pieces necessary for proper installation.						
	Calculation as per piece	pc	8,00	x	65,00 €	=	**520,00 €**
4.05.	Purchase and delivery of first class ceramic wall toilette urinal. The toilette urinal shall be fixed by means of rubber spacers, suitable wall plugs and brass screws. To install chrome plated stop valve and siphon trap. The siphon trap shall be ordered as per Employer / Employer's Representative decision. Calculation as per piece.						
	toilette urinal	pc	7,00	x	330,00 €	=	**2.310,00 €**
4.06.	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation.						
		pc	10,00	x	155,00 €	=	**1.550,00 €**
4.08.	Purchase and installation of water heater of 80 l capacity with riser pipelines, safety valves and all additional bits and pieces.						
	Calculation as per piece	pc	2,00	x	160,00 €	=	**320,00 €**

	TOTAL SANITARY EQUIPMENT						**7.585,00 €**

SUMMARY OF COSTS

I	REMOVAL WORKS	**1.267,30 €**
II	WATER-SUPPLY INDOOR INSTALLATIONS	**2.508,90 €**
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	**4.576,50 €**
IV	SANITARY EQUIPMENT	**7.585,00 €**
	TOTAL PRICE, VAT EXCLUDED	**15.937,70 €**
	VAT (19 %)	**3.028,16 €**
	TOTAL PRICE, VAT INCLUDED	**18.965,86 €**

GROUP A5.2.1	***Investor:***	**Ministry of Economy of Montenegro, Energy Efficiency Sector**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
BILL OF QUANTITIES	***Consultant:***	**FICHTNER GmbH&Co. KG**
of building and trade works for energy efficiency improvement in "Oktoih" Primary School in Podgorica	***Sub-Consultant:***	**KOPRING PMC, Podgorica**
	School:	**P. S. "Oktoih", Podgorica**
	Doc. origin:	**Final Architectural Design**
	Date:	**September, 2013**

	GENERAL TERMS
1	Works to be conducted according to applicable technical regulations, standards and required standards applicable for construction of such facilities.
2	Use materials with a quality certificate that meet required standards.
3	Apply measures promptly for safety of the facility and works, equipment and investment material, workers, passengers, traffic and surrounding facilities.
4	Obey technical documentation, based on which a building permit was granted.
5	Position unit price includes all expenses for works, materials, transport, cleaning of the facility after construction, tax liabilities, profits and all other non mentioned expenses for the completion of works under documents of the Agreement, technical regulations and applicable average standards in the construction industry.

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
SCHOOL AND GYM							
1	**THERMAL INSULATION OF FACADE WALLS**						
1.01	Dismantling of metal sheet flashings and vertical gutters. Flashings have different developed widths and they are made from galvanized, coloured steel metal sheet with double interlock system, d=0,68mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price comprises all works, materials and debris transportation to the town landfill. Calculation is based on a m1 of dismantled flashing, gutters, and their supporters.						
	-horizontal rainwater channels, developed width up to 66cm.						
	Calculation per m1.	m1	375,50	x	1,00 €	=	**375,50 €**
	- vertical gutters, dim.15x15cm, developed width up to 66cm, with dismantling of water cisterns.						
	Calculation per m1.	m1	171,45	x	1,00 €	=	**171,45 €**
	-flashing of the small parapet wall on the RC cantilever slab and in the roof parapets of the dressing rooms, developed width up to 34-40cm.						
	Calculation per m1.	m1	170,50	x	1,00 €	=	**170,50 €**
	-flashing window sills developed width 41-50cm.						
	Calculation per m1.	m1	533,75	x	1,00 €	=	**533,75 €**

	-flashing gable wall of developed width of 41-50cm.						
	Calculation per m1.	m1	104,95	x	1,00 €	=	**104,95 €**
1.02.	Repair of damages in the parapet walls d=20cm and more, caused by dismantling of the joinery. Surfaces shall be treated with cement mortar 1:3, to prepare the item for installing new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheet d=0,7 mm and PVC sills. The unit price comprises all works and materials.						
	Calculation per m1.	m1	533,75	x	5,00 €	=	**2.668,75 €**
1.03.	Repair of jamb damages d=20 cm, caused by dismantling of the joinery. Surfaces shall be treated with lime cement mortar 1:2:6, previously sprinkled with low density cement mortar, to prepare the item for installation of new PVC joinery with blind frame, plastic-laminated galvanized steel metal sheets d=0,7 mm and PVC sills. The unit price comprises all works and materials.						
	Calculation per m1.	m1	1.347,68	x	5,00 €	=	**6.738,40 €**
1.04.	The existing external gypsum plaster (on 70-80% of facade walls) has to be removed completely before the installation of the ETICS facades, as it is dissolving from the substructure. After removal, surface of the wall has to be flat and prepared for installation of the facade. The unit price shall include usage of the scaffold.						
	Calculated per m2	m2	2.120,43	x	4,00 €	=	**8.481,72 €**
1.05.	Dismantling and re-installation of lighting, and other facade devices and equipment. Dismantled units shall be registered and given to the Employer / Employer's Representative to put them in a storage. After completion of works on a new facade, these units have to be reinstalled on the facility.						
	Calculation per m1.	pc	21,00	x	35,00 €	=	**735,00 €**
1.06.	Production and installation of flashings of the small parapet wall on the RC cantilever slab and of the roof parapets of the dressing rooms and gable walls made of ready made plastic-laminated galvanized steel metal sheets=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width 60cm. The item includes surface preparation and complete binding in line with the regulations. Undertake the entire procedure in compliance with the design and sample selected by the Employer / Employer's Representative.						
	Calculation per m1.	m1	293,52	x	14,00 €	=	**4.109,28 €**

1.07.	Production and installation of the parapet sills, made of ready made plastic-laminated galvanized steel metal sheets=0.7mm, colour will be selected by the Employer / Employer's Representative. Developed width up to 50cm. The item includes surface preparation and complete binding following the regulations. Undertake the entire procedure in compliance with the design and sample selected by the Employer / Employer's Representative.						
	Calculation per m1.	m1	533,75	x	13,00 €	=	**6.938,75 €**
1.08.	Production and installation of the horizontal and vertical gutters of 150/150mm square section, made of ready painted galvanized steel metal sheets=0.7mm, colour will be selected by the Employer / Employer's Representative. Gutters shall be installed with all required anchors and flanges with the necessary binding and joining material.						
	Calculation per m1.	m1	546,95	x	16,00 €	=	**8.751,20 €**
1.09.	Purchase and installation of profiled standard flexible, vertical and horizontal expansion joints at wall-to-wall contact, for dilatation width of 5 cm, fully in line with technology of the producer.						
	Calculation per m1	m1	51,00	x	11,00 €	=	**561,00 €**
1.10.	Setting up "Demit" thermal facade. External thermal insulation of the facade reinforced concrete (hereinafter RC) and brick walls will be conducted with expanded EPS polystyrene, having heat transfer coefficient of λmax = 0,037 W/mK, thickness 8 cm, produced by the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade walls at the level of the ground floor (all parapets in the ground floor, pillars and parts of the full wall) will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=8cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK.						
	Thermal boards with B1 flammability class (DIN 4102 B1 highly flammable, non-combustible and self-extinguishing) to be used. Install panels and vertical breaks of 50 cm width along the entire facade, with maximum horizontal distance between the breaks of 20m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.						

	Use EPS/XPS, thickness d=3cm to treat jambs on the external side of the facade opening. Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels. Surface of the plates is protected with reinforced mortar, which is composed of the following elements:						
	***first layer** – refined mortar based on cement binder, mineral aggregate and admixtures to improve elasticity and water repellence. Surface for this layer of mortar will be flat and smooth. Any unevenness at joints of the installed polystyrene boards will be filled with polyurethane foam.						
	Reinforcing mesh with adequate overlapping and extra protection at the facade openings and corners is placed in a fresh layer of this mortar. In case additional mechanical anchoring is required, impact bolt through the reinforcing mesh shall be used 24 hours after applying this layer.						
	* **reinforcing mesh** * **second layer of mortar**, apply same procedure as with the first layer. This mortar is laid to well- dried first layer and polished with a screed afterwards. * **contact coating** made of the emulsion of synthetic resins and water-glass used for impregnation of the dried reinforced mortar.						
	*top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This top layer will be made in grainy and smooth structure, painted in colour defined by the Employer / Employer's Representative, while the entire procedure will be conducted according to the design details.						
	Before setting up the thermal plates, generally the following works shall be conducted: * All works on the flat roof, including sheet metal works * Replacement of façade joinery * Placing the entire envisaged installation in the facade.						
	*Covering and protection of all non-treated surfaces – glass, stone… *Control and testing of the existing facility surface, including: Use impregnation- basic coating at the most critical points of the facility. When the basic coating dries out, set up the EPS cube of 5x5x5 cm by using polystyrene adhesive. Once the adhesive completely settles, minimum 3 days after the working conditions are adequate, try to separate the cube manually.						
	If in the process of separating expanded polystyrene only the adhesive separates and not parts of the basis - the basis is sufficiently strong, solid and stable.						

	If in the process of separating expanded polystyrene, the adhesive remains, or if part of the adhesive remains on the wall and part on the polystyrene - it means that the adhesive is adequate and strong.						
	If in the process of separating expanded polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough, and shall not withstand new layer of thermal insulation.						
	Use the reinforcing mesh or angle profiles for the window corners and jambs. Facade ends along the plinth must have U-profile strip, adjusted to the thickness of thermal-plate.						
	Before setting the plates, thoroughly clean the facade surface from dust, greasy deposits and mortar. At heights over 8 meters, plates need additional anchoring with appropriate bolts.						
	During the works on the facade, surface, mortar and adhesive, temperature of air must not drop below +5°C or be above +25°C. Mortar shall not be applied in the event of heavy wind, rain or fog.						
	The unit price includes the purchase, installation of entire material, preparatory works, surface preparation, installation of thermal façade according to described layers and installation of the required scaffolding. Calculation is based on m2 of the installed facade.						
	NOTE: Treatment of jambs is included in the unit price, it won't be calculated separately. The planned facade systems shall be in line with the appropriate EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which confirms that the thermal insulation system is in compliance with the parameters laid down by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safety of use, noise protection, energy efficiency and heat retention. NOTE: The existing ventilation openings on gym lateral facades have to be closed, before the installation of the ETICS.						
	EPS	m2	1.306,65	x	23,00 €	=	**30.052,95 €**
	XPS	m2	1.455,76	x	28,00 €	=	**40.761,28 €**
	Hard Pressed mineral wool	m2	132,43	x	32,00 €	=	**4.237,76 €**
1.11.	Setting up "Demit" - thermal facade on the ceiling of facade bay and part of ceiling of connecting part between main school building and gym hall locker rooms. Use expanded polystyrene, d= 10 cm. The process is identical to item 1.13.						
	Calculation per m2.	m2	35,64	x	24,00 €	=	**855,36 €**

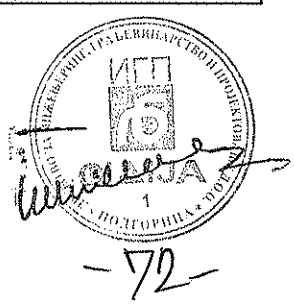
1.12.	Wall plinth lining up to 60cm height by extruded polystyrene boards XPS d=5cm, including bonding of joints with mesh and adhesive. Upon fastening of boards to fix the angular profiles with mesh.						
	For finishing treatment use ready mixed marble based mortar in the part of the plinth which is not already covered with stone, created on grain ("Kulie") as splash guard (as indicated on the drawings) of 2,2mm grains. The kind and colour to be selected by the Employer / Employer's Representative. The finishing treatment comprises complete materials and works.						
	Calculation per m2.	m2	98,70	x	27,00 €	=	**2.664,90 €**
1.13	Lining of concrete elements for shading of screen walls by expended polystyrene boards EPS d=2cm. The lining shall be done along perimeters of all concrete elements, including fastening of joints with mesh and adhesive. Upon fastening of boards to fix the angular profiles with mesh.						
	For finishing treatment use mosaic plaster "Kulir plast" of 2,2mm grains. The kind and colour to be selected by the Employer / Employer's Representative. The finishing treatment comprises complete materials and works.						
	Calculation per m2.	m2	437,75	x	21,00 €	=	**9.192,75 €**
1.14	Treating the facade surfaces with decorative ready-mixed lime-cement based render, "Bavalit" type or similar with the equivalent or better technical characteristics, where the installation of thermal plates has not been planned (RC- sun shields, roof's cantilever slabs, cornices - rainwater channels, ceiling of the main entrance canopy, stack). Type and colour will be selected by Employer / Employer's Representative. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve a better joining. Apply one layer with a painting brush, and if the surface absorbs it quickly, apply it twice. To prepare the surface, apply a layer of adhesive with a mesh. Apply other layers following the same procedure as in the previous item:						
	***Contact coating** made of the emulsion of synthetic resins and water-glass used for impregnation of the set reinforced mortar.						
	*Top coating is made of mineral binders, water-repellent admixtures, means for improving elasticity and resistance to mildew and algae. This layer shall be made in fine grained and smooth structure, painted in colour determined by the Employer / Employer's Representative, fully in line with the Design details.						

	The openings shall be protected with PVC foil. The unit price comprises the purchase, installation of complete material, preparatory works, surface preparation and installation of the scaffolding.						
	Calculation per m2.	m2	287,39	x	9,00 €	=	**2.586,51 €**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**130.691,76 €**
2	**THERMAL INSULATION AND WATERPROOFING OF THE ROOF**						
2.01.	Removal of existing thermal insulation and waterproofing from the flat impassable roof until reaching concrete floor in following layers (data from existing designs): - waterproofing 4+2+1 1,5cm - cement glazing 1:3 2cm - sloping layer 4-20cm - roofing paper - "Heraklith" boards 3cm - roofing paper The unit price to include all the work and debris dumping at the town landfill up to 5 km distance.						
	Calculation per m2.	m2	251,15	x	9,00 €	=	**2.260,35 €**
2.02.	Removal of the existing roof cover from cantilever boards from canopy over main entrance and locker rooms entrances made of waterproofing insulation completely up to the concrete structure. The unit price comprises all work and transportation of debris to a town landfill.						
	Calculation per m2.	m2	96,54	x	9,00 €	=	**868,86 €**
2.03.	Removal of the existing roof cover from the main school building made of painted trapezoid sheet metal, cement mortar of 2-3cm and roof battens completely up to inclined concrete structure. The unit price comprises the complete works and transportation of detritus to the local waist depot up to 5km distance. Calculation as per m2 measured along inclined area.						
	Calculation per m2.	m2	1.794,70	x	4,00 €	=	**7.178,80 €**
2.04.	Installation of horizontal waterproofing and thermal insulation on the impassable flat roofs. The following layers are applied onto prepared base:						
	a) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil, b) Vapour barrier of the post bituminized aluminium foil lined with glass fibre fleece, c) Thermal insulation made of extruded polystyrene boards XPS d = 10 cm with heat transfer coefficient of λmax = 0.033 W / mK (on top of already placed foil),						
	d) Layer used for separating from PVC foil, e) Sloping layer made of light-weight concrete d=5-16cm, inclined by 1%, f) Layer for equalizing the pressure, made of vapour-permeable and waterproofed foil,						

	g) Waterproofing made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is placed freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing.						
	h) Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel.						
	Calculation is based on a m2 of the roof basis. The unit price comprises all required material following the description from a) to h), including the making of a required cove and installation of the edge perforated metal sheet drips with vertical seam (gravel holder).						
	Calculation per m2.	m2	251,15	x	54,00 €	=	**13.562,10 €**
2.05.	Waterproofing of the canopies over the main school entrance, dressing rooms entrances and cantilever slab, on a sloped layer, using lean concrete d= 3-8 cm, with cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is put freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Waterproofing must be put up the walls at minimum 15 cm height. Pay special attention to the connections between horizontal and vertical waterproofing.						
	Calculation per m2.	m2	96,54	x	18,00 €	=	**1.737,72 €**
2.06.	Protect waterproofing on eaves which is not protected with gravel, with "Krovoplast" or similar coating with equal or better technical characteristics. The unit price comprises complete work and material, following the description.						
	Calculation per m2.	m2	96,54	x	6,00 €	=	**579,24 €**
2.07.	Construction of suspended ceiling in the classrooms on the first floor and in the psychologist's office on the ground floor at 3,10m height, using gypsum boards "Knauf" d=1,25cm on the metal structure made of zinc-plated steel profiles.						

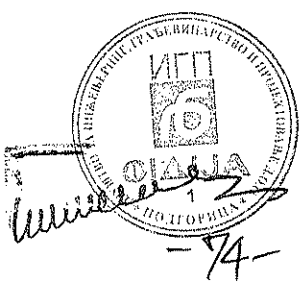
	After lining the gypsum boards, to all joints shall be fixed with fixing strips. All areas shall be skimmed two times after required preparations. For finishing treatment to use semi-dispersed paint, double painted using a colour as per the Employer / Employer's Representative's choice including use of proper scaffolds.						
	Calculation per m2.	m2	828,16	x	19,00 €	=	**15.735,04 €**
2.08.	Mounting of rectangular profiles on gym hall roof over existing roof structure. The mounted rectangular profiles have 60/40/3mm dimensions and fixed at 1,00m distance. Calculation as per m2 measured along inclined roof area. The unit price comprises the complete works and materials.						
	Calculation per m2 of inclined area.	m2	470,15	x	9,00 €	=	**4.231,35 €**
2.09.	Covering the double inclined roof construction of the gym using painted trapezoid Al metal sheet: 40/230/0,7 mm. After covering is done, valley and roof ridge flashings are foreseen as well as the flashing of the roof parapet walls. This item includes use of all necessary bonding material. The unit price comprises all work and material.						
	Calculation per m2 of inclined area.	m2	470,15	x	19,00 €	=	**8.932,85 €**
2.10.	Covering of roof with polyurethane composite panels. The thickness of panels shall be d=80mm, heat conductivity coefficient λmax = 0,025 W/mK, with standard modular width of 1000mm, fastened to the rectangular profiles 60/40/3mm, at 60-150cm distance over existing reinforced concrete inclined slab. The upper metal sheet is of unique trapezoid shape d=0,5mm, whilst the bottom is standard one SNVs d=0,5mm.						
	After mounting of composite panels to perform flashing of all wall valleys, gable edges and gutters using all required bits and pieces (stainless steel screws, washers, and EPDM gaskets). The unit price comprises the complete works and materials, as per above description.						
	Calculation per m2.	m2	1.794,70	x	43,00 €	=	**77.172,10 €**
	NOTE: The alternative technology for a flat roof cover can be offered as a deviation.						
	TOTAL FOR THERMAL INSULATION AND WATERPROOFING OF THE ROOF						**132.258,41 €**
3	**REPLACEMENT OF FACADE JOINERY**						

3.01.	Dismantling of the existing joinery, all its fittings and mechanisms, including its transportation to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery.						
	195/254	pc	7,00	x	15,26	=	**106,82 €**
	80/80	pc	12,00	x	5,44	=	**65,25 €**
	195/140	pc	2,00	x	11,39	=	**22,77 €**
	95/95	pc	3,00	x	6,46	=	**19,37 €**
	85/75	pc	12,00	x	5,44	=	**65,25 €**
	95/200	pc	13,00	x	10,03	=	**130,34 €**
	195/100	pc	33,00	x	10,03	=	**330,86 €**
	195/200	pc	8,00	x	13,42	=	**107,40 €**
	195/150	pc	72,00	x	11,73	=	**844,22 €**
	195/80	pc	36,00	x	9,35	=	**336,47 €**
	205/50	pc	4,00	x	8,67	=	**34,67 €**
	85/85	pc	2,00	x	5,78	=	**11,56 €**
	195/180	pc	3,00	x	12,74	=	**38,23 €**
	205/160	pc	2,00	x	12,41	=	**24,81 €**
	195/180	pc	1,00	x	12,74	=	**12,74 €**
	195/170	pc	10,00	x	12,41	=	**124,05 €**
	95/150	pc	13,00	x	8,33	=	**108,25 €**
	195/80	pc	53,00	x	9,35	=	**495,35 €**
	160/220+50	pc	4,00	x	9,18	=	**36,71 €**
	60/270	pc	3,00	x	11,22	=	**33,65 €**
	127/270	pc	1,00	x	13,49	=	**13,49 €**
	187/220+50	pc	1,00	x	15,53	=	**15,53 €**
	277/270	pc	1,00	x	18,59	=	**18,59 €**
	570/40	pc	1,00	x	20,73	=	**20,73 €**
	165/320	pc	1,00	x	16,48	=	**16,48 €**
	315/340	pc	2,00	x	22,26	=	**44,52 €**
	305/300	pc	3,00	x	20,56	=	**61,69 €**
	570/300	pc	1,00	x	29,57	=	**29,57 €**
	535/300	pc	2,00	x	28,38	=	**56,76 €**
	305/300	pc	1,00	x	20,56	=	**20,56 €**
	575/300	pc	1,00	x	29,74	=	**29,74 €**
	195/260	pc	1,00	x	15,46	=	**15,46 €**
	195/70	pc	1,00	x	9,01	=	**9,01 €**
	160/205	pc	1,00	x	12,41	=	**12,41 €**
	100/205	pc	1,00	x	10,37	=	**10,37 €**
	195/210+50	pc	1,00	x	15,46	=	**15,46 €**
	345/205	pc	1,00	x	18,69	=	**18,69 €**
	345/80	pc	1,00	x	14,44	=	**14,44 €**
	345/250	pc	1,00	x	20,22	=	**20,22 €**
	165/180	pc	1,00	x	11,73	=	**11,73 €**
	295/300	pc	1,00	x	20,22	=	**20,22 €**
	305/250	pc	2,00	x	18,86	=	**37,72 €**
	535/250	pc	1,00	x	26,68	=	**26,68 €**
	575/250	pc	1,00	x	28,04	=	**28,04 €**
	310/113-220	pc	1,00	x	12,97	=	**12,97 €**
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3.02.	Dismantling of the existing windows on the gym, made of ironmongery, glazed with double profiled glass. This item includes transportation of removed joinery to the town landfill or its hand-over to the Employer / Employer's Representative (according to the future agreement) for storing away. Calculation is done per m2 of dismantled joinery.						
	670/300 pc 4 675/300 pc 4						
	Calculation per m2	m2	161,40	x	4,25	=	**685,68 €**
3.03.	Production and installation of the facade PVC joinery. The unit price comprises everything from description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the PVC sill of required width. Measures must be taken on site. Calculation is based per piece of the installed joinery, by the following description: -production and installation, -6-chamber PVC profiles, -heat transfer coefficient of U = 1.5 W / m² K, -minimal permeability factor of solar energy (solar factor) of glass surfaces g≤65%, -double low-emission glass 4 +16 +4 mm, -fittings, required set for hanging and closing, - type of the opening, side hung windows using mechanism with hinges or bottom hung with ventus mechanism, in line with drawings - joinery schemes, - include PVC sill of required within the item, - PVC profile colour - white.						
	1. 195/254	pc	7,00	x	479,10	=	**3.353,69 €**
	2. 80/80	pc	12,00	x	112,44	=	**1.349,22 €**
	3 & 3'. 195/140	pc	2,00	x	257,90	=	**515,79 €**
	4. 95/95	pc	3,00	x	133,33	=	**399,98 €**
	5. 85/75	pc	12,00	x	140,82	=	**1.689,88 €**
	6. 95/200	pc	13,00	x	204,78	=	**2.662,11 €**
	7. 195/100	pc	33,00	x	268,10	=	**8.847,39 €**
	8. 195/200	pc	8,00	x	457,45	=	**3.659,58 €**
	9 & 9'. 195/150	pc	72,00	x	342,83	=	**24.683,96 €**
	10 &10'. 195/80	pc	36,00	x	158,34	=	**5.700,12 €**
	12. 85/85	pc	2,00	x	119,07	=	**238,14 €**
	13 & 13'. 195/180	pc	3,00	x	376,87	=	**1.130,61 €**
	14 &14'. 205/160	pc	2,00	x	300,27	=	**600,54 €**
	15. 195/180	pc	1,00	x	370,62	=	**370,62 €**
	16 & 16'. 195/170	pc	10,00	x	363,83	=	**3.638,34 €**
	17. 95/150	pc	13,00	x	167,91	=	**2.182,87 €**

3.04.	Production and installation of the facade aluminium joinery. The unit price comprises everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Measures shall be taken on site. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - plastic coated aluminium construction system with thermal break, - heat transfer coefficient of Umax = 2.8 W/m²K - aluminium jealousies if necessary, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - AL sill of required width shall be envisaged within the item, - profile colour - natural aluminium.							
	A1.	160/220+50	pc	2,00	x	574,55	=	**1.149,10 €**
	A2.	60/270	pc	3,00	x	185,76	=	**557,27 €**
	A3.	127/270	pc	1,00	x	280,34	=	**280,34 €**
	A4.	187/220+50	pc	1,00	x	577,26	=	**577,26 €**
	A5.	277/270	pc	1,00	x	563,43	=	**563,43 €**
	A7.	165/250	pc	1,00	x	438,57	=	**438,57 €**
	A8 & A8'.	215/250	pc	2,00	x	561,78	=	**1.123,55 €**
	A9.	305/250	pc	3,00	x	765,54	=	**2.296,63 €**
	A10.	570/250	pc	1,00	x	1.374,35	=	**1.374,35 €**
	A11.	535/250	pc	2,00	x	1.341,38	=	**2.682,77 €**
	A12.	305/300	pc	1,00	x	776,94	=	**776,94 €**
	A13.	575/250	pc	1,00	x	1.385,33	=	**1.385,33 €**
	A14.	195/260	pc	1,00	x	625,60	=	**625,60 €**
	A15.	195/70	pc	1,00	x	364,98	=	**364,98 €**
	A16.	160/205	pc	1,00	x	502,05	=	**502,05 €**
	A17.	100/205	pc	1,00	x	289,79	=	**289,79 €**
	A18.	195/210+50	pc	1,00	x	663,31	=	**663,31 €**
	A19.	345/140	pc	1,00	x	629,37	=	**629,37 €**
	A20.	345/80	pc	1,00	x	331,83	=	**331,83 €**
	A21.	345/180	pc	1,00	x	735,41	=	**735,41 €**
	A22.	165/180	pc	1,00	x	239,55	=	**239,55 €**
	A23.	295/300	pc	1,00	x	965,87	=	**965,87 €**
	A24.	305/170	pc	2,00	x	522,28	=	**1.044,56 €**
	A25.	535/170	pc	1,00	x	1.187,54	=	**1.187,54 €**
	A26.	575/170	pc	1,00	x	1.188,76	=	**1.188,76 €**
	A27.	310/33-140	pc	1,00	x	349,51	=	**349,51 €**
	A28.	670/300	pc	4,00	x	1.818,50	=	**7.274,01 €**
	A29.	675/300	pc	4,00	x	1.825,85	=	**7.303,40 €**

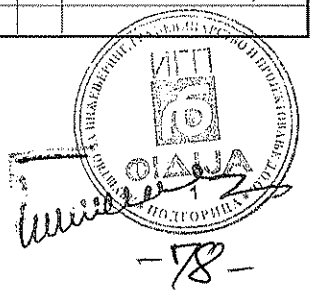


3.05.	Production and installation of the windshield aluminium joinery. The unit price comprises everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - plastic coated aluminium construction system without thermal break, -glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium.						
	A30. 160/220+50	pc	2,00	x	612,59	=	**1.225,19 €**
3.06.	Purchase of materials, processing, manufacture and mounting of Al window jalousie for mechanical and sun protection on two windows of janitor's apartment. Jalousies shall be equipped with mechanical handling and high quality mechanism, hinges and opening fittings as per details and drawings of joinery. This item also involves all required works for its installation (proper mounting, needed wall chases, required plastering and painting, and edge flashings (if necessary). The profiles are in tone selected by Employer / Employer's Representative. Measures to be taken onsite. Calculation per piece of installed jalousie, fully in line with the description. The unit price shall include dismantling of the old jalousies and its transportation to the town landfill.						
	3 195/140	pc	1,00	x	344,63	=	**344,63 €**
	3' 195/140	pc	1,00	x	344,63	=	**344,63 €**
3.07.	Wall-up of the openings on the first floor, after removal of facade joinery. The wall-up shall be performed by gas concrete blocs ("Ytong" or equivalent with similar or better characteristics) d=25cm, of 625/250/200mm size, in thin layer mortar. Connections with the existing walls to be achieved with anchors Ø10 in each raw. The unit price comprises the complete works, materials and scaffold.						
	Calculation per m3	m3	31,40	x	145,00 €	=	**4.553,00 €**
3.08.	Plastering of interior walls made of "Ytong" blocks at the places where openings are walled-up by use of flexible mortar 1:3:9 in two layers with previous spraying by lean cement mortar. The first layer shall be roughly applied, however the second one has to be smoothly floated. The unit price comprises the complete works, materials and scaffold.						
	Calculation per m2.	m2	125,56	x	9,00 €	=	**1.130,04 €**

3.09.	Plastering of facade walls made of "Ytong" blocks at the places where openings are walled-up by use of flexible mortar 1:2:6 in two layers with previous spraying by lean cement mortar. The first layer shall be roughly applied, however the second one has to be smoothly floated. The unit price comprises the complete works, materials and scaffold.						
	Calculation per m2.	m2	125,56	x	10,00 €	=	**1.255,60 €**
	NOTE: Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.						
	NOTE: Depending on the size of the opening, where it is necessary, big windows/doors elements shall have additional reinforcement/stiffening of the profiles.						
	TOTAL FOR REPLACEMENT OF FACADE JOINERY						**110.992,56 €**
4	**NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES**						
4.01.	Construction of a new top layer of 10 cm thick reinforced concrete MB20 over the old pavements around building. The surface of the existing pavement shall be thoroughly cleaned before pouring. The new pavement has to be strained into fields of approx. 1.5m2. Expansion joints shall be filled up with a bituminous joint filler. Areas to be treated shall be determined on the site with the Employer / Employer's Representative. The unit price shall include the construction of storm water grooves, and all ancillary works, materials and formworks.						
	Calculated as per m2.	m2	78,56	x	14,00	=	**1.099,84 €**
4.02.	Supply and installation of smooth wooden boards for covering the expansion joints inside the building, along the walls and ceilings. Boards shall be 2,5cm thick and 15cm width. After installing, boards shall be varnished (process: filling and grinding, primer, grinding, two layers of synthetic resin paint).						
	Calculated as per m.	m	42,75	x	16,00	=	**684,00 €**

4.03	Production and installation of protective bars for skylight above the garage door at the ground floor. The protective bars are made of steel box profiles 60*60mm which form frame, with external dimensions 200*112cm, grill (stretched metal of approximate dimensions of a rhomb cca 85*35mm) as infill. The grille is welded to angle profiles L30*30 and then fitted into the frame so that L profile is visible on the external side. The unit price shall include dismantling of the old protective bars and its transportation to the town landfill. The entire structure is anchored, appropriately protected and painted in some of the standard colors, selected by the Employer / Employer's Representative with previous approval obtained from the building users.						
	Measures to be taken onsite. Calculation per piece of installed joinery, fully in line with the description.						
	195/70	pc	1,00	x	480,00 €	=	**480,00 €**
4.04	Production and installation of meshes manufactured from ropes. Meshes shall be attached on ceilings / walls over the windows in the gym, as a glass protection. Before installation meshes shall be sampled and approved by Employer / Employer's Representative.						
	opening A28 dim. 670/300cm	pc	4,00	x	245,00 €	=	**980,00 €**
	opening A29 dim. 675/300cm	pc	4,00	x	250,00 €	=	**1.000,00 €**
	TOTAL FOR NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES						**4.243,84 €**
5	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**						
	PAINTING OF WALLS AND CEILINGS						
5.01	Scraping and skimming old walls and ceiling on the ground floor and the upper floor with emulsion putty. All surfaces need to be scraped and washed and then smoothen, cleaned and impregnated. Inspect and remedy minor damages and cracks using putty. Flatten with putty and skim with emulsion putty for the first time. All surfaces need to be smoothen, then flatten with putty and skimmed with emulsion putty for the second time. Perform all the works using required scaffold.						
	Calculation per m2.						
	- lobby, corridors						
	ground floor						
	walls	m2	609,58	x	3,30 €	=	**2.011,61 €**
	ceilings	m2	288,85	x	3,30 €	=	**953,21 €**
	upper floor						
	walls	m2	533,60	x	3,30 €	=	**1.760,88 €**

	ceiling in the flat roof and corridor area	m2	323,76	x	3,30 €	=	**1.068,41 €**
	- classrooms and other rooms						
	ground floor						
	walls	m2	1.153,68	x	3,30 €	=	**3.807,14 €**
	ceilings	m2	877,73	x	3,30 €	=	**2.896,51 €**
	upper floor						
	walls	m2	1.200,67	x	3,30 €	=	**3.962,21 €**
	ceilings	m2	80,26	x	3,30 €	=	**264,86 €**
5.02.	Painting internal walls in the areas higher than 1.5m on the ground floor and the upper floor; ceilings on the ground floor and ceilings at the parts of the flat roof with semi-dispersed distemper, by applying two layers of the paint, in colour selected by the Employer / Employer 's Representative, using scaffold.						
	Calculation per m2.						
	- lobby, corridors						
	walls	m2	1.143,18	x	2,20 €	=	**2.515,00 €**
	ceilings	m2	612,46	x	2,20 €	=	**1.347,41 €**
	- classrooms and other rooms						
	walls	m2	2.731,35	x	2,20 €	=	**6.008,97 €**
	ceilings	m2	957,99	x	2,20 €	=	**2.107,58 €**
5.03.	Treatment of interior walls in the area higher than 1,5 m and ceilings on the ground and the upper floor with double layer of semi-dispersed paint, in colour selected by the Employer / Employer's Representative, using a scaffold.						
	Calculation per m2.						
	- lobby, corridors						
	ground floor	m2	458,96	x	2,20 €	=	**1.009,71 €**
	first floor	m2	351,34	x	2,20 €	=	**772,95 €**
	- classrooms						
	ground floor	m2	581,02	x	2,20 €	=	**1.278,24 €**
	first floor	m2	663,57	x	2,20 €	=	**1.459,85 €**
5.04.	Cleaning the ground floor and the upper floor to remove construction waste and its dumping to a construction material landfill at 5 km distance.						
	Calculation per m2.	m2	2.436,67	x	1,25 €	=	**3.045,84 €**
5.05.	Painting of visible pipes, installations in bright child friendly colours (red, blue, yellow, green) in oil based paint in two layers and painting of hydrants, switch boxes and staircase handrails in oil based paint in two layers in colour determined by Employer / Employer's Representative.						
	Calculation as per lump sum.	lump sum	1,00	x	850,00 €	=	**850,00 €**



5.06.	Planting lime (Tilia sp.) tree or some similar species, in accordance with Employer / Employer's Representative. Trees shall be planted on min 5 m distance and min. 4 m distance from the buildings and 3m high. Dig a pit for planting throw out debris and dirt from the pit. Perform the planting by mixture of humus, fertilizer and sand in the ratio 6:3:1. During planting cover 2/3 of the depth of the pit with mentioned mixture and 1/3 with the addition of peat enriched fertilizer with 3 kg per tree. Having completed the planting of the seedlings trees shall be well watered.						
	Calculation per piece.	pc	30,00	x	85,00 €	=	**2.550,00 €**
	TOTAL FOR TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**39.670,38 €**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	LIST OF SPARE PARTS						
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece.	pc	3,00	x	1,65 €	=	**4,95 €**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece.	pc	1,00	x	3,00 €	=	**3,00 €**
6.03.	Purchase and delivery mounted door rubber stopper.						
	Calculated as per piece.	pc	2,00	x	1,65 €	=	**3,30 €**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece.	pc	2,00	x	15,00 €	=	**30,00 €**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high.						
	Calculated as per piece.	pc	5,00	x	29,00 €	=	**145,00 €**
6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high.						
	Calculated as per piece.	pc	5,00	x	25,20 €	=	**126,00 €**
	TOTAL FOR SPARE PARTS						**312,25 €**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing hand over document.						

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SUMMARY OF COSTS		
SCHOOL AND GYM		
1	THERMAL INSULATION OF FACADE WALLS	130.691,76 €
2	THERMAL INSULATION AND WATERPROOFING OF THE ROOF	132.258,41 €
3	REPLACEMENT OF FAÇADE JOINERY	110.992,56 €
4	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	4.243,84 €
5	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	39.670,38 €
6	SPARE PARTS	312,25 €
	TOTAL price, VAT EXCLUDED	**418.169,20 €**
	VAT (19 %):	**79.452,15 €**
	TOTAL price, VAT INCLUDED	**497.621,35 €**



GROUP A5.2.2 **BILL OF QUANTITIES** ***of thermal-technical (heating) services for energy efficiency improvement in Primary School "Oktoih" in Podgorica***	***Investor:***	**Ministry of Economy of Montenegro, Energy Efficiency Sector**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Sub-Consultant:	**KOPRING PMC, Podgorica**
	School:	**P.S. "Oktoih" Podgorica**
	Doc. origin:	**Final Heating Design**
	Date:	**17 October 2013**

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: "Siemens" or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 10 m^3/h						
	Connection size DN40						
		pc	1	x	1.220,00 €	=	1.220,00 €
2	Purchase, supply and installation of electronic flow gauge for light distillated oil .						
	Manufacturer: "Aqua metro" or equivalent						
	Type: "VZO 4 RE"						
	Nominal flow: 25 l/h						
	Minimum flow: 0.5 l/h						
		pc	2	x	440,00 €	=	880,00 €
3	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: "Siemens" or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	4.300,00 €	=	4.300,00 €
4	Software development and staff training.						
		pc	1	x	120,00 €	=	120,00 €
	TOTAL A - ENERGY MANAGEMENT						**6.520,00 €**
B - REPLACEMENT OF BOILERS AND HEATING SYSTEM OPTIMIZATION							

B.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of existing equipment in the boiler room (2 oil-fired boilers capacity 240 kW with burners, boiler pumps and funnel flues, expansion vessels 250l, 2 circulation pumps, 8 valves DN80, 4 valves DN50, 2 back-flow preventers DN80 , 1 Y-strainer DN50, air-release vessels, regulating/balancing valves, mixing valves, non-insulated pipes and other fittings). The item includes removal and transportation of the equipment to a suitable location.						
	Calculated lump-sum	pc	1	x	1.800,00 €	=	1.800,00 €
2	Cleaning of existing below-grade light distilled oil tank capacity of 20m³, removal of sediments, dumping in set manner, replacement of suction group, maintenance service of safety valves and inspection of entire ancillary installation.						
	Calculated lump-sum	pc	1	x	1.200,00 €	=	1.200,00 €
3	Dismounting of existing air convectors in the gym, type "Uniklima", 2 bigger with connection 5/4" and 4 smaller with connection 1". This item also includes dismounting of ventilation system, which consists of insulated ductwork made of galvanized steel sheet metal length 25m with four grilles for air distribution, mounted at 7.5 m above the floor, directly beneath the roof.						
	Calculated lump-sum	pc	1	x	480,00 €	=	480,00 €
4	Flushing of the entire heating system in the school with the gym. Dismounting of all radiators (total of 114 pieces, steel panel radiators length from 400 to 2000 mm height 600mm and length 1000 to 1600 mm height 600mm) and flushing to remove deposits from the radiators, cleaning of air-release vessels, remounting of radiators with installation of new radiator brackets if required.						
	Calculated lump-sum	pc	1	x	4.200,00 €	=	4.200,00 €
5	Fitting of concrete base for installation of new boilers dimensions 130x85x10cm. The item includes removal of existing ceramic tiles off the floor where new boilers are to be installed and laying of new floor coating with ceramic tiles, total floor area of 15m².						
	Calculated lump-sum	pc	1	x	960,00 €	=	960,00 €
	Total for B.II - Dismantling of existing equipment and preliminary works						**8.640,00 €**

B.II	**Boiler room elements and fittings**						
1	Purchase, delivery and installation of compact three-pass steel boiler with cylindrical combustion chamber, for economic drive with slide water temperature in the boiler, for combusting light distilled oil type EL, for heating systems with feed temperature (ultimate temperature) of up to 110°C, with Therm-Control for operating without additional function for increasing return temperature, i.e. protection for the cold end of the boiler, properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Vitoplex 300 TX3A						
	Nominal heat capacity 140kW						
	Efficiency 96%						
	Permiss. operating pressure 4 bar						
	Flue outlet 200 mm						
	Dimensions:						
	length 1910 mm (with burner) width 825mm height 1350 mm						
	Weight with insulation 540 kg						
	Boiler water capacity 250 lit						
	Boiler body fully insulated with stiff insulation thickness 100 mm.						
	Scope of delivery: boiler with doors, cleaning aperture, virburator, counter-flanges with bolts and nuts, thermal insulation, inspection port for combustion chamber, virburator extraction tool.						
	Vitotronic 100 digital control - type GC1B is used for operating two-stage or modulating burners.						
	Boiler is delivered in complete with two-stage burner Vitoflame 100. Burner is ready-made and set to nominal capacity of the boiler.						
	Viessmann Vitotronic 100 digital control containing: On/off control, test-service switch, maximal temperature electronic limitator, temperature controller and safety temperature limitator, "Power-on" and fault display, optolink Communication port for lap-top, push buttons for setting operating mode, temperature setting in boiler, setting domestic hot water temperature, heating programmes, protection from pump shunt and switching to economic mode, with water temperature sensor in the boiler.						

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	Boiler protective functions: Therm-Control, without additional function for protection of the cold end of the boiler, with illuminated push-buttons, simplified starting via sockets, flexible sanitary water control (alternative control of the system with water storage with three-way control valve), integrated diagnose system and switching to summer economy operating mode.						
		set	2	x	9.240,00 €	=	18.480,00 €
2	Purchase, delivery and installation: cascade control unit Vitotronic 300-K (type MW1B) or equivalent, for cascade control of the system comprised of two to four boilers according to outdoor temperature, with two heating circuits with mixers and preparation of hot sanitary water, for system with two-stage or modulating burner, with display, illuminated push buttons, simplified starting through socket function, flexible DHW temperature control (alternatively, control of the system with water storage with three-way control valve), with digital built-in timer for daily and weekly programmes, integrated diagnose system, switching to, summer, economy, mode and fuel consumption indicator.						
	Automatic control includes: start switch, test service switch, external temperature sensor, electronic maximal temperature limitator and safety temperature limitator, operating mode and fault indicator, Optolink laptop switch, selector push buttons, option of setting water temperature in boiler, sanitary water temperature, temperature modes, pump shunt protection, switching to economic mode.						
		set	1	x	1.630,00 €	=	1.630,00 €
3	Purchase, delivery and installation: console for cascade control unit mounting on the boiler room wall in the proximity of the boilers.						
		pc	1	x	34,00 €	=	34,00 €
4	Purchase, delivery and installation: LON communication module is electronic printed circuit board for installation in Vitotronic 100 (type GC1), for data exchange with other heating circuit control units of Vitotronic. LON external cable for data exchange between control units with socket connection RJ45, 7 m long.						
		pc	2	x	288,00 €	=	576,00 €

5	Purchase, delivery and installation of small feeder manifold with safety group (safety valve with 3 bar activation pressure, pressure gauge and automatic air-release valve) and thermal insulation.						
		pc	2	x	180,00 €	=	360,00 €
6	Purchase, delivery and installation of throttle valve PN16 DN65 with motor with additional fitting of butterfly valve VKF 41, DN 40 bis DN 150.						
		pc	2	x	660,00 €	=	1.320,00 €
7	Purchase, delivery and installation of chimney system SCHIEDEL ICS 25 or equivalent, made of twin stainless steel wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature resistant material between sheet metals – Superwool. ICS chimney system includes all required elements: inspection port and boiler, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals.						
	SCHIEDEL chimney system for repair of existing walled chimneys PRIMA PLUS is made of stainless steel wall thickness 0,6 mm. PRIMA PLUS chimney system includes all required elements: condensation vessel, inspection port and boiler connection, basic pipes, dilatation element, anchoring clips, sleeve joint clips, distancers, chimney terminals and insulation MAT Plus.						
	All chimney elements are industrially produced in every detail as set out in technical documents for particular building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø200mm, total height 10.5 m						
	Furnace flue ICS25 Ø200 mm, developed length 4.5mm						
		set	2	x	2.105,00 €	=	4.210,00 €

8	Purchase, delivery and installation of the duplex circulation pump with electronic frequency controller used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna 1 D 40-120 F						
	Flow: 13.6 m^3/h						
	Thrust: 5.5 m						
	Type of connection: Flanged DN40						
	Power supply: V=1~230V						
	Maximum current: I=0,19 - 2.1A						
	Transferred power: P=17 - 476W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
		pc	1	x	1.595,00 €	=	1.595,00 €
9	Purchase, delivery and installation of three-stage circulation pump for air convector heating, with following properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: UPS 40-50 F 250						
	Flow: 3.6 m^3/h						
	Thrust: 2.5 m						
	Type of connection: threaded 1 1/2"						
	Power supply: V=1x230V~						
	Maximum current: I=0,46A						
	Transferred power: P=75/100/105W						
	Pumps are delivered and installed together with joining and sealing material.						
		pc	1	x	430,00 €	=	430,00 €
10	Purchase, delivery and installation of compact water softener. Compact casing contains ion-exchange resin, automatically regenerated once its capacity is spent, with following properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Aquaset 500						
	Max. flow: 1,5 m^3/h						
	Amount of resin: 18 l						
	Softening capacity (for 18°dH) 3880 l						
	Salt consumption per regeneration: 3 kg						
	Operating pressure: 1,4 – 8 bar						
	Operating temperature: 4-40 °C						
	Connections inlet and outlet 1"						
	Power supply 220V/50Hz						
	Dimensions						
	l: 432 mm, w: 324mm, h: 1060 mm						
	Unit is delivered with protective pre-filter which consists of casing with 25 microns protective mesh.	pc	1	x	1.715,00 €	=	1.715,00 €

11	Purchase, delivery and installation of membrane expansion vessel. Maximum permitted pressure is 6 bars, pre-set pressure is 3.5 bars, maximum permitted temperature is 120 °C.						
	Manufacturer: "Pneumatex" Switzerland or equivalent						
	Type: Statico SU 300.6						
	Volume: 300 lit						
	Dimensions:						
	diameter 560mm, height 1408mm, weight 43kg, connection 3/4"						
		pc	1	x	1.135,00 €	=	1.135,00 €
12	Purchase, delivery and installation of angle valve to be mounted in front of expansion vessel, following properties:						
	Rated outlet: DN32						
	Operating pressure 4 bars						
	Operating temperature: -10 °C do +220 °C						
	Overpressure calibration: 10% of set pressure						
		pc	1	x	455,00 €	=	455,00 €
13	Purchase, delivery and fitting of feeder and receiver manifolds for radiator and air convector heating circuits, with following dimensions:						
	Diameter 219,1x4,5 mm						
	Feeder length 1200 mm Return pipe length 1100mm						
	Connections: DN50 x 1pc DN80 x 2pc R3/4" x 2pc R1/2" x 2pc						
		pc	2	x	540,00 €	=	1.080,00 €
14	Purchase, delivery and installation of three-way mixing valve, Viessmann Mixer 3 or equivalent, for constant control of systems with hot and cold water, for one way mixing for heating circuits, in the direction of feeder pipe. Weldable. Feed temperature 120°C. Permitted operating overpressure 6 bar.						
	DN 50 PN6; Kvs=42.0						
		pc	1	x	340,00 €	=	340,00 €
	Electric drive for mixer Viessman for continuous control with typical curve selector, for wiring in the building, for non-flanged mixer. * Voltage: 230V AC * Control: impulse * Torque: 3Nm						
		pc	1	x	474,00 €	=	474,00 €

15	Purchase, delivery and installation of: socket for mixer drive, system socket Rast 5, with 4 poles, 3 pieces. Socket for heating circuit pump, system socket Rast 5, with 3 poles, 3 pieces. Temperature sensor (NTC 10 ohm) for pipe temperature metering, with connection pipe (length 5.8m) and socket.						
		set	1	x	220,00 €	=	220,00 €
16	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN80 PN6						
		pc	6	x	120,00 €	=	720,00 €
	DN65 PN6						
		pc	4	x	99,00 €	=	396,00 €
17	Purchase, delivery and installation of threaded ball valves, connection size:						
	DN40 PN6						
		pc	4	x	24,00 €	=	96,00 €
	DN25 PN6						
		pc	5	x	12,00 €	=	60,00 €
18	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets PN6, with following dimensions of connections:						
	DN80 PN6						
		pc	1	x	125,00 €	=	125,00 €
19	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets, with following dimensions of connections:						
	DN80 PN6						
		pc	1	x	168,00 €	=	168,00 €
20	Purchase, delivery and installation of threaded backflow preventer, connection size:						
	DN50 PN6						
		pc	1	x	29,00 €	=	29,00 €
	DN25 PN6						
		pc	1	x	10,00 €	=	10,00 €
21	Purchase, delivery and fitting of threaded Y-strainer, following dimensions of connections:						
	DN50 PN6						
		pc	1	x	54,00 €	=	54,00 €

22	Purchase, delivery and fitting of fixed facade aluminium weather louver, Hidria AZR-3 or equivalent, size 400x300mm, to be fitted in the boiler room doors (to allow undisturbed air flow for fuel combustion in the boiler).						
		pc	2	x	45,00 €	=	90,00 €
23	Purchase, delivery and installation of water gauge at fresh water feeder from the water mains into the softener, with flow control scale and number disk for total flow registration, connection dimensions 1".						
		pc	1	x	144,00 €	=	144,00 €
24	Purchase, delivery and installation of glass thermometer in brass casing and sleeve for fitting into the pipeline, metering range 0-120°C.						
		pc	5	x	42,00 €	=	210,00 €
25	Purchase, delivery and installation of pressure gauge complete with manometer flow-through valve, metering range 0-6 bars.						
		pc	6	x	11,00 €	=	66,00 €
26	Purchase, delivery and installation of automatic valve for water fill in the system, with block valve and ball backflow valve filter and manometer with following characteristics:						
	Connection dimensions 1"						
	Control range 0.3 – 4 bar						
	Maximal flow at inlet 16bar						
	Maximal temperature at inlet 50°C						
		pc	1	x	96,00 €	=	96,00 €
27	Purchase, delivery and assemblage of air-release vessels with overflow pipe and tap DN 15, made of steel pipe DN150, length 300 mm.						
		pc	4	x	30,00 €	=	120,00 €
28	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	5	x	12,00 €	=	60,00 €



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29	Purchase and installation of PP-R water pipes for connecting equipment for chemical water treatment, for operating pressure of 10 bars with all required fittings. Pipes need to be fixed to walls with double pipe clips at every 1.5 to 2.0 m. Pipes on branching need to be insulated with "plamafleks" to prevent condensation. Pipes are welded with butt welded joint. Pipe diameter is rated diameter of DN25.						
		m	10	x	6,00 €	=	60,00 €
30	Purchase and delivery of hose DN 20 with unions at ends, 6 m length, for filling and discharging the installation.						
		pc	1	x	18,00 €	=	18,00 €
31	Purchase, delivery and installation of: Pipe temperature sensor * Metering range : -50... +130°C * Metering element: NTC thermistor * threaded connecting: R 1/2" * Nipple length: 200 mm.						
		pc	4	x	90,00 €	=	360,00 €
32	Purchase of material and production of insulation for pipes, feeders and receivers and fitting in the boiler room using rock wool, thickness 50 mm in AL coating thickness 0.5 mm, complete with fitting material. Fire resistance flammability class A1 in line with SIST EN 13501-1 and JUS U.J1.050. Calculated as per m2 of insulation measured on the exterior of the pipe. The item includes fitting of insulation on new pipes that go through external space.						
		m^2	29	x	48,00 €	=	1.392,00 €
	Total for B.II - Boiler room elements and fittings						38.328,00 €
B.III	**Installation of new air convectors in the gym and repairs at the heating system**						
1	Purchase, delivery and installation of the hot water air convectors to be mounted on wall, properties:						
	Manufacturer: "Hidria" Slovenia or equivalent						
	Mark: "UniKal" 250-2 W type M						
	Thermal power at t=10°C inlet air and no, of runs 1350 o/min: 18.2kW						
	Heating medium: hot water 80-60 °C						
	Total air Flow: 3100 m^3/h						
	Dimensions: 640x705x515mm						
	Electricity power: 0.69 A						
	Electrical connection: 230V, 50 Hz						

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	Air convector weight with mixing box and filter: : 29+21+14 kg						
	Hot water connection : 1"						
	The item includes basic filter 60% class EU2, mixing box for fresh and used air with ratio setting, auto louver grille, as well as connection duct made of galvanized steel sheet metal thickness 0.5 mm from the roof and connecting to the air convector, duct size 400x400mm length 1m.						
		pc	4	x	1.011,00 €	=	4.044,00 €
2	Purchase, delivery and installation of flow controller - damper for fitting on fresh air intake from the ventilation turret to air convector "Hidria" Slovenia RŽ3 400x400mm or equivalent.						
		pc	4	x	85,00 €	=	340,00 €
3	Purchase, delivery and installation of on/off electric actuator for closing control jealousies with a switch "Belimo Joventa" Italy B6 J6 or equivalent. The item includes cables for connecting the actuator to the switch, 150m total length.						
		pc	4	x	105,00 €	=	420,00 €
4	Purchase, delivery and installation of monophase transformer five stage controller of number of revolutions for power of up to 2A, voltage 220V, 50Hz, Hidria Slovenia RMT2 or equivalent.						
		pc	4	x	142,00 €	=	568,00 €
5	Purchase, delivery and installation of room thermostat for switching the air convector fan on/off, together with relay, "Hidria" Slovenia RAA30 or equivalent.						
		pc	4	x	54,00 €	=	216,00 €
6	Purchase, delivery and installation of ON/OFF anti-frost thermostat, voltage 240V, load breaking current 2A, temperature control range -5 to 15 °C						
		pc	4	x	48,00 €	=	192,00 €
7	Purchase, delivery and installation of cables for feeding and connecting the air convector to control equipment and connecting to existing outlets for current air convectors, 3x1.5mm² - 200m, 5x1.5mm² - 10m. Cable to be laid in OG hard PVC tube.						
		set.	1	x	840,00 €	=	840,00 €

8	Purchase, delivery and installation of overpressure light aluminium facade jealousies "Hidria" Slovenia ANŽ-3 500x400mm or equivalent, for releasing surplus air from the gym.						
		pc	2	x	65,00 €	=	130,00 €
9	Purchase, delivery and installation of fixed façade aluminium jealousies, dimensions 400x400mm, for installation at the entrance into the duct towards air convector, Hidria Slovenia AZR-3 400x400 or equivalent.						
		pc	2	x	57,00 €	=	114,00 €
10	Purchase, delivery and installation of inclined control valves in brass cone, dimensions and properties:						
	DN25, with drainage 1/4" Kvs=10,4						
		pc	4	x	52,00 €	=	208,00 €
11	Purchase, delivery and installation of threaded block-ball valves, in brass cone, dimensions 1" (DN25)						
		pc	12	x	15,00 €	=	180,00 €
12	Purchase, delivery and installation of bracket tray holders and bolts for mounting air convectors to the gym wall.						
		pc	4	x	12,00 €	=	48,00 €
13	Making opening in the wall for fresh air supply to hot water air convectors, size 40x40cm,and openings for transfer grill 50x40cm.						
		pc	6	x	29,00 €	=	174,00 €
14	Correction of heating system in the gym removal of 2x20 m pipes DN32 and fitting of new section for supplying air convectors, 14 m length (two DN 32 pipes). The item includes mending holes in wall after dismounting of the new route with connecting to the existing piping.						
	Calculated lump-sum	pc	1	x	280,00 €	=	280,00 €
15	Purchase of material and installation of piping (for connecting boiler room equipment, production of new pipes for supplying air convectors in the gym and new radiators) made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø88.9x3.2						
		m	18	x	19,00 €	=	342,00 €
	Ø76.1x2.9						
		m	12	x	14,50 €	=	174,00 €
	Ø60.3x2.9						
		m	8	x	12,00 €	=	96,00 €

	Ø33.7x2.6						
		m	20	x	6,00 €	=	120,00 €
	Ø21.3x2.0						
		m	12	x	5,00 €	=	60,00 €
16	Joining, tightening material and brackets, elbows, branches and such are calculated as 50% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 50% of the previous item		0,5	x	396,00 €	=	198,00 €
17	Purchase, delivery and mounting of panel radiators made of cold rolled steel sheet metal, with two lateral sides and grate sheet metal above, properties:						
	Manufacturer: Sanica Turkey type 22 or equivalent						
	Connections: 4x1/2" female						
	Test pressure 13 bars						
	Maximal operating temperature: 110°C						
	Radiator dimension and thermal efficiency at 90/70/20°C mode						
	800/600/106mm, 1802W						
		pc	2	x	108,00 €	=	216,00 €
18	Purchase, delivery and installation of radiator cap, size 1/2"						
		pc	4	x	2,00 €	=	8,00 €
19	Purchase, delivery and installation of brackets for heat emitters - wall mounted panel radiators.						
		set	2	x	4,80 €	=	9,60 €
20	Radiator cap with automatic air-release valve connection size 1/2", maximal operating temperature 100°C, maximal operating pressure of gas releasing 6 bars, EPDM rubber sealant, with safety hygroscopic valve and protective casing.						
		pc	2	x	2,00 €	=	4,00 €
21	Purchase of material and coating the pipes with insulation made of rock wool, thickness 50 mm, with AL sheeting thickness 0.5 mm, complete with installation kit. Fire-resistance class flammability A1 in line with SIST EN 13501-1 & JUS U.J1.050. Calculated per m2 of insulation measured on the external side of the pipe. The item includes insulation of new pipes that go through external space.						
		m^2	18	x	48,00 €	=	864,00 €

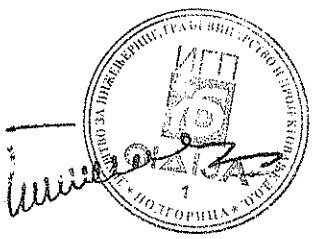
	Total for B.III - Installation of new air convectors in the gym and repairs at the heating system						9.845,60 €
B.IV - Installation of thermostatic radiator valves and network balancing							
1	Purchase, delivery and installation of: angle thermostatic radiator valve connection size 1/2", 15 pc, straight valves pc. 101 (valve shape to be determined onsite during installation). The item includes dismounting of existing valve.						
		pc	116	x	12,00 €	=	1.392,00 €
2	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without need to remove the protective cap. Thermostat has the liquid sensor.						
	Setting range from 8 °C to 26 °C						
	Closing time 24 min.						
		pc	116	x	19,00 €	=	2.204,00 €
3	Purchase, delivery and installation of the radiator angular valves, radiator sub-valves, dimensions 1/2" (sub-valve to be determined onsite during installation). The item includes dismantling of existing sub valve.						
		pc	116	x	8,50 €	=	986,00 €
4	Purchase, delivery and installation valves for balancing riser pipes with meter gauges in brass casing, pre-setting with digital reading (fitted on the feed pipe of the branch), size and properties:						
	DN50 PN6 - Kvs 33						
		pc	1	x	77,00 €	=	77,00 €
	DN40 PN6 - Kvs 19.2						
		pc	1	x	62,00 €	=	62,00 €
	DN32 PN6 - Kvs 14.2						
		pc	1	x	56,00 €	=	56,00 €
5	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
	DN50, Kvm 24.4						

		pc	1	x	340,00 €	=	340,00 €
	DN40, Kvm 12.8						
		pc	1	x	268,00 €	=	268,00 €
	DN32, Kvm 8.5						
		pc	1	x	215,00 €	=	215,00 €
6	Purchase, delivery and installation of threaded block-ball valves for separating certain branches of the pipe system, together with unions for connecting to pipes, connection size:						
	DN50, PN6						
		pc	4	x	26,00 €	=	104,00 €
	DN40, PN6						
		pc	4	x	22,00 €	=	88,00 €
	Total for B.IV - Installation of thermostatic radiator valves and network balancing						**5.792,00 €**
B.V - Preliminary and finishing works							
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
	Calculated as per lump sum.	lump-sum	1	x	300,00 €	=	300,00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves and metering and balancing of the pipe network.						
	Calculated as per lump sum.	lump-sum	1	x	240,00 €	=	240,00 €
3	Training of personnel in charge of boiler room operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.						
	Calculated as per lump sum.	lump-sum	1	x	240,00 €	=	240,00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.						
	Calculated as per lump sum.	lump-sum	1	x	180,00 €	=	180,00 €
5	Issuing of certificate and cut sheets for the entire fitted material and equipment, fitting framed and glazed scheme of connections at visible place in the boiler room.						
		lump-sum	1	x	180,00 €	=	180,00 €
6	Preparation of "As-built" design.						

	Calculated as per lump sum.	lump-sum	1	x	600,00 €	=	600,00 €
7	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with fire protection standards.						
	Calculated as per lump sum.	lump-sum	1	x	140,00 €	=	140,00 €
8	Repair of damages in walls on the six positions of calorifes which shall be dismanled in the gym.						
	Calculated as per lump sum.	lump-sum	1	x	120,00 €	=	120,00 €
	B.V - Preliminary and finishing works						**2.000,00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**6.520,00 €**
B	**REPLACEMENT OF BOILERS AND HEATING SYSTEM OPTIMIZATION**	
B.I	Dismantling of existing equipment and preliminary works	8.640,00 €
B.II	Boiler room equipment and fittings	38.328,00 €
B.III	Installation of new air convectors in the gym and repairs at the heating system	9.845,60 €
B.IV	Installation of thermostatic radiator and balancing valves	5.792,00 €
B.V	Preliminary and finishing works	2.000,00 €
	TOTAL PRICE, VAT EXCLUDED	**71.125,60 €**
	VAT (19 %)	**13.513,86 €**
	TOTAL PRICE, VAT INCLUDED	**84.639,46 €**



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GROUP A5.2.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Primary School "Oktoih" in Podgorica*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
	School:	P.S. "Oktoih" in Podgorica
	Doc. origin:	Final Electrical Design
	Date:	17 October 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	10,00				
	Works and material:	pc	20	x	15,00	=	300,00 €
1.2.	Delivery and laying of cables for recessed luminaries, to be installed in suspended ceilings, without placing switches, light bulbs and light fixtures. Electric circuit to be derived from the existing junction box in the classroom. The conductors are placed in PVC corrugated pipes of appropriate diameter, above the suspended ceiling. Installation to be performed in accordance with technical description. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	4,00				
	Works and material:	pc	106,00	x	6,00	=	636,00 €
1.3.	Delivery and laying of cables for light fittings above blackboard in classroom, without placing switches, light bulbs and light fixtures. Cables for light fittings in classroom connect to existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be executed in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Control for light fixture above blackboard shall be executed from existing control point. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	6,00				
	Works and material:	pc	26,00	x	9,00	=	234,00 €

1.4.	Delivery and laying of cables for lighting in the gym, without placing switches, light bulbs and light fixtures. Electric circuits to be derived from the existing switchboards of the gym. The conductors to be laid partly in the walls/ceilings and plaster or through rigid PVC pipes in walls. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	15,00				
	Works and material:	pc	15	x	22,00	=	330,00 €
1.5.	Delivery and laying of cables for antipanic lighting circuits, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	PP-Y 3x1,5 mm2	m	20,00				
	Works and material:	pc	26,00	x	29,00	=	754,00 €
1.6.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	494	x	3,00	=	1.482,00 €
1.7.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	116	x	60,00	=	6.960,00 €
1.8.	Delivery and mounting of recessed luminaries for installation in suspended ceilings 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	106	x	60,00	=	6.360,00 €
1.9.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted at 2.7 m height from floor level and 0.9 m from wall with board mounted on it. Works and material to be calculated per unit:	pc	26	x	80,00	=	2.080,00 €

1.10.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	68	x	60,00	=	4.080,00 €
1.11.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	12	x	55,00	=	660,00 €
1.12.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	20	x	55,00	=	1.100,00 €
1.13.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	5	x	55,00	=	275,00 €
1.14.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	32	x	55,00	=	1.760,00 €
1.15.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	16	x	50,00	=	800,00 €
1.16.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit:	pc	15	x	120,00	=	1.800,00 €
1.17.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	16	x	75,0	=	1.200,00 €
1.18.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	7	x	75,0	=	525,00 €
1.19.	Delivery and mounting of wall mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	1	x	75,0	=	75,00 €

1.20.	Delivery and mounting of fluorescent antipanic luminaries 8W, 1h with IP40 protection completely equipped with mounting gear and light source according to project of electrical installation. Works and material to be calculated per unit:	pc	6	x	50,0	=	300,00 €
1.21.	Delivery and replacement of worn-out switches (ordinary and serial) for lighting control in classrooms. Total for supply and installation of:	pc	12	x	6,0	=	72,00 €
	Total for lighting installation						**31.783,00 €**
2	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
2.1.	Delivery and laying of cables in PVC rigid installation pipes in walls and on galvanized cable trays in boiler room, for construction of electrical circuits for consumers in the boiler room. Works and material to be calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	101,00	x	1,90	=	191,90 €
	PP-Y 3x2,5 mm2	m	192,00	x	2,20	=	422,40 €
	PP-Y 5x2,5 mm2	m	51,00	x	3,00	=	153,00 €
	Cable tray PNK 100 mm	m	14,00	x	14,00	=	196,00 €
	Outlet three phase 3P+N+PE 16A/400V IP55	pc	3,00	x	11,00	=	33,00 €
	Outlet 2P+E / 230V/ IP 55	pc	5,00	x	9,00	=	45,00 €
	Two way switch IP44 10A	pc	4,00	x	7,00	=	28,00 €
2.2.	Delivery and mounting of prefabricated wall mounted IP 55 switchbox in boiler room, marked as "RT KO", with dimensions to suit and completely equipped with following parts:						
	Disconnector switch INS 1-0, 40A, 3P	pc	1,00				
	Motor protection switch 0.4 - 0.63A	pc	1,00				
	Motor protection switch 1,6 - 2,5A	pc	1,00				
	Automatic switch 3p iC60N 16A 6 kA	pc	3,00				
	Automatic switch 1p iC60N 16A 6 kA	pc	9,00				
	Automatic switch 1p iC60N 10A 6 kA	pc	4,00				
	Cable bushings for cables PG 16	pc	14,00				
	Cable bushings for cables PG 13.5	pc	4,00				
	The price includes all material required for installation of this equipment.						
	Total switch box RT KO	pc	1,00	x	440,00	=	440,00 €
	Total for power supply and electrical installation for boiler room and heating equipment						**1.509,30 €**
3	**POTENTIAL EQUALIZATION INSTALLATION**						
3.1.	Delivery and mounting of deep galvanized tape Fe-Zn 20x3 mm for potential equalization in boiler room, according to the installation layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	23	x	2,80	=	64,40 €

3.2.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	pc	23	x	3,00	=	69,00 €
3.3.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	pc	5	x	3,00	=	15,00 €
3.4.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and galvanized cable trays in boiler room for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	35	x	4,00	=	140,00 €
3.5.	Delivery and mounting box for discharge of static electricity. The box to be mounted at facade of the boiler room. To be installed within the box:						
	Disconnector switch 16A,250V SKX 12/21 0-1, Ex ed II CT6 Tep-EX	pc	1,00				
	P/F 25 mm2 with pliers for connection at end of the tendon	m	10,00				
		compl.	1,00	x	280,00	=	280,00 €
3.6.	Perform galvanic connection of all metal parts in school which are bigger than 2 m2 and which don't belong to electrical installation and currently are not grounded with conductor P/F 1x16mm2 (metal fence, low current distribution box, metal doors...).	m	55,00	x	4,00	=	220,00 €
	Total potential equalization installation						**788,40 €**
4	**LIGHTING AND GROUNDING INSTALLATION**						
4.1.	Dismantling of existing lightning protection system.	lump sum	1	x	200,00	=	200,00 €
4.2.	Delivery and installation of lightning conductors and lightning system of round conductor which is made of Al with diameter 10mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	160,00	x	3,00	=	480,00 €
4.3.	Delivery and mounting of lightning conductor bracket. Works and material to be calculated per unit:						
	Lightning conductor holder for roof installation:	pc	20,00	x	3,50	=	70,00 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	70,00	x	3,00	=	210,00 €
	Lightning conductor holder for wall installation:	pc	70,00	x	3,00	=	210,00 €
	Holders for vertical mechanical protection of lightning conductors:	pc	14,00	x	2,80	=	39,20 €
4.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	15,00	x	3,50	=	52,50 €
	linking clamp strip-wire	pc	7,00	x	3,00	=	21,00 €
	linking clamp wire-wire	pc	45,00	x	3,00	=	135,00 €

	groove clamp	pc	80,00	x	3,50	=	280,00 €
4.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	7,00	x	14,00	=	98,00 €
4.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	5,00	x	6,00	=	30,00 €
4.7.	Delivery and mounting of wet-preventing clamp .Works and material to be calculated per unit:	pc	30,00	x	2,60	=	78,00 €
4.8.	Connecting all metal conductive parts on the roof with lightning protection system. Works and material included in price.	pc	1,00	x	70,00	=	70,00 €
4.9.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measure unit.	pc	26,00	x	5,00	=	130,00 €
4.10.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 from existing output of foundation grounding system to the new position of lightning down conductors and to the metal gutters which are not earthed. The price includes excavation and backfilling of ditch, dimensions of 0.4x0.8m.The tape shall be placed through the ditch from the nearest output of foundation grounding system. Works and material to be calculated per measure unit.	m	140,00	x	8,00	=	1.120,00 €
	Total for lighting and grounding installation						**3.223,70 €**
5	**SPARE PARTS**						
5.1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	4,00	=	8,00 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	4,50	=	9,00 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	4,20	=	8,40 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	4,00	=	8,00 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	6,00	=	12,00 €
	Total for spare parts:						**45,40 €**
6	**TESTING**						
6.1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	300,00 €	=	300,00 €
6.2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	450,00 €	=	450,00 €
	Total for testing:						**750,00 €**
7	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**640,00 €**	=	**640,00 €**

SUMMARY OF COSTS:		
1	LIGHTING INSTALLATION	31.783,00 €
2	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	1.509,30 €
3	POTENTIAL EQUALIZATION INSTALLATION	788,40 €
4	LIGHTING AND GROUNDING INSTALLATION	3.223,70 €
5	SPARE PARTS	45,40 €
6	TESTING	750,00 €
7	PREPARATION OF MAINTENANCE DESIGN	640,00 €
	TOTAL PRICE, VAT EXCLUDED	38.739,80 €
	VAT (19%)	7.360,56 €
	TOTAL PRICE, VAT INCLUDED	**46.100,36 €**



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GROUP A5.3.1 **BILL OF QUANTITIES** ***of building and trade works for energy efficiency improvement in "Vuko Jovović" Danilovgrad***	*Employer / Employer's Representative:*	**Ministry of Economy of Montenegro, Energy Efficiency Sector**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Sub-Consultant:	**KOPRING PMC, Podgorica**
	Facility:	**Primary school "Vuko Jovović", Danilovgrad**
	Documentation:	**Final Architectural Design**
	Date:	**September 2013.**

	GENERAL TERMS
1	Works to be conducted according to applicable technical regulations, standards and required standards applicable for construction of such facilities.
2	Use materials with a quality certificate that meet required standards.
3	Apply measures promptly for safety of the facility and works, equipment and investment material, workers, passengers, traffic and surrounding facilities.
4	Obey technical documentation, based on which a building permit was granted.
5	Item unit price includes all expenses for works, materials, transport, cleaning of the facility after construction, tax liabilities, profits and all other non mentioned expenses for the completion of works under documents of the Agreement, technical regulations and applicable average standards in the construction industry.

Item	Description of Item	Unit of measur	Quantity		Unit price (€)		Amount (€)
	Measure no. 2						
I	**THERMAL INSULATION OF FACADE WALLS**						
1.01.	Dismantling of metal sheet flashings, window benches and vertical and horizontal gutters, cisterns, water spouts. Flashings have different developed widths and they are made from galvanized steel metal sheet with double interlock system, d=0,68mm. Surfaces shall be prepared for installation of new items without any special processing. The unit price comprises all works, materials and debris transportation to the town landfill. Calculation is based on a m1 of dismantled flashing, gutters, and their supporters.						
	Calculation per m1 and per piece.						
	dripping eaves						
	roof						
	attics - d.w. 55cm	m1	220,30	x	1,00 €	=	**220,30 €**
	boiler room - d.w. 35cm	m1	14,90	x	1,00 €	=	**14,90 €**
	window sills						
	ground floor						
	- all openings d.w. 40cm	m1	60,20	x	1,00 €	=	**60,20 €**
	- all openings d.w. 15cm	m1	93,50	x	1,00 €	=	**93,50 €**
	first floor						
	- all openings d.w. 40cm	m1	60,20	x	1,00 €	=	**60,20 €**
	- all openings d.w. 15cm	m1	122,51	x	1,00 €	=	**122,51 €**
	second floor						
	- all openings d.w. 40cm	m1	78,92	x	1,00 €	=	**78,92 €**
	- all openings d.w. 15cm	m1	129,96	x	1,00 €	=	**129,96 €**
	vertical gutters						
	14*14	m1	224,00	x	1,00 €	=	**224,00 €**
	top gutter cisterns						
	- building A	pc	15,00	x	1,00 €	=	**15,00 €**
	horizontal gutters						
	14x14	m1	31,11	x	1,00 €	=	**31,11 €**

	rainwater spouts						
	connections with downpipes	pc	15,00	x	1,00 €	=	**15,00 €**
1.02.	Demolition of existing walls in the dressing rooms due to the better space organization in rooms, jointly with demolition of old parapet walls made of bricks in the toilets and installation of new windows. The item includes removal and loading of debris onto a truck and transportation to a landfill up to 5 km distance.						
	Calculation per m^2.						
	ground floor - demolition of walls in the dressing rooms	m^2	37,17	x	14,00 €	=	**520,38 €**
	first floor - demolition of old parapet walls in the toilets	m^2	2,43	x	20,00 €	=	**48,60 €**
	second floor - demolition of old parapet walls in the toilets	m^2	2,43	x	20,00 €	=	**48,60 €**
1.03.	Removal of damaged mortar from the facade (10% of the total area of plastered facade), using scaffold. Debris shall be collected, removed, loaded onto a truck and transported to the landfill for construction material up to 5km distance.						
	Calculation per m^2.	m^2	204,16	x	5,00 €	=	**1.020,80 €**
1.04.	Cleaning the facade and removal of grease and its preparation for setting up layer of thermal insulation as well as removal of existing damaged facade finishing layer, to fit new designed finishing layers of the facade.						
	Calculation per m^2.	m^2	2041,61	x	2,00 €	=	**4.083,22 €**
1.05.	Cleaning the existing stone cladded facade (including stone cladded plinths) with removal of grease until the natural colour of stone is reached. The unit price comprises usage of scaffold.						
	Calculation per m^2.	m^2	623,48	x	18,00 €	=	**11.222,64 €**
1.06.	Purchase materials and closing the window openings in the lateral side of the classrooms in the annex building. The wall-up shall be performed by gas concrete bricks ("Ytong" or equivalent with similar or better characteristics) d=20cm, in thin layer mortar. Connections with the existing walls to be achieved with anchors Ø10 in each raw and vertical and horizontal beams in line with regulations. Dimensions of the openings to be closed are 325 / 175 cm. The inner side of new walls shall be covered by gypsums boards 12 mm thick adjusted to the existing ones. Outer side of the new wall shall be prepared for the installation of the ETICS facade. The unit price shall also include replacement of the damaged plasterboards damaged by moisture on the existing inner walls of the classrooms in the annex building (additional 20m2). Calculation per m2.						

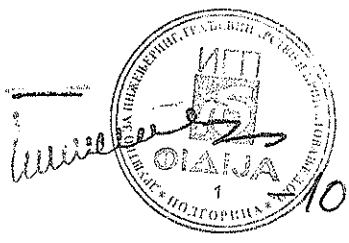
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	external walls (wall made of gas concrete blocks covered by gypsum boards from the inner side)	m2	22,75	x	25,00 €	=	**568,75 €**
	internal boards	m2	20,00	x	25,00 €	=	**500,00 €**
1.07.	Plastering of existing, damaged external walls, as well as the damages caused by dismantling of existing windows and doors. Apply double layer of cement mortar 1:2, previously treating the walls with cement milk. The first layer shall be rough and the second one has to be floated. The unit price comprises usage of scaffold. Plastered surfaces have to be smooth with no breaks and bumps, while edges have to be sharp and straight.						
	Calculation per m^2.						
	damaged facade						
	damaged façade- assessment	m^2	225,10	x	10,00 €	=	**2.251,00 €**
	over the ground floor facade	m^2	320,09	x	10,00 €	=	**3.200,90 €**
	preparation of jambs, after replacement of windows	m^2	528,92	x	10,00 €	=	**5.289,20 €**
1.08.	Dismantling and reinstallation of air-conditioning units. Dismantled units shall be registered and given to the Employer / Employer's Representative to store them. After completion of works on the new facade, these units will be reinstalled on the building. NOTE: For reinstallation of AC units, consider possible mounting of new metal support brackets and small extension of electric and Freon lines due to position of external AC units.						
	Calculation per piece.	pc	6,00	x	80,00 €	=	**480,00 €**
1.09.	Production and installation of flashings, attics, drips, window sills, gutters, top gutter cisterns, water spouts made of ready made galvanized plastic-laminated steel metal sheets d=0,70 mm. The item includes surface preparation and complete binding following the regulations. The entire process shall be carried out in line with the Design, and sample selected by the Employer / Employer's Representative. Calculation as per m1 of the fitted flashing and entire binding and joining material.						
	Calculation per m1.						
	drips						
	roof including gym annex roof						
	attic - d.w. 70cm	m1	242,84	x	14,00 €	=	**3.399,76 €**
	boiler room - d.w. 45cm	m1	14,90	x	12,00 €	=	**178,80 €**
	flashing sills						
	ground floor						
	- painted galvanized, plastic-laminated metal sheet - d.w. 50cm	m1	60,20	x	12,00 €	=	**722,40 €**
	- painted galvanized, plastic-laminated metal sheet - d.w. 30cm	m1	93,50	x	11,00 €	=	**1.028,50 €**
	first floor						
	- painted galvanized, plastic-laminated metal sheet - d.w. 50cm	m1	60,20	x	12,00 €	=	**722,40 €**

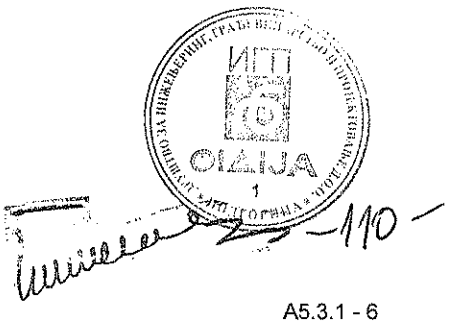
	- painted galvanized, plastic-laminated metal sheet - d.w. 30cm	m1	122,51	x	12,00 €	=	**1.470,12 €**
	second floor						
	- painted galvanized, plastic-laminated metal sheet - d.w. 50cm	m1	78,92	x	12,00 €	=	**947,04 €**
	- painted galvanized, plastic-laminated metal sheet - d.w. 30cm	m1	129,96	x	11,00 €	=	**1.429,56 €**
	vertical rain gutters						
	- painted galvanized, plastic-laminated metal sheet - dim 14x14cm	m1	224,00	x	17,00 €	=	**3.808,00 €**
	top gutter cisterns						
	- painted galvanized, plastic-laminated metal sheet	pc	15,00	x	33,00 €	=	**495,00 €**
	horizontal rain gutters						
	- painted galvanized, plastic-laminated metal sheet- dim 14x14cm	m1	35,00	x	16,00 €	=	**560,00 €**
	water spouts						
	- painted galvanized, plastic-laminated metal sheet	pc	15,00	x	14,00 €	=	**210,00 €**
1.10.	On the external side, thermal insulation of reinforced concrete (hereinafter RC) and brick facade walls will be made of expanded EPS polystyrene having heat transfer coefficient of λmax = 0,037 W/mK, thickness 8cm (on jambs 3cm), produced in line with the relevant EN standards. External thermal insulation composite system (ETICS) is required to have an ETAG 004 certificate.						
	The lower part of the facade walls at the level of the ground floor (all parapets in the ground floor, pillars and parts of the full wall) will be treated with stiffer insulating material, XPS extruded polystyrene, thickness d=8cm, resistant to mechanical damages, with nominal heat transfer coefficient of λ=0,035-0,04 W/mK.						
	Thermal panels with B1 flammability class (DIN 4102 B1 highly anti-flammable, non-combustible and self-extinguishing) to be used. Install panels and vertical breaks of 50 cm width along the entire facade, with maximum horizontal distance between the breaks of 20 m, and horizontal breaks of 50 cm width above facade openings (windows) in the area of floor slabs. These breaks shall be made of pressed mineral wool reaching A1 flammability class.						
	Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels. After fitting thermal plates, glass mesh is applied and double-layer of construction adhesive.						

	Before setting up the thermal plates, generally, the following works shall be conducted: * All works on the flat roof, including sheet metal works, * Replacement of façade joinery, * Placing the entire envisaged installation on the facade, *Closing of the classroom windows on shorter envelopes of the annex building, * Demolition of newly built parapet walls of the windows in the toilets. *Covering and protection of all non-treated surfaces – glass, stone…						
	*Checking existing cradling on the building: The most critical points on the building need to be treated with impregnation agent – basic coat. After basic coat sets, EPS block dimensions 5x5x5 cm shall be set up using expanded polystyrene adhesive. After the adhesive fully settles, minimum 3 days if work conditions are adequate, try to remove the block by hand. *Prior to above of listed works installation of all window benches is recommended.						
	If during separation of expanded polystyrene only adhesive is detached, but not parts of the cradling – the cradling has sufficient carrying capacity, it is solid and stable. If, during separation of expanded polystyrene, entire adhesive is not removed, i.e. part of the adhesive remains on the wall, and part on expanded polystyrene – it is a sign that the adhesive that is selected is adequate and firm.						
	If during separation of expanded polystyrene, part of the adhesive and cradling is separated – it is a sign that the cradling is not solid enough, and shall not withstand new layer of thermal insulation. Corners and jambs of wall openings are installed with reinforcing mesh or angle profiles.						
	Prior to installation of plates, facade cradling needs to be well cleaned to remove dust, greasy deposits and mortar. At heights above 8 m, plates shall be additionally anchored with adequate bolts. During installation of facade, temperature of air, cradling, mortar and adhesive must not drop below +5°C or above +25°C. Mortars must not be applied in case of strong wind, rain or fog.						
	The unit price comprises procurement, installation of complete material, preparatory activities, base preparation, preparation of thermal insulation for facade in described layers.						



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	ETA certificate (European Technical Approval) is a certificate issued by the European Organization for Technical Approval, which is a confirmation that the thermal insulation system is in compliance with the parameters set out by this organization - mechanical resistance and stability, safety in the event of fire, hygiene, health and environmental sustainability, safe usage, noise protection, energy efficiency and heat retention. NOTE: The existing ventilation openings on gym lateral facades have to be closed, before the installation of the ETICS.						
	Calculation per m^2.						
	ground floor						
	EPS d=8cm	m^2	111,12	x	17,00 €	=	**1.889,04 €**
	EPS d=3cm jambs	m^2	54,41	x	15,00 €	=	**816,15 €**
	first floor						
	EPS d=8cm	m^2	507,71	x	17,00 €	=	**8.631,07 €**
	EPS d=3cm jambs	m^2	54,41	x	15,00 €	=	**816,15 €**
	second floor						
	EPS d=8cm	m^2	587,30	x	17,00 €	=	**9.984,10 €**
	EPS d=3cm jambs	m^2	61,10	x	15,00 €	=	**916,50 €**
	mineral wool d=8cm						
	ground floor	m^2	108,73	x	22,00 €	=	**2.392,06 €**
	first floor	m^2	123,80	x	22,00 €	=	**2.723,60 €**
	second floor	m^2	132,94	x	22,00 €	=	**2.924,68 €**
	XPS	m^2	320,09	x	20,00 €	=	**6.401,80 €**
1,11	Setting up thermal insulation on the walls covered with metal trapezoid sheets. Use expanded polystyrene approximately 3cm thick, attached to the sheet by means of specialized adhesive to fill the gap in the metal trapezoid sheet. Over the prepared base, thermal insulation made of expanded EPS polystyrene having heat transfer coefficient of λmax = 0,037 W/mK, thickness 8cm, produced in line with the relevant EN standards shall be placed. Thermal plates are lap-joint attached to the facade wall with the relevant refined mineral adhesive and anchored with relevant dowels (dowels shall be placed in such positions to allow connection of the thermal plates 3cm and 8 cm thick and metal cover). After completion of works, newly built wall shall receive the same finish layers as the adjacent facades.						
	Calculation per m^2.	m^2	57,54	x	42,00 €	=	**2.416,68 €**



1.12.	Processing of the facade surfaces with decorative ready-mixed lime-cement based render type "Bavalit" or equivalent material. Special attention needs to be made to assure that the selected material is certified. The facade surface shall be sound and dry. Surface shall be cleaned and impregnated with insulation mass to achieve better joining. One layer shall be applied with painting brush, and if the surface absorbs it quickly, another layer shall be applied. A layer of adhesive with mesh shall be applied to prepare the surface for works. Other layers are applied in the same way as in the previous item:						
	* contact coating, made based on emulsion of synthetic resin and water glass, as agent for impregnation of dried reinforced mortar, * finishing layer, made on the base of mineral bonding agents, water repellent additives, agents for elasticity improvement and resilience to algae and mould. This layer is made in fine grained and smooth structure, painted in colour selected by the Employer / Employer's Representative, fully in line with the Design details. The openings shall be protected with PVC membrane. The unit price includes the purchase, installation of complete material, preparatory works and surface preparation.						
	Calculation per m^2.	m^2	2061,61	x	7,00 €	=	**14.431,27 €**
1.13.	Setting up of the facade plinth with decorative ready mixed marble based mortar in the part of the plinth which is not already covered with stone, created on grain ("Kulie") as splash guard (as indicated on the drawings). The existing mortar plinths have to be removed where it is peeling off from the substructure. Surface shall be cleaned, washed and sprinkled with acrylic base with granulate, color of the base by the color chart of the manufacturer determined by the Employer / Employer's Representative. Render shall be applied on cleaned and dried surface by manufacturer's instruction.						
	Calculation per m^2.	m^2	19,53	x	26,00 €	=	**507,78 €**
1,14	Purchase of the materials and installation of 10 cm thick layer of XPS on the bottom side of the existing roof's top cover (manhole).						
	Calculated as per piece.	pc	1,00	x	45,00 €	=	**45,00 €**
	TOTAL FOR THERMAL INSULATION OF FACADE WALLS						**100.167,15 €**
	Measure number 3						
II	**THERMAL INSULATION OF THE FLAT ROOF**						

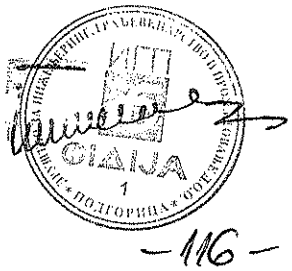
2.01.	Removal of the existing thermal insulation and waterproofing off the flat impassable roof to the concrete floor structure shall be done in following layers: -waterproofing (3 layers of card board and 4 layers of coating with albit fol protection), - sloping layer (lean concrete d = 5-16cm), - thermal insulation (hollow brick d=7cm or durisol boards). The unit price includes all works and transportation of debris to a landfill. The unit price, also includes 30cm of waterproofing put up against the walls.						
	Calculation per m^2.						
	roof over the main school building	m^2	1.067,00	x	9,00 €	=	**9.603,00 €**
	roof over the kitchen	m^2	21,01	x	9,00 €	=	**189,09 €**
	the entrance canopy	m^2	78,00	x	9,00 €	=	**702,00 €**
2.02.	Demolition of the existing chimneys up to roof slab level. Transportation of debris to a landfill up to 5km distance.						
	Calculation per piece.	pc	12,00	x	65,00 €	=	**780,00 €**
2.03.	Sealing the holes in the slab, remaining from old, dismantled chimneys, using concrete. Prior to concrete works, below the holes wooden formwork shall be installed.						
	Calculation per piece.	pc	12,00	x	35,00 €	=	**420,00 €**
2.04.	Removal of existing layers of waterproofing along the wall of attic. Transportation of debris to a landfill up to 5km distance.						
	Calculation per m^2.	m^2	120,00	x	5,00 €	=	**600,00 €**
2.05.	Installation of horizontal waterproofing and thermal insulation of the impassable flat roofs over the school, kitchen and entrance canopy. Apply the following layers on the surface:						
	a) Layer for equalizing the pressure, made of vapour-permeable and waterproof foil, b) Vapour barrier of the post bituminized aluminium foil, lined with glass fibre fleece, c) Thermal insulation made of extruded polystyrene boards XPS d = 8 cm with heat transfer coefficient of λmax = 0.033 W / mK (on top of already placed foil),						
	d) Layer used for separating from PVC foil, e) Sloping layer made of light-weight concrete d=5-22cm, sloped in range from 1.5% up to 5.4%, f) Layer for equalizing the pressure, made of vapour-permeable and waterproofed foil,						

	g) Waterproofing made of cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is placed freely over the hot bitumen with overlapping of 10-15cm and welded along their whole length. The second layer is 100% welded to the first one. Put the waterproofing at least 15 cm up the walls. Pay special attention to connections between horizontal and vertical waterproofing layers.						
	h) Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel.						
	Calculation is based on a m2 of the roof basis completely in line with the details presented on the drawings annexed. Price includes all required material following the description from a) to h), including the making of a required cove.						
	Calculation per m^2						
	roof over main school building	m^2	1.067,00	x	56,00 €	=	**59.752,00 €**
	roof over the kitchen	m^2	21,01	x	56,00 €	=	**1.176,56 €**
2.06.	Waterproofing of the canopy over the main school entrance, on a sloped layer (1.5%) made of light-weight concrete d=4-12cm, with cold bitulith coating, hot bitumen coating or bitumen masses and two layers of waterproof bitumen strip. One strip is lined with aluminium foil, the other with glass fibre fleece. Every strip is d = 4 mm thick. The first layer is put freely over the hot bitumen with overlapping of 10-15cm, welded along their whole length. The second layer is 100% welded to the first one. Waterproofing must be put up the walls at minimum 15 cm height. Pay special attention to the connections between horizontal and vertical waterproofing.						
	Calculation per m2	m2	78,00	x	18,00 €	=	**1.404,00 €**
2.07.	Protect waterproofing on eaves which is not protected with gravel, with "Krovoplast" or similar coating with equal or better technical characteristics. The unit price comprises complete work and material, following the description.						
	Calculation per m2	m2	78,00	x	6,00 €	=	**468,00 €**
	NOTE: The alternative technology for a flat roof cover can be offered as a deviation.						
	TOTAL FOR THERMAL INSULATION OF THE FLAT ROOF						**75.094,65 €**
	Measure number 4						
III	**REPLACEMENT OF FACADE JOINERY**						

3.01.	Dismantling of existing protective metal meshes from the façade. This item includes transportation of debris to a landfill or handing-over to the Employer / Employer's Representative (everything in accordance to agreement) for storing. The unit price comprises use of necessary scaffold.						
	Calculation per piece.						
	2 180/120	pc	10,00	x	10,20 €	=	**101,96 €**
	5 160/210	pc	2,00	x	12,57 €	=	**25,15 €**
	6 90/60	pc	2,00	x	5,10 €	=	**10,20 €**
	7 160/60	pc	1,00	x	7,48 €	=	**7,48 €**
	8 90/210	pc	1,00	x	10,20 €	=	**10,20 €**
	10 290/160	pc	6,00	x	15,29 €	=	**91,76 €**
	16 430/120	pc	1,00	x	18,69 €	=	**18,69 €**
	17 520/240	pc	1,00	x	25,83 €	=	**25,83 €**
	22 105/120	pc	1,00	x	7,65 €	=	**7,65 €**
3.02.	Dismantling of existing wooden and PVC façade joinery (windows, entrance doors, skylights) with all appurtenant metal supporters and mechanisms. If existing, elements of the windows-such as curtains, curtain rails etc shall also be dismantled. This item includes transportation of debris to a landfill or handing-over to the Employer / Employer's Representative (everything in accordance to agreement) for storing.						
	Calculation per piece.						
	180/120	pc	81,00	x	10,20 €	=	**825,87 €**
	90/60	pc	3,00	x	5,10 €	=	**15,29 €**
	160/60	pc	1,00	x	7,48 €	=	**7,48 €**
	430/120	pc	1,00	x	18,69 €	=	**18,69 €**
	160/210	pc	12,00	x	12,57 €	=	**150,90 €**
	255/230	pc	79,00	x	16,48 €	=	**1.302,19 €**
	252/50	pc	2,00	x	10,27 €	=	**20,53 €**
	215/230	pc	12,00	x	15,12 €	=	**181,49 €**
	280/330	pc	3,00	x	20,73 €	=	**62,20 €**
	140+170+140/330	pc	2,00	x	26,51 €	=	**53,02 €**
	95/205	pc	1,00	x	10,20 €	=	**10,20 €**
	115/205	pc	1,00	x	10,88 €	=	**10,88 €**
	90/210	pc	1,00	x	10,20 €	=	**10,20 €**
	290/160	pc	6,00	x	15,29 €	=	**91,76 €**
	230/120	pc	3,00	x	11,90 €	=	**35,69 €**
	90/120	pc	6,00	x	7,14 €	=	**42,82 €**
	520/240	pc	1,00	x	25,83 €	=	**25,83 €**
	520/410	pc	1,00	x	31,61 €	=	**31,61 €**
	450/250	pc	2,00	x	23,79 €	=	**47,58 €**
	325/175	pc	5,00	x	16,99 €	=	**84,97 €**
	300/175	pc	1,00	x	16,14 €	=	**16,14 €**
	340/175	pc	2,00	x	17,50 €	=	**35,01 €**
	310/175	pc	4,00	x	16,48 €	=	**65,93 €**
	105/220	pc	1,00	x	11,05 €	=	**11,05 €**

3.03.	Removal of the existing sills (window benches) of the opening which will be dismantled. Transportation of debris to a landfill up to 5 km distance. The unit price includes usage of necessary scaffold.						
	Calculation per m1.	m1	497,49	x	1,00 €	=	**497,29 €**
3.04.	Preparation and installation of hard highly resistant 6-chamber PVC profiled windows, reinforced with stainless steel U-profiles coated in plastics, as per joinery scheme and details, with high quality mechanism, fittings, hinges for opening and sills (window benches). Glass system 4+16+4mm, with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber are used for glazing.						
	Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill. Thermal conductivity must be maximum U=1,50 W/m²K and solar energy transmittance (solar factor) g≤65%.						
	The item includes all the necessary cleaning and dumping at the landfill as well as all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour will be selected by the Employer / Employer's Representative. Measures must be taken on site, prior to production.						
	Calculation per piece.						
	1 255/230, lower parts of the window covered with white foil.	pc	79,00	x	629,40 €	=	**49.722,45 €**
	2 180/120	pc	81,00	x	258,37 €	=	**20.927,70 €**
	3 230/120	pc	3,00	x	409,08 €	=	**1.227,23 €**
	4 215/230, lower parts of the window covered with white foil.	pc	12,00	x	559,78 €	=	**6.717,31 €**
	5 160/210	pc	8,00	x	441,07 €	=	**3.528,59 €**
	5* 160/210, lower parts of the window covered with white foil.	pc	2,00	x	452,97 €	=	**905,94 €**
	6 90/60	pc	3,00	x	139,60 €	=	**418,81 €**
	7 160/60	pc	1,00	x	192,57 €	=	**192,57 €**
	8 90/210, lower parts of the window covered with white foil.	pc	6,00	x	208,45 €	=	**1.250,68 €**
	9 160/210, lower parts of the window covered with white foil.	pc	2,00	x	426,14 €	=	**852,28 €**
	10 290/160	pc	6,00	x	520,33 €	=	**3.121,99 €**
	11 310/175	pc	4,00	x	579,24 €	=	**2.316,95 €**
	12 340/175	pc	2,00	x	616,01 €	=	**1.232,03 €**
	13 325/175	pc	1,00	x	598,07 €	=	**598,07 €**
	14 300/175	pc	1,00	x	568,29 €	=	**568,29 €**
	15 252/60	pc	2,00	x	251,86 €	=	**503,72 €**

3.05.	Preparation and installation of windows made of Al-profiles coated with plastic layer, reinforced with stainless steel U-profiles coated in plastics, as per joinery scheme and details, with high quality mechanism, fittings, hinges for opening and sills (window benches). Glass system 4+16+4mm, with hermetically sealed argon between two glass panels and tightened with permanently elastic EPDM rubber are used for glazing. Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	Thermal conductivity must be maximum U=2,30 W/m²K and solar energy transmittance (solar factor) g≤65%. Removal and transportation of old doors to a landfill selected by the Employer / Employer's Representative, shall be taken into account.						
	The item includes all the necessary cleaning and dumping at the landfill as well as all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is white. Measures must be taken on site, prior to production.						
	Calculation as per piece.						
	16 430/120	pc	1,00	x	856,03 €	=	**856,03 €**
	17 520/240	pc	1,00	x	1.585,01 €	=	**1.585,01 €**
	18 520/410	pc	1,00	x	2.585,84 €	=	**2.585,84 €**
	19 450/250	pc	2,00	x	1.323,31 €	=	**2.646,62 €**
	20 450/330	pc	1,00	x	1.618,46 €	=	**1.618,46 €**
	21 280/330	pc	3,00	x	888,90 €	=	**2.666,71 €**
	22 105/220	pc	1,00	x	344,04 €	=	**344,04 €**
	23 90/210	pc	1,00	x	283,53 €	=	**283,53 €**
	24 115/205	pc	1,00	x	351,36 €	=	**351,36 €**
	25 95/205	pc	1,00	x	325,06 €	=	**325,06 €**



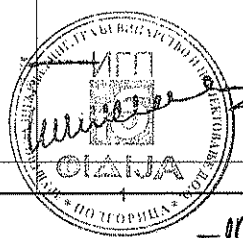
3.06.	Production and installation of the windshield aluminium joinery. The unit price comprises everything from the description: the purchase of materials, manufacturing, transport and installation of fittings and blind frame, as well as the aluminium sill of required width. Calculation is based on a piece of the installed joinery, by the following description: - production and installation, - coated "in plastic" aluminium construction system without thermal break -glass system: single glazing 4mm thick, - fittings, required set for hanging and closing, - type of the opening, as shown on the drawings- joinery schemes, - profile colour - natural aluminium. - Aluminium part with infill must be made of "sandwich" panels, 5 cm thick with extruded polystyrene as infill.						
	The item includes all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is natural aluminium. Measures must be taken on site, prior to production. Calculation per piece.						
	26 450/330	pc	1,00	x	1.618,46 €	=	**1.618,46 €**
	NOTE: Only main entrance door and the vestibule door shall be additionally equipped with emergency door handle, hydraulic closing mechanism and door pin stopper.						
	NOTE: Depending on the size of the opening, where it is necessary, big windows / doors elements shall have additional reinforcement / stiffening of the profiles.						
3.07.	Due to the damages caused by the dismantling of existing doors and windows, some parts of inner walls to be treated with gauged plaster 1:2:6, with previously sprinkled cement slurry. The first layer shall be applied roughly, and the second fine one shall be floated using necessary scaffold. The mortared surfaces must be flat, without breaks and waves with sharp and straight edges.						
	Calculation per m^2.						
	ground floor	m^2	210,31	x	9,00 €	=	**1.892,79 €**
	first floor	m^2	157,57	x	9,00 €	=	**1.418,13 €**
	second floor	m^2	161,04	x	9,00 €	=	**1.449,36 €**
3.08.	Skimming of internal walls in the parts of built skylight parapet wall and skimming of walls damaged during the process of dismantling of existing windows. Skimming shall be performed using "Plutafas" and double layer of skimming compound, with use of necessary scaffold.						

	Calculation per m^2.						
	ground floor	m^2	210,31	x	3,20 €	=	**672,99 €**
	first floor	m^2	157,57	x	3,20 €	=	**504,22 €**
	second floor	m^2	161,04	x	3,20 €	=	**515,33 €**
	TOTAL FOR REPLACEMENT OF FAÇADE JOINERY						**119.372,06 €**
NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES							
4.01.	Partial repair of the external concrete pavement around school building. Concrete works shall include, where necessary: *Clearing up and removing layer of humus d=10 cm, and planning of the terrain for sidewalk preparation. *Preparing the layer of compacted gravel, d=10 cm, *Putting plain concrete MB 20, d=10 cm, with cement screed making (anti-slip), d=2 cm, border beams 10/20 cm. New pavement shall have inclination of 1,5% compared to the building.						
	Pavement has to be strained into the fields approximately 1,5m2. Expansion joints shall be filled up with joint filler. The unit price comprises all works and materials including demolition of old concrete slabs, transportation to a landfill up to 5 km distance and finishing works.						
	Calculated per m2.	m2	50,00	x	19,00 €	=	**950,00 €**
4.02.	Purchase and installation of protective metal meshes on windows in the gym. Installation of meshes to be done on the internal side of windows, to protect them from impact of sports equipment.						
	Calculation per piece.						
	290/160	pc	6,00	x	185,00 €	=	**1.110,00 €**
4.03.	Purchase of materials, processing, manufacture and mounting of protective wire net for windows made of welded crimped mesh. Protective wire net to be welded to the L- profile frame, anchored to the wall by 150 mm length anchors. Galvanized meshed is made of wire 3,5-4 mm of thickness, while the size of openings shall not be less then 10 mm, neither larger then 30 mm. Total area of mesh openings shall not be less then 60 % of total mesh area. The unit price comprises usage of the scaffold.						
	Calculation per piece.						
	2 180/120	pc	10,00	x	100,00 €	=	**1.000,00 €**
	5 160/210	pc	2,00	x	120,00 €	=	**240,00 €**
	6 90/60	pc	3,00	x	80,00 €	=	**240,00 €**
	7 160/60	pc	1,00	x	90,00 €	=	**90,00 €**
	8 90/210	pc	1,00	x	90,00 €	=	**90,00 €**
	10 290/160	pc	6,00	x	185,00 €	=	**1.110,00 €**

	16	430/120	pc	1,00	x	230,00 €	=	**230,00 €**
	17	520/240	pc	1,00	x	550,00 €	=	**550,00 €**
	22	105/120	pc	1,00	x	90,00 €	=	**90,00 €**
	TOTAL NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES							**5.700,00 €**
V	**MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS**							
-INSTALLATION OF NEW WALL AND FLOOR CERAMIC TILES IN THE SANITARY; -PAINTING WORK IN ALL OF THE ROOMS; REPAIR OF THE PARQUET FLOOR;								
5.01.	Dismantling of existing interior wooden doors in sanitary facilities. Classification and storing away in a place set by the Employer / Employer's Representative.							
	Calculation per piece.							
	70/205	pc	33,00	x	10,00 €	=	**330,00 €**
	75/205	pc	11,00	x	10,00 €	=	**110,00 €**
	90/205	pc	4,00	x	10,00 €	=	**40,00 €**
5.02.	Demolition of existing wall and floor ceramic tiles in toilets. Debris needs to be collected, removed, loaded onto a truck and dumped at construction material landfill – distance up to 5km.							
	Calculation per m^2.							
	ground floor- dressing rooms	m^2	101,91	x	5,00 €	=	**509,55 €**
	ground floor	m^2	116,65	x	5,00 €	=	**583,25 €**
	first floor	m^2	116,65	x	5,00 €	=	**583,25 €**
	second floor	m^2	116,65	x	5,00 €	=	**583,25 €**
5.03.	Purchase of material and plastering wall parts in sanitary facilities and dressing rooms, where ceramic wall tiles were, using double layer of gauged mortar 1:2:6 over previously sprayed cement slurry. The first layer shall be applied roughly, and the second fine one shall be floated. The unit price comprises usage of necessary scaffold. Surfaces must be flat, without breaks and waves with sharp and straight edges.							
	Calculation per m^2.							
	ground floor- dressing rooms	m^2	143,82	x	9,00 €	=	**1.294,38 €**
	ground floor	m^2	161,20	x	9,00 €	=	**1.450,80 €**
	first floor	m^2	161,20	x	10,00 €	=	**1.612,00 €**
	second floor	m^2	161,20	x	10,00 €	=	**1.612,00 €**
5.04.	Purchase of material and preparation of base for ceramic tiles floors in sanitary blocks, made of cement screeding 1:3, simultaneously mechanically injecting binding fibbers.							
	Calculation per m^2.							
	ground floor- dressing rooms	m^2	48,57	x	9,00 €	=	**437,13 €**
	ground floor	m^2	44,50	x	9,00 €	=	**400,50 €**
	first floor	m^2	44,50	x	9,00 €	=	**400,50 €**

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	second floor	m^2	44,50	x	9,00 €	=	**400,50 €**
5.05.	Preparation of waterproofing below floors in sanitary blocks, in following layers from bottom to top: -bitulith + polyasbestos + glass mesh, - polyasbestos + glass mesh, - polyasbestos. Water proofing needs to be put up against the walls for min. h=25cm. The unit price includes all the works and material as described.						
	Calculation per m^2.						
	ground floor- dressing rooms	m^2	78,90	x	18,00 €	=	**1.420,20 €**
	ground floor	m^2	61,30	x	18,00 €	=	**1.103,40 €**
	first floor	m^2	61,30	x	19,00 €	=	**1.164,70 €**
	second floor	m^2	61,30	x	19,00 €	=	**1.164,70 €**
5.06.	Purchase and installation of floor ceramic tiles I class in sanitary blocks and dressing rooms. Tiles shall be placed in adhesive, joint bonding manner, type as selected by the Employer / Employer's Representative. The unit price includes fitting of Al- strips.						
	Calculation per m^2.						
	ground floor- dressing rooms	m^2	48,57	x	26,00 €	=	**1.262,82 €**
	ground floor	m^2	44,50	x	26,00 €	=	**1.157,00 €**
	first floor	m^2	44,50	x	27,00 €	=	**1.201,50 €**
	second floor	m^2	44,50	x	27,00 €	=	**1.201,50 €**
5.07.	Purchase and tiling of walls in sanitary blocks with I class tiles, at height h=220cm. Tiles shall be placed in adhesive, joint bonding manner, type sampled and selected by the Employer / Employer's Representative. The unit price includes installation of AL strips.						
	Calculation per m^2.						
	ground floor- dressing rooms	m^2	143,82	x	26,00 €	=	**3.739,32 €**
	ground floor	m^2	161,20	x	26,00 €	=	**4.191,20 €**
	first floor	m^2	161,20	x	27,00 €	=	**4.352,40 €**
	second floor	m^2	161,20	x	27,00 €	=	**4.352,40 €**
5.08.	Preparation and installation of doors in sanitary facilities, made of hard highly resistant PVC profiles reinforced with stainless steel U-profiles coated in plastics, as per joinery scheme and details, with high quality mechanism, hardware, hinges for opening. PVC panels shall be used as infill.						
	The item includes all the necessary cleaning and dumping at the landfill as well as all the works necessary for installation of joinery (proper installation, required chasing, edge strips - if required). Calculation is made per piece of finished item. Profile colour is selected by the Employer / Employer's Representative. Measures must be taken on site, prior to production.						
	Calculation per piece.						



	1 70/205	pc	31	x	260,00 €	=	**8.060,00 €**
	2 75/205	pc	10	x	260,00 €	=	**2.600,00 €**
	3 90/205	pc	4	x	290,00 €	=	**1.160,00 €**
	Measure number 4						
5.09.	Scraping and skimming existing walls and ceilings with emulsion putty. All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Inspect and flatten with putty minor damages and cracks. The unit price comprises dismantling of all wall equipment in the gym before start of the renovation of the walls and its remantling after finishing of the works. All the surfaces must be finely glassed, then flattened with putty for the second time, using required scaffold.						
	Calculation per $m^{2.}$						
	ground floor	m^2	1.238,36	x	3,20 €	=	**3.962,75 €**
	first floor	m^2	1.024,71	x	3,20 €	=	**3.279,07 €**
	second floor	m^2	1.233,97	x	3,20 €	=	**3.948,70 €**
5.10.	Scraping and skimming existing walls and ceilings with emulsion putty. All the surfaces must be scraped and washed, then glassed, cleaned and impregnated. Inspect and flatten with putty minor damages and cracks. All the surfaces must be finely glassed, then flattened with putty for the second time. The unit price comprises usage required scaffold.						
	Calculation per $m^{2.}$						
	ground floor	m^2	2.133,95	x	3,20 €	=	**6.828,64 €**
	first floor	m^2	1.745,76	x	3,20 €	=	**5.586,43 €**
	second floor	m^2	2.143,62	x	3,20 €	=	**6.859,58 €**
5.11.	Treatment of interior walls in the corridors as well as the stairs with double layer with oil based paint up to the height of 1,7 m. Colour will be selected by the Employer / Employer's Representative.						
	Calculation per $m^{2.}$						
	ground floor	m^2	1.029,83	x	6,00 €	=	**6.178,98 €**
	first floor	m^2	898,36	x	6,00 €	=	**5.390,16 €**
	second floor	m^2	1.114,83	x	6,00 €	=	**6.688,98 €**
5.12.	Treatment of interior walls in the area higher than 1,7 m with double layer of semi-dispersed paint, in colour selected by the Employer / Employer's Representative. The unit price comprises usage of scaffold.						
	Calculation per $m^{2.}$						
	ground floor	m^2	1.168,13	x	2,20 €	=	**2.569,89 €**
	first floor	m^2	899,77	x	2,20 €	=	**1.979,49 €**
	second floor	m^2	1.093,09	x	2,20 €	=	**2.404,80 €**

5.13.	Treatment of interior ceilings with double layer of semi-dispersed paint, in colour selected by the Employer / Employer's Representative. The unit price comprises usage of scaffold.						
	Calculation per m^2.						
	ground floor	m^2	1.276,16	x	2,20 €	=	**2.807,55 €**
	first floor	m^2	1.055,45	x	2,20 €	=	**2.321,99 €**
	second floor	m^2	1.233,97	x	2,20 €	=	**2.714,73 €**
5.14.	Painting of visible pipes, installations in bright child friendly colors (red, blue, yellow, green) in oil based paint in two layers. The item also includes painting of metal fences and handrails of all staircases in colour determined by Employer / Employer's Representative.						
	Calculation per lump sum.	lump sum	1,00	x	850,00 €	=	**850,00 €**
5.15.	Production and installation of metal blinds from white coated aluminium of the windows of the three classrooms of the annex building, on top of the gym. Metal blinds shall consist several layers of perforated PVC or min. 1mm thick L-shaped aluminium sheet profiles (approx. 10 cm wide) shall be screwed horizontally onto the new PVC window frames (max. load bearing and bending capacity to be considered; use of raw plugs for hollow profile). All screws shall be from stainless steel. Calculation as per piece.						
	pos 11 dim 310/175	pc	4,00	x	480,00 €	=	**1.920,00 €**
	pos 12 dim 340/175	pc	2,00	x	520,00 €	=	**1.040,00 €**
5.16.	Cleaning of construction site, school and school backyard from debris and left material. Transportation of debris to a landfill. Cleaning of all windows and floors.						
	Calculation per lump sum.	lump sum	1,00	x	3.300,00 €	=	**3.300,00 €**
5.17.	Due to the reconstruction of the facility, some additional investment for unplanned works (all in agreement with the Employer / Employer's Representative) shall be foreseen.						
	Calculation per lump sum.	lump sum	1,00	x	1.500,00 €	=	**1.500,00 €**
	TOTAL FOR MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS						**120.610,01 €**
	GENERAL NOTE: If certain internal hindering items have been removed, they have to be re-installed or replaced by new ones and these costs shall be included in the respective line items (e.g. curtain rails, sports wall equipment in sport halls, etc.).						
VI	LIST OF SPARE PARTS						

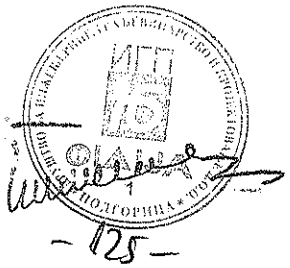
6.01.	Purchase and delivery of the spare window handles.						
	Calculated as per piece	pc	3,00	x	1,65 €	=	**4,95 €**
6.02.	Purchase and delivery of the spare internal door handles.						
	Calculated as per piece	pc	1,00	x	3,00 €	=	**3,00 €**
6.03.	Purchase and delivery mounted door rubber stopper.						
	Calculated as per piece	pc	2,00	x	15,00 €	=	**30,00 €**
6.04.	Purchase and delivery of push bar mechanism to the floor, to keep external doors open.						
	Calculated as per piece	pc	2,00	x	15,00 €	=	**30,00 €**
6.05.	Purchase and delivery of rope operated opening mechanism for the windows at high.						
	Calculated as per piece	pc	5,00	x	29,00 €	=	**145,00 €**
6.06.	Purchase and delivery of lever operated opening mechanism for the windows at high.						
	Calculated as per piece	pc	5,00	x	25,00 €	=	**125,00 €**
6.07.	Purchase and delivery of spare amount of ceramic tiles I class. Calculated as per m².						
	wall	m^2	1,00	x	16,00 €	=	**16,00 €**
	floor	m^2	1,00	x	16,00 €	=	**16,00 €**
	TOTAL FOR SPARE PARTS						**369,95 €**
	NOTE: Spare parts shall be submitted to school Representatives in the presence of Employer / Employer's Representative, followed up by signing hand over document.						

SUMMARY OF COSTS

I	THERMAL INSULATION OF FAÇADE WALLS	**100.167,15 €**
II	THERMAL INSULATION OF THE ROOF	**75.094,65 €**
III	REPLACEMENT OF FACADE JOINERY	**119.372,06 €**
IV	NON-EE AND ANCILLARY WORKS ARISING FROM IMPLEMENTATION OF EE MEASURES	**5.700,00 €**
V	MEASURES TO ENABLE HIGHER COMFORT AND BETTER WORKING CONDITIONS	**120.610,01 €**
VI	SPARE PARTS	**369,95 €**
	TOTAL price, VAT EXCLUDED	**421.313,82 €**
	VAT (19 %)	**80.049,63 €**
	TOTAL price ,VAT INCLUDED	**501.363,44 €**

GROUP A5.3.2 **BILL OF QUANTITIES** ***of thermal-technical (heating) services for energy efficiency improvement in Primary School "Vuko Jovovic" in Danilovgrad***	***Investor:***	**Ministry of Economy of Montenegro, Energy Efficiency Sector**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Sub-Consultant:	**KOPRING PMC, Podgorica**
	School:	**P.S. "Vuko Jovovic" in Danilovgrad**
	Doc. origin:	**Final Heating Design**
	Date:	**17 October 2013**

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
A - ENERGY MANAGEMENT							
1	Purchase, supply and installation of ultrasonic heat gauge and cable from computer unit to heat gauge of 1,5m, for mounting into return piping line. The gauge is battery powered. Together with gauge a pair of temperature sensors Pt500 is delivered, one sensor mounted directly into flow gauge body, M-Bus module, brass bushing for sensors mounting, and set threaded unions.						
	Manufacturer: "Siemens" or equivalent						
	Type: "UH50 Ultraheat"						
	Nominal flow: 10 m^3/h						
	Connection size DN40						
		pc	1	x	1.218,56 €	=	1.218,56 €
2	Purchase, supply and installation of electronic flow gauge for light distillated oil .						
	Manufacturer: "Aqua metro" or equivalent						
	Type: "VZO 4 RE"						
	Nominal flow: 25 l/h						
	Minimum flow: 0.5 l/h						
		pc	2	x	440,30 €	=	880,60 €
3	Purchase, supply and installation of control unit with M-Bus communication and display.						
	Manufacturer: "Siemens" or equivalent						
	Type: "Climatix POL638"						
		pc	1	x	4.299,47 €	=	4.299,47 €
4	Software development and staff training.						
		pc	1	x	119,00 €	=	119,00 €
	TOTAL A - ENERGY MANAGEMENT						**6.517,63 €**



B - REPLACEMENT OF BOILERS AND HEATING SYSTEM OPTIMIZATION							
B.I	**Dismantling of existing equipment and preliminary works**						
1	Dismantling of existing equipment in the boiler room (2 oil fired boilers capacity 290 kW with burners, expansions vessel 250l, 2 circulator pumps, 1 boiler pump, 6 valves DN80, 2 valves DN40, back-flow preventer DN40, Y-strainer DN80, air-release vessels, insulated pipes and other sundries). The item includes removal and transportation of dismounted equipment to a suitable location.						
	Calculated lump-sum	pc	1	x	1.785,00 €	=	1.785,00 €
2	Dismounting of self-supporting prefabricated steel insulated funnel height 13m with fire flues 4 and 3 m long.						
	Calculated lump-sum	pc	1	x	833,00 €	=	833,00 €
3	Cleaning existing below-grade light distilled oil tank capacity 15m³, removal of sediments, dumping in set manner, replacement of suction group, maintenance service of safety valves and inspection of entire ancillary installation.						
	Calculated lump-sum	pc	1	x	892,50 €	=	892,50 €
4	Cleaning of floor and walls in the boiler room, closing openings in walls through which funnel flues and new pipes are pulled through, painting walls 80m², construction of concrete base for the boilers, dimensions 2 pc 125x85x10 cm, laying ceramic tiles on the boiler room floor 25m².						
	Calculated lump-sum	pc	1	x	2.213,40 €	=	2.213,40 €
5	Flushing of the entire heating system in the school and the gym. Dismounting of all radiators (total of 148 pieces: steel radiators made of pressed sheet metal with 13 to 25 ribs dimensions 600x200mm 135 pieces, steel cast 13 to 15 ribs 600x110mm 3 pieces and panel steel radiators 1600x600mm and 1800x600mm 10 pieces), and flushing to remove deposits from the radiators, cleaning of air-release radiator vessels, remounting of radiators with installation of new radiator brackets if required.						
	Calculated lump-sum	pc	1	x	5.355,00 €	=	5.355,00 €
	Total for B.I - Dismantling of existing equipment and preliminary works						11.078,90 €

B.II	**Boiler room elements and fittings**						
1	Purchase, delivery and installation of compact three-pass steel boiler with cylindrical combustion chamber, for economic drive with slide water temperature in the boiler, for combusting light distilled oil type EL, for heating systems with feed temperature (ultimate temperature) of up to 110°C, with Therm-Control for operating without additional function for increasing return temperature, i.e. protection for the cold end of the boiler, properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Vitoplex 300 TX3A						
	Nominal heat capacity 140kW						
	Efficiency 96%						
	Permiss. operating pressure 4 bar						
	Flue outlet 200 mm						
	Dimensions:						
	length 1910 mm (with burner) width 825mm height 1350 mm						
	Weight with insulation 540 kg						
	Boiler water capacity 250 lit						
	Boiler body fully insulated with stiff insulation thickness 100 mm.						
	Scope of delivery: boiler with doors, cleaning aperture, virburator, counter-flanges with bolts and nuts, thermal insulation, inspection port for combustion chamber, virburator extraction tool.						
	Vitotronic 100 digital control - type GC1B is used for operating two-stage or modulating burners.						
	Boiler is delivered is complete with two-stage light distilled oil-burner Vitoflame 100. Burner is ready-made and set to nominal capacity of the boiler.						
	Viessmann Vitotronic 100 digital control containing: On/off control, test-service switch, maximal temperature electronic limitator, temperature controller and safety temperature limitator, "Power-on" and fault display, optolink Communication port for lap-top, pushbuttons for setting operating mode, temperature setting in boiler, setting domestic hot water temperature, heating programmes, protection from pump shunt and switching to economic mode, with water temperature sensor in the boiler.						



	Boiler protective functions: Therm-Control, without additional function for protection of the cold end of the boiler, with illuminated push buttons, simplified starting via sockets, flexible sanitary water control (alternative control of the system with water storage with three-way control valve), integrated diagnose system and switching to summer economy operating mode.						
		set	2	x	9.200,00 €	=	18.400,00 €
2	Purchase, delivery and installation: cascade control unit Vitotronic 300-K (type MW1B) or equivalent, for cascade control of the system comprised of two to four boilers, according to outdoor temperature, with two heating circuits with mixers and preparation of hot sanitary water, for system with two-stage or modulating burner, with display, illuminated push buttons, simplified starting through socket function, flexible DHW temperature control (alternatively, control of the system with water storage with three-way control valve), with digital built-in timer for daily and weekly programmes, integrated diagnose system, switching to, summer, economy, mode and fuel consumption indicator.						
	Automatic control includes: start switch, test service switch, external temperature sensor, electronic maximal temperature limitator and safety temperature limitator, operating mode and fault indicator, Optolink laptop switch, selector pushbuttons, option of setting water temperature in boiler, sanitary water temperature, temperature modes, pump shunt protection, switching to economic mode.						
		set	1	x	1.625,00 €	=	1.625,00 €
3	Purchase, delivery and installation: console for cascade control unit mounting on the boiler room wall in the proximity of the boilers.						
		pc	1	x	33,00 €	=	33,00 €
4	Purchase, delivery and installation: LON communication module is electronic printed circuit board for installation in Vitotronic 100 (type GC1) for data exchange with other heating circuit control units Vitotronic. LON external cable for data exchange between control units with socket connection RJ45, 7 m long.						
		pc	2	x	288,00 €	=	576,00 €
5	Purchase, delivery and installation of small feeder manifold with safety group (safety valve with 3 bar activation pressure, pressure gauge and automatic air-release valve) and thermal insulation.						

		pc	2	x	180,00 €	=	360,00 €
6	Purchase, delivery and installation of throttle valve PN16 DN65 with motor with additional fitting of butterfly valve VKF 41, DN 40 bis DN 150.						
		pc	2	x	660,00 €	=	1.320,00 €
7	Purchase, delivery and installation of chimney system SCHIEDEL ICS 25 or equivalent, made of twin stainless steel wall thickness 0,6 mm, with 25 mm layer of high-quality and temperature resistant material between sheet metals – Superwool. ICS chimney system includes all required elements: inspection port and boiler, telescopic pipes, basic pipes, bearing dilatation element, anchoring clips, sleeve joint clips, chimney brackets, flashings and chimney terminals.						
	All chimney elements are industrially produced in every detail as set out in technical documents for particular building. Prefabricated elements are corrosion resistant and laser welded in protective atmosphere. System elements are structured in such way so that joints allow for resistance to condensation and gas-tightness. Because of the sleeve joint, the insulation in the pipe is able to be continuous, and to compensate system lengthening due to heating.						
	Chimney "Prima Plus", internal diameter Ø200mm, total height 2x13.9 m						
	Furnace flue ICS25 Ø200 mm, developed length 3.6m and 4.0m						
		set	2	x	3.505,00 €	=	7.010,00 €
8	Purchase, delivery and installation of the duplex circulation pump with electronic frequency controller used to supply the radiator heating, with integrated controller, with the option of feed pressure control, proportionally and constantly, properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: Magna 1 D 40-120 F						
	Flow: 13.6 m^3/h						
	Thrust: 5.5 m						
	Type of connection: Flanged DN40						
	Power supply: V=1~230V						
	Maximum current: I=0,19 - 2.1A						
	Transferred power: P=17 - 476W						
	Pumps are delivered and installed jointly with the counter flanges, connecting and sealing material.						
		pc	1	x	1.595,00 €	=	1.595,00 €
9	Purchase, delivery and installation of three-stage circulation pump for air convector heating, with following properties:						
	Manufacturer: "Grundfos" or equivalent						
	Type: UPS 25-55 180						

	Flow: 3.1 m^3/h						
	Thrust: 2.25 m						
	Type of connection: threaded 1 1/2"						
	Power supply: V=1x230V~						
	Maximum current: I=0,38A						
	Transferred power: P=65/80/85W						
	Pumps are delivered and installed together with joining and sealing material.						
		pc	1	x	260,00 €	=	260,00 €
10	Purchase, delivery and installation of compact water softener. Compact casing contains ion-exchange resin, automatically regenerated once its capacity is spent, with following properties:						
	Manufacturer: Viessmann or equivalent						
	Type: Aquaset 500						
	Max. flow: 1,5 m^3/h						
	Amount of resin: 18 l						
	Softening capacity (for 18°dH) 3880 l						
	Salt consumption per regeneration: 3 kg						
	Operating pressure: 1,4 – 8 bar						
	Operating temperature: 4-40 °C						
	Connections inlet and outlet 1"						
	Power supply 220V/50Hz						
	Dimensions						
	l: 432 mm, w: 324mm, h: 1060 mm						
	Unit is delivered with protective pre-filter which consists of casing with 25 microns protective mesh.						
		pc	1	x	1.714,00 €	=	1.714,00 €
11	Purchase, delivery and installation of membrane expansion vessel. Maximum permitted pressure is 6 bars, pre-set pressure is 3.5 bars, maximum permitted temperature is 120 °C.						
	Manufacturer: "Pneumatex" Switzerland or equivalent						
	Type: Statico SU 800.6						
	Volume: 800 lit						
	Dimensions:						
	diameter 740mm, height 2044mm, weight 105kg, connection 3/4"						
		pc	1	x	2.470,00 €	=	2.470,00 €
12	Purchase, delivery and installation of angle valve to be mounted in front of expansion vessel, following properties:						
	Rated outlet: DN32						
	Operating pressure 4 bars						
	Operating temperature: -10 oC do +220 oC						
	Overpressure calibration: 10% of set pressure						
		pc	1	x	454,00 €	=	454,00 €
13	Purchase, delivery and fitting of feeder and receiver manifolds for radiators and air convectors heating circuits following dimensions:						
	Diameter 219,1x4,5 mm						

	Feeder length 1200 mm Return pipe length 1100mm						
	Connections: DN40 x 1pc DN80 x 2pc R3/4" x 2pc R1/2" x 2pc						
		pc	2	x	540,00 €	=	1.080,00 €
14	Electric air convector, capacity 9kW, voltage 400V, for maintaining minimum temperature in the boiler room and to prevent the installations from freezing at low outdoor temperatures when the heating system is off, fitting together with thermostat for calorifer engagement.						
		pc	1	x	560,00 €	=	560,00 €
15	Purchase, delivery and installation of three-way mixing valve, Viessmann Mixer 3 or equivalent, for constant control of systems with hot and cold water, for one way mixing for heating circuits, in the direction of feeder pipe. Weldable. Feed temperature 120°C. Permitted operating overpressure 6 bar.						
	DN 50 PN6; Kvs=42.0						
		pc	1	x	340,00 €	=	340,00 €
	Electric drive for mixer Viessman for continuous control with typical curve selector, for wiring in the building, for non-flanged mixer. * Voltage: 230V AC * Control: impulse * Torque: 3Nm						
		pc	1	x	452,00 €	=	452,00 €
16	Purchase, delivery and installation of: socket for mixer drive, system socket Rast 5, with 4 poles, 3 pieces, socket for heating circuit pump, system socket Rast 5, with 3 poles, 3 pieces. Temperature sensor (NTC 10 kOhm) for pipe temperature metering, with connection pipe (length 5.8m) and socket.						
		set	1	x	240,00 €	=	240,00 €
17	Purchase, delivery and fitting of flat butterfly valves with flanges, with counter-flanges, screws and nuts, gaskets, connection size:						
	DN80 PN6						
		pc	6	x	120,00 €	=	720,00 €
	DN65 PN6						
		pc	4	x	96,00 €	=	384,00 €
18	Purchase, delivery and installation of threaded ball valves, connection size						
	DN40 PN6						
		pc	4	x	20,00 €	=	80,00 €
	DN25 PN6						
		pc	5	x	11,00 €	=	55,00 €

19	Purchase, delivery and installation of flanged backflow preventers with counter-flanges, bolts, nuts, gaskets PN6, with following dimensions of connections:						
	DN80 PN6						
		pc	1	x	122,00 €	=	122,00 €
20	Purchase, delivery and fitting of flanged Y-strainer with counter-flanges, bolts, nuts, gaskets, with following dimensions of connections:						
	DN80 PN6						
		pc	1	x	21,42 €	=	21,42 €
21	Purchase, delivery and installation of threaded backflow preventer, connection size:						
	DN40 PN6						
		pc	1	x	9,52 €	=	9,52 €
	DN25 PN6						
		pc	1	x	47,60 €	=	47,60 €
22	Purchase, delivery and fitting of threaded Y-strainer, following dimensions of connections:						
	DN40 PN6						
		pc	1	x	48,00 €	=	48,00 €
23	Purchase, delivery and fitting of fixed facade aluminium weather louver, Hidria AZR-3 or equivalent, size 400x200mm, to be fitted in the boiler room doors (to allow undisturbed air flow for fuel combustion in the boiler).						
		pc	2	x	40,00 €	=	80,00 €
24	Purchase, delivery and installation of water gauge at fresh water feeder from the water mains into the softener, with flow control scale and number disk for total flow registration, connection dimensions 1".						
		pc	1	x	144,00 €	=	144,00 €
25	Purchase, delivery and installation of glass thermometer in brass casing and sleeve for fitting into the pipeline, metering range 0-120°C.						
		pc	5	x	41,00 €	=	205,00 €
26	Purchase, delivery and installation of pressure gauge complete with manometer flow-through valve, metering range 0-6 bars.						
		pc	6	x	11,00 €	=	66,00 €
27	Purchase, delivery and installation of automatic valve for water fill in the system, with block valve and ball backflow valve filter and manometer with following characteristics:						
	Connection dimensions 1"						
	Control range 0.3 – 4 bar						

	Maximal flow at inlet 16bar						
	Maximal temperature at inlet 50°C						
		pc	1	x	96,00 €	=	96,00 €
28	Purchase, delivery and assemblage of air-release vessels with overflow pipe and tap DN 15, made of steel pipe, DN150 length 300 mm.						
		pc	6	x	30,00 €	=	180,00 €
29	Purchase, delivery and installation of DN15 fill and discharge tap valve with a cap, chain and threaded connection.						
		pc	5	x	12,00 €	=	60,00 €
30	Purchase and installation of PP-R water pipes for connecting equipment for chemical water treatment, for operating pressure of 10 bars with all required fittings. Pipes need to be fixed to walls with double pipe clips at every 1.5 to 2.0 m. Pipes on branching need to be insulated with "plamafleks" to prevent condensation. Pipes are welded with butt welded joint. Pipe diameter is rated diameter of DN25.						
		m	5	x	5,90 €	=	29,50 €
31	Purchase and delivery of hose DN 20 with unions at ends, 6 m long, for filling and discharging the installation.						
		pc	1	x	18,00 €	=	18,00 €
32	Purchase, delivery and installation of: Pipe temperature sensor * Metering range : -50... +130°C * Metering element: NTC thermistor * threaded connecting: R 1/2" * Nipple length: 200 mm.						
		pc	4	x	90,00 €	=	360,00 €
33	Purchase of material and production of insulation for pipes, feeder and receiver manifolds and fitting in the boiler room using rock wool, thickness 50 mm in AL coating thickness 0.5 mm, complete with fitting material. Fire resistance flammability class A1 in line with SIST EN 13501-1 and JUS U.J1.050. Calculated as per m2 of insulation measured on the exterior of the pipe. The item includes fitting of insulation on new pipes that go through external space.						
		m^2	26	x	48,00 €	=	1.248,00 €
	Total for B.II - Boiler room elements and fittings						42.463,04 €
B.III	**Repair of pipe system**						

1	Correction of the heating system in the gym, switching the air convector from the existing branch, dismounting of air convector, flushing exchangers and testing valves and air-release valves for proper operating, remounting and connecting to new pipes for hot water supplying.						
	Calculated lump-sum	pc	1	x	178,50 €	=	178,50 €
2	Purchase of material and installation of piping (for connecting boiler room equipment, production of new pipes for supplying air convectors in the gym) made of steel seamless pipes in line with JUS standard C.B5.221 or DIN 2448, following dimensions:						
	Ø88,9x3,2						
		m	20	x	19,04 €	=	380,80 €
	Ø76,1x2,9						
		m	11	x	14,28 €	=	157,08 €
	Ø60,3x2,9						
		m	2	x	11,90 €	=	23,80 €
	Ø48,3x2,6						
		m	40	x	9,52 €	=	380,80 €
	Ø42,4x2,6						
		m	32	x	8,33 €	=	266,56 €
	Ø33.7x2,6						
		m	8	x	5,95 €	=	47,60 €
3	Joining, tightening material and brackets, elbows, branches and such are calculated as 60% of the previous pipe item. This item includes cleaning, prime coating and painting with finishing paint resilient to high temperatures.						
	Calculated as 60% of the previous item		0,6	x	1.201,90 €	=	721,14 €
	Total for B.III - Repair of pipe system						2.156,28 €
B.IV	**Installation of thermostatic radiator valves and network balancing**						
1	Purchase, delivery and installation of 51 pc of angle thermostatic radiator valve connection size 1/2" and 97 pc of straight valves (valve shape to be determined onsite during installation). The item includes dismounting of existing valve.						
		pc	148	x	12,00 €	=	1.776,00 €
2	Purchase, delivery and installation of thermostatic head for installation in buildings that accommodate many people, with flexural strength of the thermostatic head min. 1000 N (anti-theft). Continuous setting of temperature is done using special key without need to remove the protective cap. Thermostat has the liquid sensor.						
	Setting range from 8 °C to 26 °C						
	Closing time 24 min.						
		pc	148	x	19,20 €	=	2.841,60 €

3	Purchase, delivery and installation of the radiator sub-valves, dimensions 1/2" (sub-valve to be determined onsite during installation). The item includes dismantling of existing subvalve.						
		pc	148	x	8,50 €	=	1.258,00 €
4	Purchase, delivery and installation valves for balancing riser pipes, with meter gauges in brass casing, pre-setting with digital reading (fitted on the feed pipe of the branch), size and properties:						
	DN50 PN6 - Kvs 33						
		pc	2	x	78,00 €	=	156,00 €
	DN32 PN6 - Kvs 14.2						
		pc	1	x	58,00 €	=	58,00 €
5	Purchase, delivery and installation of differential pressure controller valve with no additional power feeding, for two-pipe systems with thermostatic valves fitted on heat emitters, with continuous temperature setting, with 1 m long capillary pipe (fitted on the return pipe of the manifold) size and properties:						
	DN50, Kvm 24.4						
		pc	2	x	340,00 €	=	680,00 €
	DN32, Kvm 8.5						
		pc	1	x	96,00 €	=	96,00 €
6	Purchase, delivery and installation of threaded block-ball valves for separating certain branches of the pipe system, together with unions for connecting to pipes, connection size:						
	DN65, PN6						
		pc	4	x	58,00 €	=	232,00 €
	DN50, PN6						
		pc	2	x	27,00 €	=	54,00 €
	Total for B.IV - Installation of thermostatic radiator valves and network balancing						7.151,60 €
B.V	**Preliminary and finishing works**						
1	Preparation of the construction site for fitting of thermo-technical installations. Surveying on site situation. Installation of containers. Transportation of people, goods and materials.						
	Calculated as per lump sum.	lump-sum	1	x	300,00 €	=	300,00 €
2	Putting the boiler facility into operation and trial testing of the entire heating system, as well as testing of proper operating of all installed radiator valves and metering and balancing of the pipe network.						
	Calculated as per lump sum.	lump-sum	1	x	240,00 €	=	240,00 €

3	Training of personnel in charge of boiler room operation and heating system maintenance, training of personnel for operation of newly incorporated equipment, as well as training for cases of emergency.						
	Calculated as per lump sum.	lump-sum	1	x	240,00 €	=	240,00 €
4	Installation of one dry powder fire extinguishers (S-9), a vessel with sand, volume 0.25m³, shovel and pick axe. Fully aligned with the fire protection standards.						
	Calculated as per lump sum.	lump-sum	1	x	180,00 €	=	180,00 €
5	Issuing of certificate and cutsheets for the entire fitted material and equipment, fitting framed and glazed scheme of connections at visible place in the boiler room.						
	Calculated as per lump sum.	lump-sum	1	x	180,00 €	=	180,00 €
6	Preparation of "As-built" design.						
	Calculated as per lump sum.	lump-sum	1	x	600,00 €	=	600,00 €

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7	Installation of stop and warning and stop signs on a visible place in the boiler room fully in line with fire protection standards.						
	Calculated as per lump sum.	lump-sum	1	x	145,00 €	=	145,00 €
	Total for B.V - Preliminary and finishing works						**1.885,00 €**

SUMMARY OF COSTS:

A	**ENERGY MANAGEMENT**	**6.517,63 €**
B	**REPLACEMENT OF BOILERS AND HEATING SYSTEM OPTIMIZATION**	
B.I	Dismantling of existing equipment and preliminary works	11.078,90 €
B.II	Boiler room equipment and fittings	42.463,04 €
B.III	Repair of pipe system	2.156,28 €
B.IV	Installation of thermostatic radiator and balancing valves	7.151,60 €
B.V	Preliminary and finishing works	1.885,00 €
	TOTAL PRICE, VAT EXCLUDED	**71.252,45 €**
	VAT (19 %)	**13.537,97 €**
	TOTAL PRICE, VAT INCLUDED	**84.790,42 €**

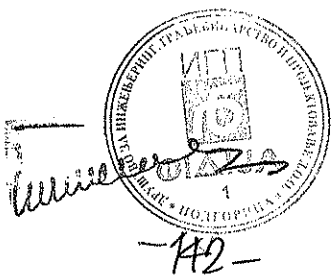
GROUP A5.3.3 **BILL OF QUANTITIES** *of electrical services for energy efficiency improvement in Primary School "Vuko Jovović" in Danilovgrad*	*Investor:*	Ministry of Economy of Montenegro, Energy Efficiency Sector
	Project financed by:	KfW ENTWICKLUNGSBANK
	Consultant:	FICHTNER GmbH&Co. KG
	Sub-Consultant:	KOPRING PMC, Podgorica / SIENERSYS, Podgorica
	School:	P.S. "Vuko Jovović" in Danilovgrad
	Doc. origin:	Final Electrical Design
	Date:	17 October 2013

No.	Item Description	Unit of measure	Quantity		Unit price (€)		Amount (€)
1	**LIGHTING INSTALLATION**						
1.1.	Delivery and laying of cables for light fittings, without installation of new switches, light bulbs and light fixtures. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	NHXMH-J 3x1,5 mm2	m	8,00				
	Works and material:	pc	345	x	14,00	=	4.830,00 €
1.2.	Delivery and laying of cables for antipanic lighting circuits, without placing switches, light bulbs and lighting fixtures. Connection point is from nearest existing junction box. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	NHXMH-J 3x1,5 mm2	m	14,00				
	Works and material:	pc	22,00	x	25,00	=	550,00 €
1.3.	Delivery and laying of cables for lighting in the gym, without placing switches, light bulbs and light fixtures. Electric circuits to be derived from the existing switchboards of the gym. The conductors to be laid partly in the walls/ceilings and plaster or through rigid PVC pipes in walls. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	NHXMH-J 3x1,5 mm2	m	13,00				
	Works and material:	pc	6,00	x	23,00	=	138,00 €

1.4.	Delivery and laying of cables for lighting on the facade of the building, without placing switches, light bulbs and light fixtures . Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	NHXMH-J 3x1,5 mm2	m	22,00				
	Works and material:	pc	3,00	x	39,00	=	117,00 €
1.5.	Delivery and laying of cables for lighting control in corridors. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one light fitting:						
	NHXMH-J 4x1,5 mm2	m	55,00	x	2,00	=	110,00 €
	NHXMH-J 3x1,5 mm2	m	27,00	x	1,80	=	48,60 €
	NHXMH-J 2x1,5 mm2	m	109,00	x	1,60	=	174,40 €
1.6.	Dismantling of existing luminaries. Works to be calculated per unit:	pc	270	x	3,00	=	810,00 €
1.7.	Delivery and mounting of ceiling mounted luminaries 2/35WT16 F840 [STD] T16 x 2/35W, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	7	x	65,00	=	455,00 €
1.8.	Delivery and mounting of ceiling mounted luminaries 1/54W(or 2x28 W) T16 F840 [STD] T16 x 1/54W(or 2x28W), with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Norms 12464 for DSE for working stations. Works and material to be calculated per unit:	pc	124	x	60,00	=	7.440,00 €
1.9.	Delivery and mounting of ceiling mounted luminaries 1/80W T16 F840 with asymmetrical light distribution for school boards lighting, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Luminaries have to be mounted on 2.7 m height from floor level and 0.9 m from wall with board mounted on it. Works and material to be calculated per unit:	pc	18	x	80,00	=	1.440,00 €
1.10.	Delivery and mounting of ceiling mounted luminaries 2/28 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	74	x	60,00	=	4.440,00 €

1.11.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16 IP50, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	2	x	65,00	=	130,00 €
1.12.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	19	x	60,00	=	1.140,00 €
1.13.	Delivery and mounting of ceiling mounted luminaries 2/18 W TC-L IP50, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	3	x	55,00	=	165,00 €
1.14.	Delivery and mounting of ceiling mounted light fitting 1/28 W T16 IP54, with opaline protector, with electronic high frequency ballast, completely equipped with mounting gear and light source 840. Works and material to be calculated per unit:	pc	21	x	55,00	=	1.155,00 €
1.15.	Delivery and mounting of ceiling mounted luminaries 2/35 W T16, with IP65 protection, completely equipped with light source, electrical pre-assembly device, electronic high frequency ballast with dark light diffuser and mounting gear. Works and material to be calculated per unit:	pc	2	x	50,00	=	100,00 €
1.16.	Delivery and mounting of ceiling mounted luminaries 4/80W T16 EVG vandal proof; T16, completely equipped with mounting gear and light source, DIN 18032. Works and material to be calculated per unit:	pc	6	x	120,00	=	720,00 €
1.17.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	15	x	75,00	=	1.125,00 €
1.18.	Delivery and mounting of ceiling mounted antipanic luminaries LED 5W which illuminates 12m of radius with min 1lux. Works and material to be calculated per unit:	pc	6	x	75,00	=	450,00 €
1.19.	Delivery and mounting of wall mounted antipanic luminaries LED 5W, 1h, IP40 which illuminates 12m in length and 2m in width with min 1lux. Works and material to be calculated per unit:	pc	1	x	75,00	=	75,00 €

1.20.	Delivery and mounting of fluorescent antipanic luminaries 8W, 1h with IP40 protection completely equipped with mounting gear and light source according to project of electrical installation. Works and material to be calculated per unit:	pc	4	x	50,0	=	200,0
1.21.	Delivery and installation of MH reflector 250W, IP65, mounted on the facade. Reflector to be equipped with mounting gear and light source. Works and material to be calculated per unit:	pc	3	x	140,0	=	420,0
1.22.	Delivery and installation of modular accessories, white						
	PVC box Ø 60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 2M - pcs 1						
	Total for works and material	lump sum	9	x	9,00	=	81,00 €
1.23.	Delivery and installation of modular accessories, white						
	PVC box Ø 60						
	armature 2M						
	decorative mask 2M						
	ordinary switch 1M - pcs 2						
	Total for works and material	lump sum	6	x	7,00	=	42,00 €
1.24.	Delivery and installation of modular accessories, white						
	PVC box 3M						
	armature 3M						
	decorative mask 3M						
	ordinary switch 1M - pcs 3						
	Total for works and material	lump sum	24	x	12,00	=	288,00 €
1.25.	Delivery and installation of modular accessories, white						
	PVC box 4M						
	armature 4M						
	decorative mask 4M						
	ordinary switch with indication 1M - pcs 4						
	Total for works and material	lump sum	1	x	18,00	=	18,00 €
1.26.	Delivery and mounting of occupancy sensor 360° IP 54, 4m. Works and material to be calculated per unit:	pc	25	x	120,00	=	3.000,00 €
	Total for lighting installation						**29.662,00 €**



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2	**ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION**						
2.1.	Marking the route, excavation and backfilling of the trench with dimensions of 0.4x0.8m for the purpose of laying cables. The excavation should be done by mechanical machines in the soil of III and IV category. This item includes: -delivery and spreading the sand at cable trench. The two layers of sand shall be laid, thickness of 10cm, before and after laying of cable. The sand is laid across the entire width of the trench, -delivery and placing PVC "gal"-protector for mechanical protection of cables at soil trench, after spreading second layer of sand. The protector should be laid to each other, lengthwise, overlapping for by 10 centimeters, completely covering the cable, -delivery and placing warning tape made of soft polyvinyl chloride, which is placed at 20cm from the surface. -delivery and laying of Zink-plated steel tape, Fe/Zn 25x4mm in the cable trench and connecting of the tape on outlet of foundation grounding unit, as shown in the drawings. The tape shall be laid at filling of the trench, after the first layer of excavation. Total for work, calculated per one meter of the trench:	m	14	x	18,00	=	252,00 €
2.2.	Delivery and mounting of deep galvanized perforated able trays 60x200x3000 mm, according to the drawing layouts. Total for work and material:	pc	5,00	x	21,00	=	105,00 €
2.3.	Delivery and installation of bracket, made of sheet metal, 210 mm in width , with fixing screw M10x25, similar to MWA 12/21 manufactured by OBO Bettermann.	pc	18	x	6,00	=	108,00 €
2.4.	Delivery and installation of fixing curve 90°, horizontal, with angular connector, 60 x 100 mm, made of sheet metal similar to RB 90 320 manufactured by OBO Bettermann.	pc	6	x	30,00	=	180,00 €
2.5.	Delivery and mounting of main distribution switchbox "GRO", ready-made with a lock, dimensions 950x800x205 mm, IP54, IK09, class II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Disconnector switch INS 1-0, 80A, 3P	pc	1				
	Fupact ISFT 100/50A	pc	1				
	V25-B/3 + NPE, OBO-Betterman	pc	1				
	Automatic switch iC60N-D/32A, 1p; 6 kA	pc	6				
	Automatic switch iC60N-D/25A, 1p; 6 kA	pc	15				
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	2				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	6				
	Automatic switch iC60N-C/6A, 1p; 6 kA	pc	2				
	Contactor iCT 3NO, 16A, 230V	pc	1				
	Contactor iCT 1NO, 16A, 230V	pc	2				

	Selector switch CM 1-0-2, 16A	pc	2				
	Programmable time switch IHP 24 hours + 7 days	pc	1				
	Cable bushings for cables PG 36	pc	1				
	Cable bushings for cables PG 29	pc	2				
	Cable bushings for cables PG 21	pc	5				
	Cable bushings for cables PG 16	pc	3				
	Cable bushings for cables PG 13.5	pc	11				
	The price includes all material required for installation of this equipment.						
	Total switchbox GRO:	pc	1	x	850,00	=	850,00 €
2.6.	Delivery and mounting of switchbox "RT-S", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, class II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	6				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	5				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-S:	compl.	1	x	80,00	=	80,00 €
2.7.	Delivery and mounting of switchbox "RT-P1", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, class II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-D/25A, 1p; 6 kA	pc	3				
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	4				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	6				
	Contactor iCT 1NO, 16A, 230V	pc	1				
	Differential current protective device iID 25/0,03A, 4p	pc	2				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-P1:	compl.	1	x	200,00	=	200,00 €
2.8.	Delivery and mounting switchbox "RT-P2", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, sass II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-D/25A, 1p; 6 kA	pc	3				
	Automatic switch iC60N-C/16A, 3p; 6 kA	pc	1				
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	19				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	5				
	Contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-P2:	compl.	1	x	190,00	=	190,00 €
2.9.	Delivery and mounting switchbox "RT-I1", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, sass II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-D/25A, 1p; 6 kA	pc	3				
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	5				

	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	6				
	Contactor iCT 1NO, 16A, 230V	pc	1				
	Differential current protective device iID 25/0,03A, 4p	pc	2				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-I1:	compl.	1	x	200,00	=	200,00 €
2.10.	Delivery and mounting switchbox "RT-I2", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, sass II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-D/25A, 1p; 6 kA	pc	3				
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	4				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	5				
	Contactor iCT 1NO, 16A, 230V	pc	1				
	Differential current protective device iID 25/0,03A, 4p	pc	2				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-I2:	compl.	1	x	200,00	=	200,00 €
2.11.	Delivery and mounting switchbox "RT-I3", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, sass II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-D/25A, 1p; 6 kA	pc	3				
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	7				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	7				
	Contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-I3:	compl.	1	x	150,00	=	150,00 €
2.12.	Delivery and mounting switchbox "RT-II1", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, sass II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	5				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	7				
	Contactor iCT 1NO, 16A, 230V	pc	2				
	Differential current protective device iID 25/0,03A, 4p	pc	2				
	The price includes all material required for installation of this equipment.	compl.	1	x	210,00	=	210,00 €
	Total switchbox RT-II1:						
2.13.	Delivery and mounting switchbox "RT-II2", ready made with a lock, dimensions 500x300x161mm, IP44, IK09, sass II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	4				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	6				
	Contactor iCT 1NO, 16A, 230V	pc	2				

	Differential current protective device iID 25/0,03A, 4p	pc	2				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-II2:	compl.	1	x	200,00	=	200,00 €
2.14.	Delivery and mounting switchbox "RT-II3", ready-made with a lock, dimensions 500x300x161mm, IP44, IK09, sass II . The price includes all material required for installation of this equipment. The following equipment shall be installed inside:						
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	3				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	7				
	Contactor iCT 1NO, 16A, 230V	pc	1				
	The price includes all material required for installation of this equipment.						
	Total switchbox RT-II3:	compl.	1	x	120,00	=	120,00 €
2.15.	Delivery and mounting supply cables from KPO to GRO, and from GRO to RT-K. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Then item includes complete delivery with installation, connection and testing of conductors:						
	N2XH-J 4x35 mm2	m	27	x	18,00	=	486,00 €
	N2XH-J 1x35 mm2	m	27	x	5,00	=	135,00 €
	N2XH-J 5x6 mm2	m	40	x	5,20	=	208,00 €
	HDPE Ø32 mm	m	14	x	2,70	=	37,80 €
2.16.	Delivery and mounting supply cables from GRO to RT-P1;2, RT-I1;2;3, RT-II1;2;3. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Then item includes complete delivery with installation, connection and testing of conductors:						
	N2XH-J 5x10 mm2	m	63	x	8,00	=	504,00 €
	N2XH-J 5x6 mm2	m	98	x	5,20	=	509,60 €
2.17.	Delivery and installation of 3-phase connection points with NHXMH-J 5x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one connection point is 23m. Total for work and material:	pc	1	x	66,00	=	66,00 €

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2.18.	Delivery and installation of single-phase connection points with NHXMH-J 3x2.5mm2 conductor. Cables to be laid in walls and/or suspended ceiling and covered by plaster. Installation to be done in accordance with technical description. The price shall include chiseling away of walls/ceilings , electrical connection on both sides and reparation of damaged surfaces. Average cable length per one connection point is 14m. Total for work and material:	pc	105	x	30,50	=	3.202,50 €
2.19.	Delivery and installation of modular accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative mask 2M						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	83	x	7,50	=	622,50 €
2.20.	Delivery and installation of modular accessories, white						
	PVC box 4M						
	armature 4M						
	decorative mask 4M						
	outlet 2P+E 16A, 2M white - pcs 2						
	Total for works and material	compl.	5	x	13,50	=	67,50 €
2.21.	Delivery and installation of modular accessories, white						
	PVC box 6M						
	armature 6M						
	decorative mask 6M						
	outlet 2P+E 16A, 2M white - pcs 3						
	Total for works and material	compl.	11	x	18,00	=	198,00 €
2.22.	Delivery and installation of modular accessories, white						
	PVC box Ø60						
	armature 2M						
	decorative and protective mask 2M, IP55						
	outlet 2P+E 16A, 2M white - pcs 1						
	Total for works and material	pc	2	x	9,00	=	18,00 €
	Total electrical installations for general consumption						**9.099,90 €**
3	**POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT**						
3.1.	Delivery and mounting of prefabricated wall mounted IP 65 switchbox in boiler room, marked as "RT KO", with dimensions 800x600x250 mm, and completely equipped with following parts:						
	Selector switch 1-0-2 40A, 4P, tip SF419G, Hager	pc	1				
	Motor protection switch 0.4 - 0.63A	pc	1				
	Motor protection switch 1,6 - 2,5A	pc	1				
	Automatic switch iC60N-C/20A, 3p; 6 kA	pc	1				
	Automatic switch iC60N-C/16A, 3p; 6 kA	pc	2				
	Automatic switch iC60N-C/16A, 1p; 6 kA	pc	9				
	Automatic switch iC60N-C/10A, 1p; 6 kA	pc	5				
	Cable bushings for cables PG 21	pc	2				
	Cable bushings for cables PG 16	pc	13				
	Cable bushings for cables PG 13.5	pc	5				

	The price includes all material required for installation of this equipment.						
	Total switch box "RT-KO"	compl.	1	x	500,00	=	500,00 €
3.2.	Delivery and laying of cables in wall installations with PVC rigid installation pipes and on galvanized cable trays in boiler room, for electrical circuits of electrical consumers in the boiler room. Works and material are calculated per average measure unit.						
	PP-Y 3x1,5 mm2	m	66,00	x	1,90	=	125,40 €
	PP-Y 3x2,5 mm2	m	131,00	x	2,20	=	288,20 €
	PP-Y 5x2,5 mm2	m	28,00	x	3,00	=	84,00 €
	PP-Y 5x4 mm2	m	13,00	x	3,50	=	45,50 €
	Outlet three phase 3P+N+PE 16A/400V IP55	pc	2,00	x	11,00	=	22,00 €
	Outlet 2P+E / 230V/ IP 55	pc	5,00	x	9,00	=	45,00 €
	Two-way switch IP44 10A	pc	2,00	x	7,00	=	14,00 €
	Delivery and mounting of ceiling mounted emergency luminaries with electronic control gear similar to PRATICA COMPLETA 8W,IP 65, 1h- BEGHELI. Works and material for unit:	pc	1,00	x	57,00	=	57,00 €
3.3.	Delivery and mounting of hard PVC pipes, similar to VRM manufactured by Univolt. The price includes all material required for installation of PVC pipes (curve 90°, connectors, screws..). Total for works and material:						
	Ø16mm	m	22,00	x	1,40	=	30,80 €
	Ø20mm	m	25,00	x	1,70	=	42,50 €
	Ø25mm	m	7,00	x	2,00	=	14,00 €
3.4.	Delivery and mounting of perforated deep galvanized cable trays 60x100x3000 mm, according to drawing layouts . Total for works and material:	pc	3,00	x	22,00	=	66,00 €
3,5	Delivery and installation of metal sheet brackets, 110 mm in width , with fixing screw M10x25, similar to MWA 12/21 manufactured by OBO Bettermann.	pc	9		4,00		36,00 €
3,6	Delivery and installation of fixing curve 90°, horizontal, with angular connector, 60 x 100 mm, made of sheet metal, similar to RB 90 310 manufactured by OBO Bettermann.	pc	1		30,00		30,00 €
	Total for power supply and electrical installation for boiler room and heating equipment						**1.400,40 €**
4	**POTENTIAL EQUALIZATION INSTALLATION**						
4.1.	Delivery and mounting of deep galvanized tape Fe-Zn 25x4 mm for potential equalization in boiler room, according to the installation drawing layouts. Tape is mounted on tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	11,00	x	2,80	=	30,80 €

4.2.	Delivery and mounting of tape carriers type C.L. JUS N.B4.925-P. Works and material are calculated per measure unit.	m	12,00	x	3,00	=	36,00 €
4.3.	Delivery and mounting of tape junction elements type JUS N.B4. 936 for connection between tapes. Works and material are calculated per measure unit.	m	3,00	x	3,00	=	9,00 €
4.4.	Delivery and laying of cables P/F 1x16 mm2 in wall installations with PVC installation pipes and on galvanized cable trays in boiler room, for connecting all metal conductive parts with potential equalization bus bar. Works and material are calculated per measure unit.	m	14,00	x	4,00	=	56,00 €
4.5.	Delivery and mounting box for discharge of static electricity. The box to be mounted at facade of the boiler room. To be installed within the box:						
	Disconnector switch 16A,250V SKX 12/21 0-1, Ex ed II CT6 Tep-EX	pc	1,00				
	P/F 25 mm2 with pliers for connection at end of the tendon	m	10,00				
		compl.	1,00	x	280,00	=	280,00 €
	Total potential equalization installation						**411,80 €**
5	**LIGHTING AND GROUNDING INSTALLATION**						
5.1.	Dismantling of existing lightning protection system.	lump sum	1	x	200,0	=	200,00 €
5.2.	Delivery and installation of lightning conductors and lightning system of round conductor which is made of Al with diameter 10mm. Lightning system is set according to the plan of lightning rod installation. Works and material to be calculated per unit:	m	680,00	x	3,00	=	2.040,00 €
5.3.	Delivery and mounting of lightning conductor bracket. Works and material to be calculated per unit:						
	Roof holder with concrete pad	pc	400,00	x	3,50	=	1.400,00 €
	Lightning conductor holder for wall installation, completely with screw anchor and screw length of 160mm:	pc	180,00	x	3,00	=	540,00 €
	Lightning conductor holder for wall installation:	pc	60,00	x	3,00	=	180,00 €
	Holders for vertical mechanical protection of lightning conductors:	pc	40,00	x	2,80	=	112,00 €
5.4.	Delivery and mounting of connecting elements. Works and material to be calculated per unit:						
	linking clamp strip-strip	pc	20,00	x	3,50	=	70,00 €
	linking clamp strip-wire	pc	20,00	x	3,00	=	60,00 €
	linking clamp wire-wire	pc	65,00	x	3,00	=	195,00 €
	groove clamp	pc	25,00	x	3,50	=	87,50 €

5.5.	Delivery and mounting of vertical mechanical protection for lightning conductors, length of 1500mm. Works and material to be calculated per unit:	pc	20,00	x	14,00	=	280,00 €
5.6.	Delivery and mounting of lightning rod (spike). Works and material to be calculated per unit:	pc	11,00	x	6,00	=	66,00 €
5.7.	Connecting all metal conductive parts on the roof with lightning protection system. Work and material included in price.	pc	1,00	x	70,00	=	70,00 €
5.8.	Delivery and mounting of prefabricated tape junction elements for gutters according to JUS and IEC standards and technical report. Works and material are calculated per measure unit.	pc	14,00	x	5,00	=	70,00 €
5.9.	Delivery and mounting of deep galvanized tape Fe/Zn 25x4 mm2 from existing output of foundation grounding system to the new position of lightning down conductors and to the metal gutters which are not earthed. The price includes excavation and backfilling of ditch, dimensions of 0.4x0.8m. The tape shall be placed through the ditch from the nearest output of foundation grounding system. Work and material to be calculated per measure unit.	m	160,00	x	8,00	=	1.280,00 €
	Total for lighting and grounding installation						**6.650,50 €**
6	**SPARE PARTS**						
6.1	After work completions, it is necessary to deliver the following spare parts to the end user:						
	fluorescent light bulb T16 x 1/80W, 840	pc	2	x	4,00	=	8,00 €
	fluorescent light bulb T16 x 1/54W, 840	pc	2	x	4,50	=	9,00 €
	fluorescent light bulbT16 x 1/35W, 840	pc	2	x	4,20	=	8,40 €
	fluorescent light bulb T16 x 1/28W, 840	pc	2	x	4,00	=	8,00 €
	compact fluorescent light bulb TC-L 18W	pc	2	x	6,00	=	12,00 €
	Total for spare parts:						**45,40 €**
7	**TESTING**						
7.1	Testing of new electrical power supply installation with issuance of attest.	lump sum	1	x	600,00 €	=	600,00 €
7.2	Testing of electrical grounding installation and lightning protection system with issuance of attest.	lump sum	1	x	600,00 €	=	600,00 €
	Total for testing:						**1.200,00 €**
8	**PREPARATION OF MAINTENANCE DESIGN**	lump sum	1	x	**450,00 €**	=	**450,00 €**

SUMMARY OF COSTS:		
1	LIGHTING INSTALLATION	29.662,00 €
2	ELECTRICAL INSTALLATIONS FOR GENERAL CONSUMPTION	9.099,90 €
3	POWER SUPPLY AND ELECTRICAL INSTALLATION FOR BOILER ROOM AND HEATING EQUIPMENT	1.400,40 €
4	POTENTIAL EQUALIZATION INSTALLATION	411,80 €
5	LIGHTING AND GROUNDING INSTALLATION	6.650,50 €
6	SPARE PARTS	45,40 €
7	TESTING	1.200,00 €
8	PREPARATION OF MAINTENANCE DESIGN	450,00 €
	TOTAL PRICE, VAT EXCLUDED	48.920,00 €
	VAT (19%)	9.294,80 €
	TOTAL PRICE, VAT INCLUDED	**58.214,80 €**

GROUP A5.3.4 **ESTIMATED BILL OF QUANTITIES** ***on Indoor Water Supply and Sewerage Services***	***Client:***	**Ministry of Economy of the Republic of Montenegro, Energy Efficiency Department**
	Project financed by:	**KfW ENTWICKLUNGSBANK**
	Consultant:	**FICHTNER GmbH&Co. KG**
	Local designer:	**KOPRING PMC, Podgorica**
	Facility:	**Primary school "Vuko Jovović", Danilovgrad**
	Documentation:	**Final Design of Interior Water Supply and Sewerage Services**
	Date:	**September, 2013**

	GENERAL TERMS
1	Works shall be performed in accordance with valid technical regulations, rules and obligatory standards complied with the construction of this type of buildings.
2	Installed material shall be in accordance with prescribed standards, i.e. with quality certificate.
3	Safety measures concerning buildings, works, equipment, investment materials, labor, passers-by, traffic and surrounding buildings, shall be undertaken in a timely manner.
4	Technical documentation regarding construction approval (Building Permit), shall be complied with.
5	All working costs, material, transport, facility cleaning upon works completion, taxes, profit and all other not mentioned expenditures, shall be incalculated in accordance with item unit price.
6	The following Bill of quantities is only assumed on the basis of the Final Architectural Design. Since the exact position of installation can not be determined without demolition of walls and floors, final Plumbing Design is not prepared. Final costing shall be confirmed in the measurement book and construction log book.

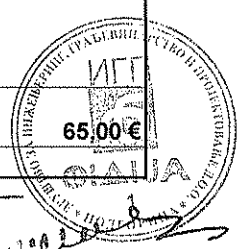
Item	Item Description	Unit	Quantity		Unit Price €		Amount €
I	**WORKS ON REMOVAL OF SANITARY EQUIPMENT, WATER SUPPLY AND SEWERAGE DISTRIBUTION LINES**						
1.01.	Removal of existing lavatories, with siphon trap and faucet, with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation per piece	pc	5,00	x	8,00 €	=	**40,00 €**
1.02.	Removal of existing squat toilets with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation per piece	pc	20,00	x	10,00 €	=	**200,00 €**
1.03.	Removal of existing toilet bowels with water tank with belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation per piece	pc	5,00	x	14,00 €	=	**70,00 €**
1.04.	Removal of existing shower faucets, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation per piece	pc	20,00	x	12,00 €	=	**240,00 €**

1.05.	Removal of existing faucets above concrete lavatories, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation per piece	pc	26,00	x	10,00 €	=	**260,00 €**
1.06.	Removal of existing faucets above concrete urinals, with belonging elements. Carrying out, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation per piece	pc	24,00	x	15,00 €	=	**360,00 €**
1.07.	Removal of existing water supply installations made of zinc-plated steel pipes within the wall, floor and ceiling, with belonging elements (valves, fittings etc.). Wall chase cutting, removal, carrying, truck loading, transport and disposal to the waist depot are included within the unit price.						
	Calculation per m'	m1	115,00	x	15,00 €	=	**1.725,00 €**
1.08.	Removal of existing sewage installations, with belonging elements. Concrete floor smashing, excavation, removal, truck loading, transport and disposal to the waist depot are included within the price.						
	Calculation as per m'.	m'	124,00	x	3,00 €	=	**372,00 €**
1.09.	Removal of existing water heating cylinders, and belonging elements. Carrying, truck loading, transport and disposal to the waist depot are included within the price.				25,00 €		
	Calculation as per piece	pc	2,00	x		=	**50,00 €**
	TOTAL REMOVAL WORKS						**3.317,00 €**
II	**WATER-SUPPLY INDOOR INSTALLATIONS**						
1.01.	Purchase and installation of water supply PP-R pipes for operating pressure of 10,00 bars, together with all required fittings. Pipes must be anchored to the wall by saddles and covered by flexible thermal insulation to prevent condensation. Hot water pipeline has to be thermally insulated on order to prevent heat losses. Pipe joints shall be butt welded all in accordance with pipe manufacturer's recommendations. installed pipes shall be tested at 12 bars pressure. Pipe diameter enclosed within item is nominal pipe diameter "DN". All chase cuttings, hole perforations and restoration to the original state, shall be incalculated within the works performance unit price.						
	Calculation as per m' of installed pipe						
	dø20mm(DN15)	pc	55,00	x	14,00 €	=	**770,00 €**
	dø25mm(DN20)	pc	37,00	x	16,00 €	=	**592,00 €**

1.02.	Purchase and installation of straight stop valves. The valves shall be consisted of chrome plated cap and installed on each outflow point at the separate distribution line branches within sanitary facilities according to the design.						
	Calculation as per installed piece						
	dø20mm(DN15)	pc	50,00	x	11,00 €	=	**550,00 €**
	dø25mm(DN20)	pc	14,00	x	14,00 €	=	**196,00 €**
1.03.	Purchase and installation of "EK" angle valves DN 20mm. The valves shall be installed on each outflow point, except showers, both on cold and hot water distribution lines.						
	Calculation as per installed piece						
	EK DN20mm	pc	25,00	x	12,00 €	=	**300,00 €**
1.04.	Complete water supply installations test at test pressure of 12 bars. Upon completed test the Report shall be made. The Report shall be signed by Contractor and Supervisor. Complete material and equipment are included within the unit price.						
	Calculation as per m of tested pipeline	m	92,00	x	1,00 €	=	**92,00 €**
1.05.	Disinfection of complete water supply installations. The following actions shall be done: Chlorination, chemical and bacteriological tests of water from installations. Complete material, equipment and prescribed analyses are included within the unit price. Disinfection works shall be done by certified organization.						
	Calculation as per m of disinfected pipeline	m	92,00	x	1,00 €	=	**92,00 €**
1.06.	Various unpredictable works resulted after revealing of existing installations and adaptation of connection way between new and existing installations. The unit price shall be given as 15 % of the summarized unit price of previous items: 1-5, within this type of works.	lump sum	1,00	x	400,00 €	=	**400,00 €**
	TOTAL WATER-SUPPLY INDOOR INSTALLATIONS						**2.992,00 €**
III	**SANITARY SEWERAGE INDOOR INSTALLATIONS**						
3.01.	Purchase and installation of PP sewage pipes for interior installations, together with all required sealing equipment for proper network operation. Pipe connecting shall performed by rubbers. Upon finished pipes assembling to rinse pipelines and performed distribution lines has to be waterproof tested. All chase cuttings and hole perforations within walls and structures, as well as bringing the walls back into original state shall be incalculated within the unit price. Calculation as per m' of installed pipes.						
	DN50mm	m	53,90	x	16,00 €	=	**862,40 €**
	DN75mm	m	25,30	x	18,00 €	=	**455,40 €**



	DN110mm	m	58,30	x	20,00 €	=	**1.166,00 €**
3.02.	Purchase and installation of required supports and fixing saddles with rubbers for sewage pipelines: DN 50, DN 75, DN 110 mm. The pipes shall be anchored to the walls and interfloor structure.						
	Calculation as per m' of anchored pipe	m	90,30	x	4,00 €	=	**361,20 €**
3.03.	Purchase and installation of fittings for interior sewage installations, made of hard PP. All the fittings shall sealed by rubbers of corresponding diameter.						
	Calculation as per piece.						
	"Y" branch Ø 75 / 50	pc	3,00	x	4,00 €	=	**12,00 €**
	"Y" branch Ø 50 / 50	pc	12,00	x	4,00 €	=	**48,00 €**
	"Y" branch Ø 110 / 50	pc	2,00	x	4,00 €	=	**8,00 €**
	"Y" branch Ø 110 / 110	pc	5,00	x	4,00 €	=	**20,00 €**
	"T" branch Ø 110 / 110	pc	9,00	x	4,00 €	=	**36,00 €**
	"T" branch Ø 50/50	pc	12,00	x	4,00 €	=	**48,00 €**
	Siphon arch trap 50	pc	5,00	x	4,00 €	=	**20,00 €**
	Elbow 45° / 110	pc	28,00	x	4,00 €	=	**112,00 €**
	Elbow 45° / 50	pc	39,00	x	4,00 €	=	**156,00 €**
	Elbow 90° /50	pc	25,00	x	4,00 €	=	**100,00 €**
	Elbow 45° / 75	pc	9,00	x	4,00 €	=	**36,00 €**
	PP reducer 75/50	pc	3,00	x	4,00 €	=	**12,00 €**
	PP reducer 110/50	pc	5,00	x	4,00 €	=	**20,00 €**
	PP reducer DN75	pc	3,00	x	4,00 €	=	**12,00 €**
	PP revision DN110	pc	8,00	x	4,00 €	=	**32,00 €**
	Siphon for squat toilette Ø 110	pc	20,00	x	4,00 €	=	**80,00 €**
	double "Y" branch Ø 75 / 75	pc	3,00	x	4,00 €	=	**12,00 €**
	double "Y" branch Ø 110 / 110	pc	3,00	x	4,00 €	=	**12,00 €**
	double "T" branch Ø 110 / 110	pc	5,00	x	4,00 €	=	**20,00 €**
3.04.	Purchase and installation of floor drains in order to prevent odors and possible vapors out of water trap, type "HL310NPr" or similar. Calculation as per piece						
	Floor drain, type: "HL310NPr"	pc	26,00	x	24,00 €	=	**624,00 €**
3.05.	Purchase and installation of ventilation head HL900N or similar one. Calculation as per piece						
	ventilation head HL900N	pc	5,00	x	33,00 €	=	**165,00 €**
3.06.	Excavation and ditch backfilling 40 cm wide, where under floor installations shall be laid down, by manually compacted sand and making of concrete slab of 20cm thickness.						
	Calculation as per m'	m	26,00	x	15,00 €	=	**390,00 €**
3.07.	The ground sewerage pipe connecting to the first manhole in the backyard shall be checked and cleaned due reported frequent clogging.						
		lump sum	1,00	x	65,00 €	=	**65,00 €**



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3.08.	Cleaning and improvement of the main sewerage man hole in the mail toilet on the ground floor. Purchase and installation of metal shaft cover dim 50x50cm.						
	Calculated as per piece.	pc	1,00	x	110,00 €	=	**110,00 €**
3.09.	Various unpredictable works as a result of revealing of the existing installations and adapting the ways of joining process of new installations to the existing ones. The unit price shall be given as 15 % of the summarized unit price of previous items: 1-8, within this type of works.	lump sum	1,00	x	650,00 €	=	**650,00 €**
	TOTAL SANITARY SEWERAGE INDOOR INSTALLATIONS						**5.645,00 €**
IV	**SANITARY EQUIPMENT**						
4.01.	Purchase and installation of toilet bowl completely made of ceramics, type "simplon", with plastic low mounted water tank, connection pipes, sealing and gaskets, including all other bits and pieces necessary for proper installation of the toilet bowl. Calculation as per piece.						
	Type: "Simplon"	pc	5,00	x	165,00 €	=	**825,00 €**
4.02.	Purchase and mounting of cast-iron squat toilette, first class one. The squat toilette and network should be connected by siphon trap of Ø100. Water tank should be mounted with accessible handle and connected with water supply network by chrome-plated valve and hose. Squat toilette should be ordered as per designer's decision. Calculation as per pieces.						
	Squat toilette	pc	20,00	x	155,00 €	=	**3.100,00 €**
4.03.	Purchase and mounting of cool water tap over the concrete lavatory, with sealing and gaskets including all other bits and pieces necessary for proper installation.						
		pc	18,00	x	65,00 €	=	**1.170,00 €**
4.04.	Purchase and mounting of cool water tap over the concrete urinal, with sealing and gaskets including all other bits and pieces necessary for proper installation.						
	toilette urinal	pc	24,00	x	80,00 €	=	**1.920,00 €**
4.05.	Purchase and installation of lavatory sink completely made of ceramics, a wall mounting type by screws, chrome-plated wall mounted tap for cold water only, chrome plated siphon trap, towel holder, mirror with shelf and other accessories for proper operation.						
	Calculation as per piece	pc	5,00	x	155,00 €	=	**775,00 €**
4.06.	Purchase and installation of water heater of 80 l capacity with riser pipelines, safety valves and all additional bits and pieces.						
	Calculation as per piece	pc	2,00	x	160,00 €	=	**320,00 €**

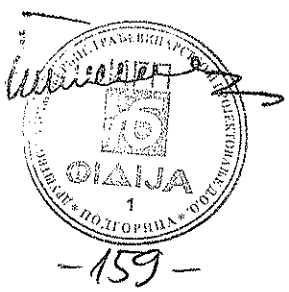
	TOTAL SANITARY EQUIPMENT						**8.110,00 €**

SUMMARY OF COSTS

I	REMOVAL WORKS	**3.317,00 €**
II	WATER-SUPPLY INDOOR INSTALLATIONS	**2.992,00 €**
III	SANITARY SEWERAGE INDOOR INSTALLATIONS	**5.645,00 €**
IV	SANITARY EQUIPMENT	**8.110,00 €**
	TOTAL PRICE, VAT EXCLUDED	**20.064,00 €**
	VAT (19 %)	**3.812,16 €**
	TOTAL PRICE, VAT INCLUDED	**23.876,16 €**



2.2 Price Schedule - Grand Summary		
No.	**Description**	**Total Price per Building [EUR]**
	Educational Building 1	
A.5.1	Secondary School "Branko Božović", Podgorica	745.594,67
	Educational Building 2	
A.5.2	Primary School "Oktoih", Podgorica	628.361,18
	Educational Building 3	
A.5.3	Primary School "Vuko Jovović", Danilovgrad	668.244,82
	Grand Total for All Schools (Total Contract Price)	2.042.200,67



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2.3 Price Schedule - Group Prices		
No.	**Description**	**Total Price per Works [EUR]**
A.5.1	**Educational Building 1: "Branko Božović", Podgorica**	***745.594,67***
A.5.1.1	Building and trade works	559.667,76
A.5.1.2	Thermo-technical (heating) services	118.482,95
A.5.1.3	Electrical services	48.478,10
A.5.1.4	Sanitary (Water Supply and Sewage) services	18.965,86
A.5.2	**Educational Building 2: "Oktoih", Podgorica**	***628.361,18***
A.5.2.1	Building and trade works	497.621,35
A.5.2.2	Thermo-technical (heating) services	84.639,46
A.5.2.3	Electrical services	46.100,36
A.5.3	**Educational Building 3: "Vuko Jovović", Danilovgrad**	***668.244,82***
A.5.3.1	Building and trade works	501.363,44
A.5.3.2	Thermo-technical (heating) services	84.790,42
A.5.3.3	Electrical services	58.214,80
A.5.3.4	Sanitary (Water Supply and Sewage) services	23.876,16



2.4 Options				
No.	Description	Unit	Qty	Total Cost [EUR]
		1	2	3=1 x 2
	Primary School"Branko Božović" in Podgorica			
Building and trade works				
2	**THERMAL INSULATION AND WATERPROOFING OF THE ROOF**			
2.01.	Removal of existing thermal insulation and waterproofing from the flat and impassable roof, reaching concrete floor in following layers (data from the existing designs: - waterproofing 4+2+1, 1,5cm - cement glazing 1:3, 2cm - sloping layer, 4-20cm - roofing paper, - "Heraklith boards", 3cm -roofing paper. The unit price to include all the work and debris dumping at the town landfill, up to 5 km distance.	0,00	236,09	**0,00**
	Calculated as per m2.			
2.04.	Making the waterproofing system SIKA as follows: 1 / cleaning flat roof as preparation for installation of thermal insulation,, 2/ Thermal insulation made of extruded polystyrene panes XPS d=10cm, having heat conductivity coefficient of λmax = 0,033 W/mK (measured over the already installed foil); 3/Placing geotextile AD Plastik 416131 Geotextile T-300B 4 / Seting the waterproofing membrane, type Sikaplan-SGmA 1.5 (Trocal SGmA , 1.5.) 5/ Placing geotextile AD Plastik 416131 Geotextile T-300B 6/Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel.	49,00	250,31	12.265,19
	Primary School"Oktoih" in Podgorica			
Building and trade works				
2	**THERMAL INSULATION AND WATERPROOFING OF THE ROOF**			
2.01.	Removal of existing thermal insulation and waterproofing from the flat impassable roof until reaching concrete floor in following layers (data from existing designs): - waterproofing 4+2+1 1,5cm - cement glazing 1:3 2cm - sloping layer 4-20cm - roofing paper - "Heraklith" boards 3cm - roofing paper The unit price to include all the work and debris dumping at the town landfill up to 5 km distance.	0,00	251,15	0,00
	Calculation per m2.			

2.4 Options				
No.	Description	Unit	Qty	Total Cost [EUR]
		1	2	3=1 x 2
2.04.	Making the waterproofing system SIKA as follows: 1 / cleaning flat roof as preparation for installation of thermal insulation, 2/ Thermal insulation made of extruded polystyrene panes XPS d=10cm, having heat conductivity coefficient of λmax = 0,033 W/mK (measured over the already installed foil); 3/Placing geotextile AD Plastik 416131 Geotextile T-300B 4 / Seting the waterproofing membrane, type Sikaplan-SGmA 1.5 (Trocal SGmA , 1.5.) 5/ Placing geotextile AD Plastik 416131 Geotextile T-300B 6/Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel.	49	251,15	12.306,35
	Primary School "Vuko Jovovic" in Danilovgrad			
Building and trade works				
II	**THERMAL INSULATION OF THE FLAT ROOF**			
2.01.	Removal of the existing thermal insulation and waterproofing off the flat impassable roof to the concrete floor structure shall be done in following layers: -waterproofing (3 layers of card board and 4 layers of coating with albit fol protection), - sloping layer (lean concrete d = 5-16cm), - thermal insulation (hollow brick d=7cm or durisol boards). The unit price includes all works and transportation of debris to a landfill. The unit price, also includes 30cm of waterproofing put up against the walls.			
	Calculation per m^2.			
	roof over the main school building	0,00	1.067,00	0,00
	roof over the kitchen	0,00	21,01	0,00
	the entrance canopy	0,00	78,00	0,00
2.05.	Making the waterproofing system SIKA as follows: 1 / cleaning flat roof as preparation for installation of thermal insulation, 2/ Thermal insulation made of extruded polystyrene panes XPS d=10cm, having heat conductivity coefficient of λmax = 0,033 W/mK (measured over the already installed foil); 3/Placing geotextile AD Plastik 416131 Geotextile T-300B 4 / Seting the waterproofing membrane, type Sikaplan-SGmA 1.5 (Trocal SGmA , 1.5.) 5/ Placing geotextile AD Plastik 416131 Geotextile T-300B 6/Heavy protection of waterproofing with gravel d = 5 cm, with the sliding layer of waterproof dimpled membrane, placed dry between waterproofing and gravel.			
	roof over main school building	49	1.067,00	52.283,00
	roof over the kitchen	49	21,01	1.029,49
	Total Atlernative Items excluding VAT			77.884,03
	VAT 19%			14.797,97
	Total Alternative Items			**92.682,00**

2.5 Price Schedule Extra Works

No.	Description	Unit	Quantity	Rate [EUR]
			1	2
I	**Labor**			
1.	**Supervisor unit rates**			
1.01	Leading Contractor Engineer	hour	1	25,00
1.02	Site engineer (architectural works, civil works, thermal-technical (heating), electrical, water supply and sewage services)	hour	1	18,00
1.03	Design engineer	hour	1	16,00
1.04	Foreman	hour	1	13,00
2.	**Labor unit rates**			
2.01	Unskilled laborer	hour	1	5,50
2.02	Sheet metal worker	hour	1	8,00
2.03	Bricklaying worker	hour	1	8,00
2.04	Bar bender	hour	1	8,00
2.05	Plastering worker	hour	1	8,00
2.06	Waterproofing worker	hour	1	9,00
2.07	Carpenter	hour	1	9,00
2.08	Ironmongery worker	hour	1	9,00
2.09	Joinery assembler	hour	1	8,00
2.10	Floor (parquet) worker	hour	1	9,00
2.11	Ceramic worker	hour	1	9,00
2.12	Painter	hour	1	9,00
2.13	Electrician	hour	1	10,00
2.14	Heating services assembler	hour	1	10,00
2.15	Plumber	hour	1	10,00

II Material

The Bidder shall state the percentage on-cost which would be added to the net cost of any sub-contracted extra supply or works not covered by the Contract/unit rates.
This percentage must include handling charges and all other costs involved in providing extra equipment or work at site in accordance with the General Conditions of Contract and the requirements of the Technical Requirements

_____**30 %**

III Plant and equipment

The Bidder shall add to the list all other items of plant which he expects to have on site