

Section VI

TECHNICAL SPECIFICATION

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VOLUME 3

SECTION GENERAL TECHNICAL SPECIFICATION

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3.1.1 LIST OF ABBREVIATIONS

Abbreviation	Full Reference
ACAD	Auto-CAD- computer aided design
AHD	Average Haul Distance
BoQ	Bill of Quantities
BS	Basement
CA	Contracting Authority
Cca	Circa (approximately)
CE	Conformity European
Const. Book.	Construction Book (presented executed works)
ČPČ	Pure - Half pure
CSNU	Central Supervisory and Control System
Day	Calendar Day
DD	Detailed Design
DEA	Diesel electric generating set
DN	Diameter Nominal
DNP	Defects Notification Period
EMP	Environmental Management Plan
EN	European Norms
ENEC	European Norms Electrical Certification
EU	European Union
FP	Fire Protection
GC	General Conditions
GF	Ground floor
GRO	Main distribution cabinet
GSIP	Main Bus for Potential Equalization
H&S	Health and Safety
H&S&E	Health, Safety and Environment
HVAC	Heating, Ventilating, and Air Conditioning
ICT	Information and Communications Technologies
IEC	International Electro Technical Commission
ISO	International Organization for Standardization
JA	Judicial Academy
JUS	Yugoslavian Standard
KRK	Cable Connection
LAN	Local Area Network
LED	Light-emitting Diode
MCB	Main Circuit Board
Misc.	Miscellaneous
MS	Method Statement
MSDS	Material Safety Data Sheet
OSB	Oriented Strand Board
OSHA	Occupational Safety and Health Administration
PAC	Provisional Acceptance Certificate
PCT	Perforated Cable Tray
PE	Poly Ethylene
PM	Project Manager
PP	Polypropylene
PRAG	Procedures and Practical Guide
PVC	Polyvinyl Chloride
QAP	Quality Assurance Plan
QAS	Quality Assurance System
RAL	Colouring system (Reichs-Ausschul3 fUr Lieferbedingungen und Gtitesicherung)
RC	Reinforced Concrete
MNE	Montenegro
TMP	Trafic Management Plan
TS	Technical Specifications

3.1.2 GENERAL REQUIREMENTS

These General Requirements take precedence over the Technical Specifications, BoQ and apply to all types of work.

Introduction

The General Technical Conditions pertain to all types of works described in the special technical conditions, in the Bill of Quantity and Main Design, as well as the works which may occur during the execution of works and are necessary for completion of project. The obligation of the Contractor is to study these Technical Conditions in detail, to examine in advance the Main Design and terrain at the construction site, in order to get a clear picture of the type and scope of works involved. In case that the technical documentation is not clear enough, the Contractor should ask for clarifications in written form. If the Contractor finds discrepancies in the technical documentation, he is obliged to inform the Supervisor.

All works included in the Bill of Quantity must be carried out in accordance with the technical description of positions, general technical conditions, requests of the main design, details of the project, as well as requirements of the Supervisor. The Contractor's scope of works shall include all required activities to ensure the correct and proper realization of construction / adaptation and reconstruction works. The Contractor is responsible for complete and accurate performance of works in accordance with Main Design.

Notwithstanding the content of the item descriptions below the Contractor will be deemed to have included in his rates and prices the full inclusive cost of carrying out all the works described in the General Technical Conditions.

Standards:

The stated Technical Description / Specifications are an English translation of the descriptive part of the main project published in Montenegrin. Whenever this document refers to standards (national, European, etc.) and manufacturers, it should be read "or equivalent"

Any standard that meets the same functionality and describes the same level of quality or better can be replaced by any of the listed standards.

Specified manufacturer's products:

Manufacturer's name or catalogue number, if shown in the Technical Description / Specification or indicated on the Drawings or Bill of Quantities, are given only for indicative purposes and for general reference only. It shall be understood that the actual material supplied shall meet the requirements of the Specifications, and if necessary, the material specified under such manufacturer's name or catalogue indicated for reference, shall be modified under the direction of the Supervisor.

Alternative materials:

If during the course of the Contract certain materials or items required for use in the Works

should be unobtainable, despite the best effort of the Contractor, the Contractor may offer for the approval of the Supervisor alternative materials or items, provided that they possess the minimum requirements of the originally specified material.

In the event of acceptance of any alternative materials or items a suitable price reduction shall be made in respect of any decrease in value but no price addition shall be made in respect of increase in value.

In the event of refusal of any alternative materials or items the Contractor shall not be relieved of any of his obligations under the Contract and shall be solely liable for any delay or loss occasioned by his failure to provide the material or items as specified.

3.1.2.1 Background of the Project

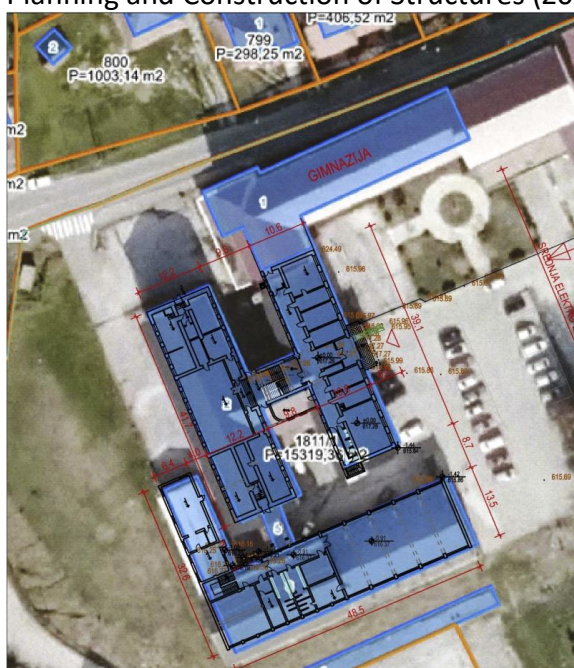
The aim of the project is reconstruction and refurbishment of the part of existing facility "Srednja elektro ekonomska škola" in Bijelo Polje in purpose of replacement of existing old wooden ceilings and floors with a new one, with metal construction.

Location of the building

The facility is situated in Bijelo Polje, Vladike Knezevica Volodjina Street. The building consists two parts - the main building and annex, connected by a passage on the first floor. As the buildings are not with the same of floor heights, overcoming of the different floor levels was achieved by stairs in the connecting corridor between these two parts of buildings.

The old building which is partly refurbishing consists of two tracts, connected by stairs on half landing. The first tract consist basement, ground floor and first floor, and the second tract consists ground floor and two floors. The building has several exits, the main on the first tract, and the auxiliary one in the staircase landing zone in the ground floor.

Reconstruction works include civil, electrical, and other works necessary for the operation of the facility. Works will be executed according to the revised Main Design, based on the design documentation prepared according to the Montenegrin regulations, and valid Law of Spatial Planning and Construction of Structures (2017).



3.1.2.2 Drawings provided by the Designer

All basic drawings necessary for preparation of Contractor's Proposal are enclosed in Volume 5 of the tender documentation. All construction works shall be performed in compliance with the requirements of the provided revised technical and working designs, the regulations in force and these TS.

3.1.3 CONSTRUCTION SITE

3.1.3.1 Fencing of the Construction Site

The Contractor must maintain the security of its activities, including fencing of the construction site according to the regulatory requirements.

The Contractor shall fence the construction site, in the parts where external and internal works are planned.

The fence shall be installed in line with the regulations on occupational health and safety and a sketch of the construction site approved by the Supervisor.

Construction site board prepared in accordance with the Law on Planning and Construction shall be placed on the temporary fence adjacent to the entrance gate to the site.

The Contractor shall provide the whole information concerning the regulations and procedures governing the use of local facilities for access, transport, storage facilities and in compliance with them to take measures for providing the necessary documents.

The Contractor shall be aware of existing restrictions and shall be responsible for their observance during construction.

The Contractor shall be liable for all damages on the existing infrastructure caused by him - they shall be repaired at its expense.

The Contractor will be responsible for ensuring the control of any access or the right to leave the boundaries of the construction site, so that it does not lead to interference with the locals or damage to public or private property as a result of the entry or exit of its employees and subcontractors.

The Contractor shall indentify and hold harmless the Contracting Authority against any accusations arising from its failure to comply with the above point, including legal fees and costs.

At finalization of works (Provisional Acceptance), all temporary fences, gates and signs erected by the Contractor must be removed.

The item shall be paid as a lump sum.

3.1.3.2 Visibility

A Signboard, prepared according to the "Visibility Guidelines of the European Union", shall be fixed on the temporary fence adjacent to the entrance gate to the site as well as Rulebook about shape and outlook of the construction building board (Official Gazette of Montenegro no.040/17, from 27.10.2017)

The Contractor shall obtain instructions from the Supervisor regarding information to be displayed on the signboard. The dimensions and text on the board shall be as per the requirements in the latest version of the EU "Visibility Guidelines" which can be found at <https://ee.europa.eu/europeaid/funding/communication-and-visibility-manual-eu-external-acticms.en>.

All supplied goods must comply with requirements laid down in the "Communication and Visibility in EO-financed external actions". For the purpose of visibility and clarity of labeling, all hardware shall have a solidly fixed metallic or solid plastic label. Self-adhesive paper or film is not allowed. The EU emblem must prominently feature and the phrase "provided with the financial support of the European Union" in English and Montenegrin. Events such as a "hand-over ceremony" should be envisaged and implemented according to visibility requirements.

The Contractor shall not undertake or allow bill posting or advertising of any kind upon the Works without the written consent of the Supervisor.

The item shall be paid as a lump sum.

3.1.3.3 Temporary Site Facilities

The Contractor, prior to the start of construction works, shall submit a draft Design for the organization and execution of construction. The Design must be submitted no later than 15 days before the planned start of construction works. The Design must indicate the work zones, as well as areas for temporary storage of necessary construction materials and goods, and areas for temporary settlements for the personnel of the Contractor and Supervisor.

The Contractor shall provide and install all necessary facilities/installations for accommodation of its staff, including dressing and rest containers, toilets, drinking and washing water, electricity, etc. All costs for temporary facilities shall be included in the Bid.

The item shall be paid as a lump sum.

3.1.3.4 Facilities and Equipment for the Contractor and the Supervisor

The Contractor shall hand over the fully equipped office to the Supervisors within 2 weeks of being ordered to do so.

The cost of office and accommodation shall be paid by the Contractor and shall be included in the unit prices in the Bill of Quantities.

The Contractor shall procure, at its own risk and expense, all additional facilities outside the site that may be necessary for its work.

3.1.3.4.1 Offices for the Supervisor

All offices for the Supervisor shall have at least two grounded electrical sockets, rooms exceeding 10 m² floor areas, having at least one additional socket per 5 m² of floor area or part thereof.

The Contractor shall supply, install and maintain in the offices equipment and furniture which shall be new, undamaged and complete with all necessary keys.

The Contractor shall supply, install and maintain furniture such as desks, cupboards, drawing tables and plan chests, chairs and shelves, etc. in the numbers, trademarks and quality as approved by the Supervisor.

The Contractor shall arrange internet connection. The item shall be paid as a lump sum.

3.1.3.4.2 Protective Equipment for the Supervisor

The Contractor shall initially provide the Supervisor with protective clothing and equipment, as follows, and, as the Supervisor considers necessary, provide replacement items under the provisions for maintenance of the Supervisor's facilities. Prior to making this provision, the Contractor shall obtain a list of appropriate sizes from the Supervisor. As and where the Contractor's methodology, activities or planned testing program may require additional protective equipment (such as gloves, earplugs, goggles, torches etc.) the Contractor shall make these available to the Supervisor when the need arises.

The item shall be paid as a lump sum.

3.1.3.4.3 Facilities for the Contractor

The Contractor shall provide and maintain on site suitable site offices for its own use. It shall also provide and maintain on approved sites, sufficient stores, tanks and workshops for the proper storage of materials, fuel plant and equipment.

The stores shall be of such size and construction to provide adequate storage and protection of stocks of material, fuel, spares, etc. in quantities ensuring uninterrupted progress of the work. Workshops shall be suitably equipped to ensure carrying out of major repairs, overhaul or modification by the Contractor of all plant and equipment in or on the Works. The Contractor shall allow in its rates for all costs related to provision of the offices and workshops for its own use.

The item shall be paid as a lump sum.

3.1.3.5 Site Cleaning

The Contractor shall make every effort to keep the site tidy and in orderly manner and to take at any time every possible precaution against the contamination of subsoil and groundwater.

The Contractor shall be responsible for making all arrangements for the disposal of solid and liquid wastes from the site. Furthermore, the Contractor shall give strict instructions to all its employees to use the sanitary accommodation provided at the site.

The item shall be paid as a lump sum.

3.1.3.6 Storage of Equipment and Materials in Public Space

Construction materials and equipment shall not be stored outside the site borders. All documents and requests for approval have to be submitted to the Supervisor. Approvals and instructions are given exclusively by the Supervisors.

Where Works are to be completed in public spaces, all plant and excess material shall be removed immediately from the site upon completion of the relevant task so as to limit public objections and complaints.

The item shall be paid as a lump sum.

3.1.3.7 Traffic Arrangements

The Contractor shall, as far as be required, comply with all requirements and recommendations of the Police and Authorities regarding traffic arrangements and road safety measures on public roads outside the construction sites.

The Contractor shall, where necessary, provide all barriers and traffic signs agreed by the Supervisor.

Traffic diversions, if necessary, shall be planned and arranged with the responsible Authorities by the Contractor and harmonized with the Supervisor. No diversion shall be implemented without a written consent of the responsible Authority and after given information to the Supervisor. Access to the site shall be available to vehicles of emergency services and residents in the areas.

All traffic signs and traffic control signals, as necessary and/or may be required by the Police Authority for the safe direction and control of the traffic, shall be provided, placed and maintained by the Contractor on the appropriate sites and locations on the access to the sites. The location and size of all such signs and the lettering thereon shall be agreed by the Supervisor before placement of the signs.

The Contractor shall reposition, cover or remove signs as required during the progress of the works. The item shall be paid as a lump sum.

3.1.4 CONTRACTOR'S GENERAL RESPONSIBILITIES

3.1.4.1 Management of the Project by the Contractor

The Contractor shall provide the Quality Assurance Plan(QAP) for the management and execution of construction works.

The QAP should reflect the management structure and clearly describe the duties, responsibilities and powers of each member of the Contractors' staff.

The representative of the Contractor and its staff must possess experience and qualifications according to the contract, MNE Law and type and scope of works.

The QAP will be updated and provided again whenever there is a change in personnel.

3.1.4.2 Approval and Instruction by the Supervisor

All requests for instruction, approval of documents and drawings should be submitted to the Supervisor. The Supervisor is the only actor who can give instruction, direction or approval to the Contractor.

The Supervisor will supervise the works and give instructions according to Law on Planning and Construction and PRAG requirements defined by these TS and Contract.

Approvals, instructions or directions by the Supervisor shall not relieve the Contractor from its liabilities and responsibilities under the Contract.

3.1.4.3 Quality Assurance Plan

The Contractor shall be responsible for assuring such quality of materials, works and processes that shall comply with the requirements of the Specifications.

In order to meet the specified requirements, the Contractor shall implement Quality Assurance System presented in Quality Assurance Plan (QAP) containing the following details:

- Quality control procedures
- Personnel responsibilities
- Procurement procedures
- Testing procedures
- Equipment and measurement devices
- Frequency of testing, measurements etc.
- Holding points in production for inspection
- Rejection and corrective procedures
- Documentation and communication
- H&S and Environmental Plan.

The Contractor shall be liable to keep a register of all materials delivered on site or implemented in the construction to be accessed for review upon request by the Supervisor or Contracting Authority. Also, the Contractor shall maintain archive of the whole correspondence and instructions.

The Contractor shall within 28 days of the date of the Letter of Acceptance provide the Supervisor with the Organization chart containing names, CVs and duties of all key personnel whether or not they are related to quality assurance directly.

The item shall be paid per piece of completed documents.

3.1.4.4 Work Program

3.1.4.4.1 Form of submissions

The Work Program presented by the Contractor shall consist of a detailed schedule of all construction works and phases. Once approved by the Supervisor, the Work Program shall be binding for the construction works on site.

3.1.4.4.2 Requirements

The Contractor shall present a Work Schedule for execution of the works with distribution of resources and manpower, including volume of works, number of workers for the stage, coordination of activities, interaction with different participants in the process, time limit for execution and sequence of the works to the Supervisor for approval according to this Contract.

3.1.4.4.3 Work program

Pursuant to the requirements, the Work Program to be submitted by the Contractor shall show the planned monthly rates of progress between the program dates for commencement and completion of each major item or work for the various stages of construction, in accordance with the Conditions of Contract.

The Work Program shall take into account climatic conditions, groundwater, geo-technical data, completion of critical components by the Contractor or other contractors, water supply service conditions and other conditions, to ensure the completion of the works in accordance with the Contract.

The Contractor shall not be permitted to commence any construction work on that part of the works until the Supervisor has no objection to the method statements, drawings and calculations. Sufficient time for

approval of drawings materials and method statements must be allowed for in the Work Program for each component.

The Contractor shall allow in its Program a reasonable period for work to be carried out by Public Utility Services, Authorities and the Beneficiary where necessary. The Beneficiary will provide all necessary assistance in liaising with such Authorities.

The Contractor shall also allow in its Program sufficient time required for Provisional Acceptance and for the maintenance periods (Defects Notification Period) as stipulated in the Contract.

3.1.4.5 Monthly Progress Reports

During of the execution of the Contract, the Contractor shall follow the progress of activities relative to the time schedule and shall submit to the Supervisor Monthly reports for the results of its activities, conforming to the following requirements:

- The Report to be provided to the Supervisor in 1 hardcopy in Montenegrin and English languages as well as digitally (on CD enclosed to the Report)
- Diagrams with detailed progress description, Contractor's documents, delivery, construction works, assembly and tests
- Digital photos (on CD enclosed to the Report)
- Linear chart (schedules) for the current Stage, showing the actual and the planned progress
- Provision of resources - actual and planned
- Diagram for labor flow - actual and planned
- Report, reflecting all considerable differences from the construction program, and if necessary, explanation for the proposed steps to be undertaken for the completion of the approved program;
- Statistics on safety and environment protection
- Financial Statement

When actual work progress differs from that shown in the Construction Program, the Contractor shall submit an updated schedule to the Supervisor. The updated time schedule shall be current to the last day of a calendar month and shall show the detailed "work-as-executed" program in respect of work carried out. It shall be submitted within ten working days of the following month at the latest.

Processing of the Interim Payment Certificate (IPC) is conditioned with completed Progress Report. According to Special and General Conditions to the Contract

3.1.4.6 Progress Photographs

Digital color photographs showing the progress of the Works in detail shall be taken by the Contractor every week, from positions to be selected by the Supervisor.

The Contractor shall hand over the corresponding electronic files to the Supervisor on a CD, as well as an electronic list numbering and labeling each photography (location, date when taken and a brief description or title).

The item shall be paid as a lump sum.

3.1.4.7 Contractor's Design Documentation

For the Design, works and supply use of metric units is compulsory.

All documents will be issued in English. The official documents, which are to be presented to authorities (such as for the purpose of the issuance of permits, of an inspection, etc.), will be issued in Montenegrin language too.

Works documentation (see Chapter 3.1.4.) will be in English and in Montenegrin, except Construction Log, which will be in Montenegrin.

Reports and correspondence documentation will be in English and in Montenegrin.

When submitted as electronic files, the documents shall be compatible with the following formats: texts in

MS Word, tables in MS Excel, drawings in ACAD, time schedules in MS Project.

During the entire Project, the Contractor is obliged to act in line with the Contract with all applicable annexes, PRAG rules and regulations and all laws and standards valid at the time of execution of activities. Laws and regulations include, but are not limited to Law on Spatial Planning and Construction of Structures, Law on Occupational Health and Safety, Fire protection regulations, etc.

Design for execution

The Contractor shall prepare, in accordance with MNE legislation, Main design drawings included in this Tender Dossier and taking into account the Contracting Authority's Requirements, written in the present Technical Specifications.

In course of development of the Design for execution, the Contractor is obliged to foresee all necessary provision for access of disabled persons to the premises.

Works documentation

The Contractor shall be liable to provide the Supervisor with due documentation as per local Regulations. The Contractor shall keep/maintain the following Works documentation, all according to Rulebook on the manner of keeping and content of the construction log and construction book (Official Gazette of Montenegro, no.068/18, from 19.10.2018 :

- Inspection Book (forms laid down by the MNE Law)
- Construction Log (forms laid down by the MNE Law)
- Measurement Book (forms laid down by the MNE Law)
- All necessary certificates (for material, equipment and other) during the works execution

The Contractor (Site Manager) shall keep the Construction Log and submit the Measurement Book sheets of the executed works along with each invoice. The Measurement Book has to be verified by the Supervisor.

The Contractor (Site Manager) has to enter the following data into the Construction Log:

- Number and qualification of workers executing the works
- Number and type of construction machinery used for works execution
- Weather conditions under which the works are executed
- How the works are executed and if there is any deviation from the design, contract and regulations in doing so

The Supervisor will ensure that all documents are prepared in line with the Contractual requirements, PRAG guidelines and current local legislation.

Modification of main design

Any Modification of the revised master plan due to deficiencies and unforeseen circumstances should be considered and regulated in accordance with Law on Spatial Planning Construction of Structures- "Official Gazette no. 064/17 od 06.10.2017, 044/18 od 06.07.2018, 063/18 od 28.09.2018, 011/19 od 19.02.2019, 082/20 od 06.08.2020), article 97.and 98.

Operation and maintenance manuals

The Contractor shall provide comprehensive operation and maintenance manuals for the delivered equipment including a full technical description and operational characteristics thereof. The Contractor shall provide 2 copies in both English and Montenegrin of each of the manuals bound loose leaf in ring binder folders.

Manuals shall be prepared in accordance with the approved standard. Manuals shall also be subject to the approval of the Supervisor.

The item shall be paid as a lump sum.

3.1.5 HEALTH & SAFETY AND ENVIRONMENT PROTECTION

3.1.5.1 Health & Safety

3.1.5.1.1 Health and Safety Plan and other general requirements

Without limiting the Contractor's obligations under the Conditions of Contract, the Contractor shall take all measures and precautions necessary to ensure the health, safety and welfare of staff, labor, and other persons authorized to be on the Site, as well as visitors and third parties.

The Contractor shall prepare H&S Plan and develop detailed sequence and safety measures in the Organizational plan for the management and execution of the works. The Contractor shall:

- Fully comply with the Law on Safety and Health at Work (Official Gazette of the Montenegro, no 34/2014 and 44/2018);
- Appoint a member of staff responsible for all matters related to health and safety for the duration of the Contract according to MNE regulations;
- Provide and maintain equipment in a safe working condition and adopt safe methods of work
- Adopt methods for the use, handling, storage, transport, and disposal of materials, and substances which are not injurious to health and safety;
- Provide and maintain adequate lighting, signing, and fencing of the Works;
- Provide adequate protective clothing and safety equipment, including such information, instruction, training and supervision as are necessary to ensure the health and safety of all persons employed on or entering on the Site in connection with the Works

Safety equipment shall include but not be limited to:

- safety helmets;
- protective footwear with integral steel toe-caps;
- safety glasses, welding goggles and other eye protectors
- ear defenders
- safety harnesses
- high visibility reflective vests
- Fire extinguishers
- Provide and maintain access to all places on the Site in a condition that is safe and without risk of injury
- Provide and maintain adequate water, waste water and waste collection, for all offices, workshops, and laboratories erected on the Site;
- Provide and maintain adequate sanitary units at locations where works are in progress;
- Appoint a member of its staff to be responsible for the safety of the Works throughout any shutdown period and notify the Supervisor of the name and contact telephone number of the responsible person;
- Report all accidents to the Supervisor and appropriate authorities at the time of occurrence or as soon as possible thereafter.

The item shall be paid per piece of completed documents.

3.1.5.1.2 Testing and certification of mechanization and equipment

The Contractor shall provide and maintain equipment for lifting, embedding and transporting materials and must comply with all relevant requirements of the standards in Montenegro.

All equipment must be regularly maintained in accordance with the recommendations and standards of the manufacturer, according to local laws and recommendations of the relevant authority.

The Contractor shall prepare and update construction sites according to MNE Law.

The Contractor must appoint competent personnel responsible for the operation of all kinds of equipment. They must provide evidence that they have passed training and have respective license for operating the specific equipment.

All the technological equipment (with test certificates) used on or around the site must be equipped with the necessary protective devices that will be in continuous readiness.

Should the Supervisor consider the Contractor's method of working unsafe or that there are insufficient or inadequate safety barriers or other devices or that there is insufficient safety or rescue equipment, the Contractor shall change its method of working or install or strengthen safety and rescue equipment if so instructed. Such instructions shall not relieve the Contractor of any of its responsibilities under the Contract.

The Contractor shall immediately notify the Supervisor about any accident that occurs, whether on site or off site, in which the Contractor is directly involved and which resulted in any injury to any person whether directly concerned with the site or a third party. Such initial notification may be verbal and shall be followed by a written comprehensive report within 24 hours of the accident.

Transportation of any material by the Contractor shall be in suitable vehicles, which do not cause spillage when loaded, and all loads shall be suitably secured. Any vehicle shall be removed from the site, which does not comply with this requirement or any of the local traffic regulations and laws.

The Contractor shall ensure access to sites at all times to any authorized external institutes or experts carrying out safety inspections.

3.1.5.1.3 Fire protection

During the performance of the Contract, the Contractor shall make arrangements to the agreement of the Supervisor for the protection of the permanent works and any temporary works and any adjacent property from fire and, if required, it shall give the Fire Authority access to all facilities periodically to inspect the fire prevention arrangements.

Particular care must be exercised in connection with the operation of electric arc welding equipment, oxyacetylene cutting equipment and other processes involving the use of naked lights. Special arrangements will be necessary for the storage of highly flammable liquids on the site.

The Contractor shall remove all waste and material of a flammable nature and take other steps as the Supervisor may require but this shall not relieve the Contractor of any of its obligations under the Contract.

3.1.5.2 Environmental Protection

3.1.5.2.1 Environmental Management Plan and other general requirements

The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on or off site are carried out in conformity with statutory and regulatory environmental requirements.

The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of the Works. This shall be achieved wherever possible by suppression of the nuisance at source rather than abatement of the nuisance once generated.

The provisions of these Sub-Clauses shall only be disregarded in respect of emergency work required for the saving of life or property or the safety of the Works.

In the event of any spoil or debris or silt from the Sites being deposited on any adjacent land, the Contractor shall immediately remove all such spoil debris or silt and restore the affected area to its original state to the agreement of the Supervisor.

The offer should include appropriate cost-effective mitigation measures, which should form part of the project cost.

Environmental Management Plan (EMP) shall be prepared by the Contractor incorporating proposals concerning the implementation, management and monitoring of the environmental components of the project.

Within two (2) weeks from the commencement of the works the Contractor shall submit an EMP with operational details of its proposals to the Supervisor for approval.

The item shall be paid per piece of completed documents.

3.1.5.2.2 Environmental protection during construction period

The Contractor shall use such construction methods and shall maintain all borrow/stockpile/spoil disposal area so as to assure the stability and safety of the Works and any adjacent feature, to assure free and efficient natural and artificial drainage and to prevent erosion.

The Supervisor has the power to disallow the methods of construction and/or the use of any borrow/stockpile/spoil disposal area if in their opinion the stability and safety of the Works or any adjacent features are in danger, or if they disturb natural or artificial drainage, or if the method or use of the area will promote undue erosion.

Following excavation for the works, the Contractor shall take all steps necessary to complete drainage and slope protection works in advance of each rainy season. Erosion or instability or sediment deposition arising from operations not in accordance with the Specifications shall be repaired immediately by the Contractor at its expense. The Contractor shall also take all steps necessary to complete drainage in advance of each winter rainy season in the areas excavated for borrowing materials.

Notwithstanding approval of the intended method of working, the Contractor shall at all times be responsible for constructing works in accordance with the Specifications, the Design and drawings.

3.1.5.2.3 Prevention of pollution

The Contractor shall ensure that its activities do not result in any contamination of land or water by polluting substances.

The Contractor shall implement physical and operational measures such as oil and grease traps in drainage systems from workshops, service and fuel ingress, the establishment of sanitary solid and liquid waste disposal systems, the maintenance in effective condition of the same assures, the establishment of emergency response procedures for pollution events and dust suppression, all in accordance with normal good practice and to the agreement of the Supervisor.

3.1.5.2.4 Environmental considerations

The following environmental protection measures shall be observed during the execution of the construction of the works:

Demolition material- Reuse of demolition materials as backfill for trenches and excavations or/and hard fill for construction foundations and roadways is possible, unless contaminated or hazardous materials such as asbestos are identified. The Contractor will be responsible for environmentally safe disposal of any material resulting from the demolition and other site materials with approval from the relevant local Authorities at a designated licensed disposal facility.

Excavated soil - Reuse of excavated natural soil, which is free of cohesive components, salt, sulphate and/or clay materials, may be used as backfill for trenches and excavations. The Contractor will be responsible for environmentally safe disposal of surplus materials with approval from the relevant local Authorities at a designated licensed disposal facility.

Ground water - Temporary and/or permanent groundwater lowering may be required. The Contractor shall

apply appropriate dewatering measures as required and shall also ensure that adequate measures are implemented to control surface water discharge.

Air pollution - Construction may give rise to dust and construction equipment exhaust emissions. Due note shall be taken of the proximity of residential housing to the works. The normal health and safety controls will be required to safeguard the residential and passing population.

Noise pollution - Construction works may cause annoyance caused by noise. The normal health and Safety controls will be required to safeguard the residential and passing population.

Maximum noise levels - During construction works the Contractor shall comply with the local and national requirements. The Contractor shall be legally responsible and financially liable to observe Serbian environmental legislation.

The noise levels shall be in accordance with the relevant Montenegrin noise environmental legislative.

Noise and disturbance shall be kept to the reasonable minimum as far as required for this project. The Contractor's attention is drawn to the close proximity of some residential areas. All plant and tools used at such sites above or near ground level shall be silenced or of a silent type.

The Contractor shall take all necessary steps to ensure that its workmen carry out their duties in a quiet manner particularly when working at night.

Pollution prevention - the Contractor shall not pollute or unnecessarily disturb lands, roads and other places on and around the Site. No trees or other vegetation shall be removed except to the extent necessary for the Works.

3.1.5.2.5 Air quality

The Contractor shall devise and arrange methods of working to minimize dust, gaseous or other air-borne emissions and carry out the Works in such a manner as to minimize adverse impacts on air quality.

The Contractor shall utilize effective water sprays during the delivery and handling of materials when dust is likely to be created, and to dampen stored materials during dry and windy weather.

Stockpiles of materials shall be sited in sheltered areas. Stockpiles of friable material shall be covered with clean tarpaulins, and sprayed with water during dry and windy weather. Stockpiles of material or debris shall be dampened prior to their movement, except where this is contrary to the Specification.

Any vehicle transporting no coherent material shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend at least 300 mm over the edges of the side and tail boards.

In periods of high wind, dust generating operations shall not be permitted within 200 m of residential areas having regard to the prevailing direction of the wind.

Construction vehicles and machinery shall be kept in good working order and engines turned off when not in use. Appropriate measures shall be taken to limit exhaust emissions from construction vehicles, machinery and plant.

An advance warning shall be given to potentially affected persons, so that some measures can be taken by them before commencement of works, especially before dismantling/demolition.

3.1.5.2.6 Noise

The Contractor shall consider noise as an environmental constraint in its planning and execution of the Works. The Contractor shall take all necessary measures to ensure that the operation of all mechanical equipment and

construction processes on and off the Site shall not cause any unnecessary or excessive noise, taking into account applicable environment requirements. The Contractor shall use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimize the noise emission during construction works.

3.1.5.2.7 Measures for decreasing the negative environmental impact

In order to mitigate negative environmental impact, the Contractor should propose necessary actions in its Environmental Management Plan (EMP), such as:

- To create adequate organization for execution of construction works which shall comply with local construction regulations;
- To provide water sprinkling of the construction site;
- To create organization for control on the facilities storing fuel and lubricants and on the technical condition of the machines in order to avoid accidental oil spills;
- Along the construction site, waste water should be treated and sedimentation tanks and oil separators should be placed if needed;
- To foresee the necessary maintaining and drainage measures for the construction site, access roads and service roads, in order limiting the erosion processes;
- To specify the quantity and type of waste and how its disposal is intended to be transported and removed from the site area;
- Measures for fast conservation of unfinished works at unfavorable conditions.

3.1.6 MATERIALS

3.1.6.1 General

All materials used shall be of the best quality as specified and described in the Specification, Design, Drawings and the Bills of Quantities. Where in the Design Drawings and/or BoQ the products are brand named, this should be understood as supplemented by 'or equivalent'. These materials shall be procured from approved manufacturers or suppliers.

The Contractor must secure the compliance with the Specification of materials or plant to be provided under this Contract before the supplier or manufacturer is proposed for approval to the Supervisor.

The Contractor shall take into consideration the local climatic and other environmental conditions when selecting and proposing the materials. The quality of the material has to be confirmed by the attests and suppliers' certificates, all according to TS and MNE regulations.

Whenever possible, the Contractor shall provide equipment of a similar nature from the same manufacturer, e.g. electric motors;

The Contractor shall note that particular attention will be paid to these requirements. In cases where the proposed equipment is not standardized with regard to manufacturer and type, the Contractor shall be required to provide conclusive technical justification; considerations of price alone will not be accepted. Equipment and components that have not been standardized will not be accepted.

3.1.6.2 Origin

Certificates of origin have to accompany the products proving that supplies originate from an eligible country as stated in general Conditions (GC) of the Contract. List of eligible countries and territories may be found in the annex on "Rules on participation in procurement procedures and grants" to the Practical Guide on procurement and grants for European Union external actions (PRAG) on the following link: <http://ec.europa.eu/europeaid/prag/annexes.do?annexName=A2a&lang=en>

3.1.6.3 Conformity of Materials

All materials implemented during construction shall be in compliance with the requirements of:

- Requirements of the local legislation (Law on construction products ("Official Gazette of Montenegro", no. 018/14 from 11.04.2014, 051/17 from 03.08.2017), Rulebook on construction products (Official Gazette of Montenegro "no.082/16 from 29.12.2016, 041/18 from 28.06.2018, 039/20 from 28.04.2020);
- Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products;
- The present Technical Specifications;
- Requirements of the design documentation.

All materials applied shall be accompanied with quality certificates to prove their concordance with the requirements set out in the design, the Specification and the Code for Civil Construction Works.

The Contractor shall make diligent efforts to procure the specified materials. Where, due to different reasons, the materials required by the Contract are not available, substitute materials may be used but with the prior approval by the Supervisor.

3.1.7 TECHNICAL REQUIREMENTS FOR EXECUTION OF WORKS

3.1.7.1 Technical Requirements

3.1.7.1.1 Purpose of the technical requirements

The purpose of the technical requirements is to provide quality performance of works to comply with technical regulations and standards. Therefore, the Contractor is obliged to adhere strictly to them and to perform all the works that are the subject of this project, in accordance with technical requirements, design documentation, accompanying drawings and Bill of Quantities.

In addition, technical requirements define the method of measurement. Therefore, bidders are required to include all costs for not separately analyzed and measured items in the unit prices of the existing ones.

3.1.7.2 General Terms

3.1.7.2.1 Notice of commencement

In accordance with the provisions of the Law - Article 90 [Application of adaptation works], the owner or holder of another right on the existing facility or part of the facility is obliged to submit a report on adaptation works to the competent inspection body (Ministry of Sustainable Development and Tourism - Urban Development Inspectorate), which is given on Form 4 of the Rulebook on application forms, applications and statements in the procedure of construction of facilities ("Official Gazette of Montenegro", No. 070/17 of 27.10.2017, 060/18 of 07.08.2018).

The Contractor shall give a written notice to the Supervisor of its intention to commence works (Notice of Commencement). The works shall not be commenced until written approval has been received from the Supervisor.

3.1.7.2.2 Technical specifications for works

Technical Specifications are an integral part of the Tender Documentation, and are annexed to the Works Contract.

The Contractor is fully familiar with all details of the provided design documentation, as well as with all local regulations, local standards (MEST), common practice of trade and circumstances for their execution. Nevertheless, it is understood that, whenever local regulations, local standards (MEST), or any common practice of trade, are subject to any interpretation, clarification, ambiguity, or dispute, a ruling by the

Supervisor will prevail, always provided that such ruling will be fully in compliance with and will be based on the subject local regulations, local standards (MEST), as well as in accordance with common practice of trade, and any such ruling by the Supervisors and subsequent instruction in that respect, will not constitute any ground for variation order and/or any additional payment.

Communication between the Contractor and the Beneficiary (and also the Designer), during the works will be carried out exclusively through the Supervisor. The Beneficiary is responsible for the design. Any communication with the Designer is through the Beneficiary because the Designer is not party to the contract signed.

All works must be carried out precisely and professionally. Prior to application, the Supervisor must examine all material and all his comments referring to material and quality of work will be obligatory for the Contractor. The agreed prices include all fully completed works and final products ready for use.

ICS number	Standard number	Year	TITLE
03.120.10	MEST EN ISO 9000:2016	2016	Quality management systems - Fundamentals and vocabulary
	MEST EN ISO 9001:2016	2016	Quality management systems-Requirements
	MEST EN ISO 9004:2018	2018	Quality management - Quality of an organization - Guidance to achieve sustained success
	MEST ISO/TS 9002:2019	2019	Quality management systems - Guidelines for the application of ISO 9001:2015
	MEST ISO 10002:2009	2009	Quality management - Customer satisfaction - Guidelines for complaints handling in organizations
	MEST ISO 10005:2009	2009	Quality management systems - Guidelines for quality plans

The Contractor will be responsible for any and all damages caused by the Contractor during any works, to any third party, structure, main building or adjacent buildings, and any and all repair works and compensations of any kind will be at the Contractor's expense.

Prior to the commencement of the works, and also in the course of the execution of every work item, the Contractor will ask the Supervisor for any explanations and clarifications required, therefore, the Contractor will solely bear full material responsibility for all works not completed in accordance with the concept and details of this specifications.

The Contractor will be responsible to keep records on the progress of works in the measurement book and have it controlled and verified by the Supervisor.

Upon the completion of the works the Contractor will remove from the building site and other used areas all its tools, machinery, surplus material, etc. so as to have the site nearly arranged as defined in the investment technical documentation, and all other areas restored in same condition as before the construction.

All construction works must be carried out under the conditions and in the manner prescribed by Law on Spatial Planning and Construction of Structures.

For all works, applicable MNE regulations and standards shall prevail.

3.1.7.3 Technical Standards and Regulations

In accordance to these Technical Requirements, the Contractor shall ensure that its performance incorporates the following key principles:

- For all required works and services specified in this Tender Dossier, the relevant MNE standards

and codes of practice shall apply. In any case, if Montenegrin standards are more strict or dominant, they shall apply to replace other standards given or not in other parts of this document.

- For works and services where no relevant Montenegrin standards or codes of practice exist, the latest European Standards and code of practice shall be applied.
- The proposed application of other standards and code of practice for certain works and/or services shall be such as to ensure equal or higher than specified quality and safety of works, and to facilitate operation, inspection, maintenance, repairs, lubrication and similar operations.
- In any case, National standards and code of practice have to be used for each service and work, accompanied with explanations, to demonstrate to the agreement of the Supervisor that application of these standards and code of practice shall give required quality, safety, functionality and durability of the completed works.
- The applicable version of any standard shall be that valid 28 days prior to the latest date for submission of tenders.

3.1.7.4 Matters Not Covered by the Standards

Any materials and workmanship not fully specified herein or covered by the Standards, Codes or Manuals shall be of such type and quality so as to produce a required quality of work. In such circumstance, the Supervisor shall determine whether all or any of the materials offered or delivered to the site are suitable for use in the Works and the Supervisor's decision in this respect shall be final and conclusive.

3.1.7.5 Civil Works

The term "Civil Works" means the obligations of the Contractor to perform all manufacturing, excavation, building, structures and other construction Works.

All other works from the Contractor's Offer whether specified or not in the BoQ or any other Contract Document (including the Contractor's proposal), as necessary for the completion of the Works and the operation thereof, and as required under the terms of the Contract;

3.1.7.6 Mechanical and Electrical Installations

The term "Mechanical and Electrical Installations" shall mean the obligations of the Contractor under the Contract to cover all manufacturing, delivery, assembling and installation, testing and commissioning of the required mechanical and electrical equipment and machinery for the proper completion of Works, which shall be performed by the Contractor.

The following shall be included, but not limited to, within the limits of the Works:

- Mechanical and electrical equipment and machinery, including motors and pumps and spare parts;
- Complete piping system, incl. armatures and fittings
- All other auxiliary materials of any description and all materials
- Spare parts for fixed and mobile mechanical equipment

3.1.7.7 Contractor's Equipment

Details of all Contractors' Equipment to be used in the execution of the Works shall be submitted to the Supervisor prior to its use.

The Supervisor's consent to use such Equipment will not be unreasonably withheld, but if, in the Supervisor's opinion, circumstances arise which make it desirable that the use of the said Equipment should be suspended either temporarily or permanently, the Contractor shall change the method of performing the work affected and it shall be deemed to have no cause for claims against the Supervisor on account of having to carry out the work by another method, nor it shall be deemed to have cause for claim if any order issued by the Supervisor results in the Contractor's equipment having to stand idle for a period of any duration

whatsoever or having to be removed.

3.1.7.8 Subcontracted Work

The Contractor shall appoint subcontractors for the work for which the Contractor is not experienced, recognized or approved. All documents and requests for approval have to be submitted to the Supervisor. Approvals and instructions are given exclusively by the Supervisors.

The Contractor shall submit for consent, the names of all proposed subcontractors and suppliers of special manufactured items with full details of the company, reference list and all other documentation needed for approval of the subcontractors and shall indicate the precise sections of the work for which each will be responsible.

The Contractor shall be solely responsible for the overall co-ordination of the Contract. Direct formal communication between its sub-contractors and the Supervisor will not be allowed.

3.1.7.9 Method Statements

The Contractor shall provide, in writing, a description of the arrangements and methods it intends to apply for the execution of the Works.

Method Statements (MS) shall show in detail the methods proposed by the Contractor for carrying out the principal activities of construction in full safety. In particular, the Contractor shall indicate the resources (plant, personnel, materials) to be allocated, timing and sequencing, emergency/contingency measures, and any other information required to clearly detail the proposed methods. All necessary health and safety and environmental measures required shall be clearly indicated.

This will be supported by calculations for temporary works for supporting excavated faces and shuttering of concrete. Flowcharts, sketches and drawings shall be included if necessary.

Proposed MS will be submitted to the Supervisor for approval. The Supervisor will review and provide its comments within 10 days. The Contractor shall make final corrections (if any) and submit it them to the Supervisor for: final approval 15 days before the commencement of relevant work. Written agreement shall be obtained before any work is commenced.

3.1.7.10 Provisional Time Schedule

The Defects Notification Period (DNP) shall be twelve (12) months under the Contract and shall commence after completion of the Works and issuing of Provisional Acceptance Certificate.

The duration and sequence of the various activities constituting the Works may be varied by the Contractor to suit its own proposals for carrying out the works, subject to the approval of the Supervisor, but no consideration will be given to any request by the Contractor to extend the Contract completion dates.

3.1.7.11 Standards on the Site

The Contractor shall purchase and keep on Site at least one copy of each of the relevant Standards, Codes and Manuals or approved National Standards which are referred to in the Specification. In addition, the Contractor shall keep on Site a copy of any other Standard, Code, Manual, or National Standard, which applies to materials supplied.

Copies of the standards shall be made available for reference at all times at the office of the Supervisor.

Should the Supervisor require an English or Montenegrin translation of any of the Standards or Manuals, the Contractor shall provide a translation within 7 days of receiving a written request from the Supervisor.

3.1.7.12 Technical specifications of the mobile fire extinguishing equipment

The apparatuses shall have cylindrical shape. The apparatuses shall be operational at temperatures from -20 to +40°C. The free play of the units for activation of the apparatuses (button, handle, lever ...) must be 3 ± 1 mm, and the hand wheel on the valve of the propellant gas bottle shall have free play at the angle of 30°.

The apparatuses shall be delivered filled.

The apparatus should be delivered with attests and manuals in both English and Serbian language. Maintenance and handling have to be described in detail in manuals and training for the staff has to be obtained by the Contractor. The Contractor is obliged to prepare evacuation plan and also prepare graphical presentation of the evacuation plans and place them along the building.

Record on the fillings, tests, and other characteristics on the apparatus have to be presented on the technical service card.

3.1.7.12.1 Hand- held portable apparatus type CO2

The apparatuses with carbon dioxide are made with the activation handle or with the valve wheel. Each apparatus has an upward pressure tube, but the high-pressure valve design may differ and depends on the manufacturer of the apparatus.

The apparatuses with the activation handle have a spring, the resistance of which is overcome by manual force, whereby the valve closing device moves downwards, opening the path to carbon dioxide.

The apparatuses are used in the upright position, and the handle enables their easier carrying.

Apparatus	Quantity of filling[kg]	Temperature range[°C]	Gross weight [Kg]	Action time [s]	Jet range [m]	Operating pressure [bar]	Test pressure [bar]	Safety VALVE [bar]
CO2-5	5	-20 / + 40	20	20	2-3	56	190	175

The item shall be paid per piece.

3.1.7.12.2 Hand- held portable apparatus type S-9A

These apparatuses are used for extinguishing of fires of liquid substances (petrol, oil, benzene, alcohol, ether, paints, varnishes, greases, etc.), gaseous substances (methane, propane, acetylene, etc.), and for fires of solid substances, as well as for fires on electrical equipment and installations.

A range of the jet must be minimum 2 meters. The valve of the apparatus must enable interruption of the jet and apparatuses must be provided with a discharge nozzle, and the apparatus of 5 kg must also be provided with a hose 0.8 meters long. Such apparatuses operate at temperatures from -20 to +35°C, winter filling, and from -20 to +40°C, summer filling.

Technical data for hand-held portable fire extinguishing apparatuses using powder:

Apparatus	Powder content [kg]	Gas content [°C]	Gross weight [Kg]	Action time [s]	Jet range [m]	Operating pressure [bar]	Test pressure [bar]	Safety VALVE [bar]
S-9	9	160-200	15.7	20-22	4-6	12-14	22-25	16-19

The item shall be paid per piece.

3.1.8 Technical Specifications

General

The Contractor must be fully acquainted with all details of the provided design documentation, as well as with all local regulations, local standards (MEST), common practice of trade and circumstances for their execution. Nevertheless, it is understood that, whenever local regulations, local standards (MEST), or any common practice of trade, are subject to any interpretation, clarification, ambiguity, or dispute, a ruling by the Supervisor will prevail, always provided that such ruling will be fully in compliance with and will be based on the subject local regulations, local standards (MEST), as well as in accordance with common practice of trade, and any such ruling by the Supervisors and subsequent instruction in that respect, will not constitute any ground for variation order and/or any additional payment.

Communication between the Contractor and the Contract Authority and/or Beneficiary, during the works will be carried out exclusively through the Supervisor. The Contract Authority is responsible for the design.

All works must be carried out precisely and professionally. Prior to application, the Supervisor must examine all material and all his comments referring to material and quality of work will be obligatory for the Contractor. The agreed prices include all fully completed works and final products ready for use.

The subject of the Tender Documentation (TD) is refurbishment of the part of the old school building – Srednja Elektro ekonomska skola.

In order to facilitate the presentation of the technical documentation for Refurbishment of Vocational High School in Bijelo Polje in the tender, we divided the documentation on three parts:

0	General items	(3.1)
A	ARCHITECTURE / CONSTRUCTION-CRAFT WORKS	(3.2)
B	ELECTRICAL WORKS	(3.3)

**VOLUME 3-SECTION 2-CIVIL ENGINEERING
TECHNICAL SPECIFICATION**

1. TECHNICAL DESCRIPTION

Object:	“Srednja elektro ekonomska škola”
Location:	Bijelo Polje
Investor:	JU “Srednja elektro ekonomska škola”
Total gross area:	1931m ²
Total net area:	1646m ²
Stories:	2

2. EXISTING PLAN / INTERVENTION PLAN

The aim of the project is reconstruction and refurbishment of the part of existing facility Vocational High School in Bijelo Polje in purpose of replacement of existing old wooden ceilings and floors with a new one, with metal construction.

The facility is situated in Bijelo Polje, Vladike Knezevica Volodjina Street. The building consists two parts - the main building and annex, connected by a passage on the first floor. As the buildings are not with the same of floor heights, overcoming of the different floor levels was achieved by installing the pedestrian ramp in the connecting corridor between these two parts of buildings.

The old building which is partly refurbishing consists of two tracts, connected by two flight stairs. The first tract consist basement, ground floor and first floor, and the second tract consists ground floor and two floors. The building has several exits, the main on the first tract, and the auxiliary one in the staircase landing zone in the ground floor.

The main-old building consists of two tracts, connected by a staircase –level of the half-platform. The first tract consists Basement (BS) + higher Ground floor (GF, level±0.00) + First floor, and the second tract consists different level of GF(lower level -1.80) and two floors. The building has several exits, the main of which is at the level of higher GF, and the auxiliary at the level of lower GF, from where access to the toilets located in the basement of the first tract, which have an external entrance.

From this entrance, you can approach to another, extended building, which consists of a gym with additional spaces, and two floors with classrooms.

Reconstruction works include civil, electrical, and other works necessary for the operation of the whole facility. Works will be executed according to the revised Main Design, based on the design documentation prepared according to the Montenegrin regulations, and valid Law of Spatial Planning and Construction of Structures (2017).

The old school building that will be partly refurbished, consisting of floors accessed from the staircase landings. The building has a massive structure, stone walls in the basement, bricks wall on the upper floors. The ceiling above the basement is ribbed reinforced concrete slab, but above the ground floor and first floor is mostly wooden construction with a wooden floor.

The ceiling above the ground floor of the second tract (elevation +1.80) is a wooden only in classrooms, but not in hallways; however, the ceiling above the ground floor of the first tract (elevation +3.94) is completely wooden: all

classrooms, hallways and part of the communication, to the stair beams. Under the second floor of the second tract (elevation +5.74) is completely wooden, from the stair landing beam.

Since the rooms with a wooden floor construction (wooden beams in a shorter span) is a board on a slatted substructure, which bends in certain parts, and is in poor condition, the subject of this project is the replacement of the wooden ceiling.

In accordance with the Terms of Reference and applicable Laws and Regulations, the planned interventions at the facility are:

1. replacement of the dilapidated wooden structure of the ceilings above the ground floor and a part of the first floor with a prefabricated metal structure-beams,
2. removal of the suspended ceiling from reed on mortar- and replacement with a mounting (60x60cm boards),
3. replacement of the wooden floor in all rooms.

The ceiling above the ceremonial hall in the basement (elevation -1.71) is concrete slab, on the upper floor it is partly with a terrazzo floor (in the hallway), and in the other part with a wooden floor (classroom). This wooden floor on the substructure over the concrete ceiling is also intended for replacement. All brick partition walls which must be removed for the purpose of replacing the wooden ceiling, are replaced by prefabricated walls.

A. Floor, wall, ceiling details:

• Floors:

1.1 FLOOR ABOVE CONCRETE CEILING – classroom

(P 1.1)

- Laminate d = 12.3 mm
- Sponge -thermo silent d = 3mm
- OSB boards on a wooden grill

(depending on the thickness of the existing floor substructure) d = 2.2cm + batten 5x4cm on 60cm distances

- Felt / acoustic insulation d = 1cm
- existing concrete ceiling

1.2 FLOOR ABOVE METAL STRUCTURE

(P 1.2)

- Laminate d = 12.3 mm
- Sponge thermo silent d = 3mm
- OSB boards (screw connection with metal construction) d = 2.2 cm
- Felt / acoustic insulation over metal construction d = 2cm

• Walls

2.1. Interior walls of spaces where the floor is changing

(Z 2.1)

- washable coating for interior surfaces
- smoothing compound

2.2NEW PARTITION WALLS d = 12cm

(Z 2.2)

- double GK plate / bandage tape
- metal substructure, acoustic insulation in the middle layer (glass wool)

• Ceilings

3.1. CEILING of ROOMS where construction will be changed

- Highly acoustic suspended mineral plates 60x60cm
- Metal substructure.

3.2. Ceiling above the toilet

(PI 3.2)

- Moisture resistant Gypsum Plaster Board

- Metal grid-framing system

3.3. Ceiling above the entrance to the building

(PI 3.3)

- Metal grid-framing system / laminated wool d = 5cm
- Moisture resistant Gypsum Plaster Board
- glue
- Styrofoam d = 8cm
- Glue and mesh
- "Bavalit" (finishing plaster and façade paint-according to the existing, on the facility facade)

B. JOINERY

- Single-leaf classroom doors: The frame is made of aluminum profiles without thermal break, in the color and design of other existing doors (brown). The door leaf is made of veneered plywood. The doors to the classrooms are glazed in the central upper part with safety thermo "pamplex" glass 331 + 12 + 331. Glass dimensions 80x60cm.

Single-leaf cabinet door: The frame is made of aluminum profiles without thermal break, in the color of other existing doors (brown). The door leaf is made of veneered plywood.

3. CONSTRUCTION AND CRAFT WORKS

General description:

Before beginning of construction works, the contractor shall coordinate and agree with the designer each position and every technical detail, in order to accurately determine the dimensions, construction, manufacture and processing, ironmongery as well as the installation methods. All works should be performed professionally and properly according to details, designs drafts of manufacturers; details. It is necessary to attach the required certificates. Manufactured parts shall be measured in the workshop in the presence of the supervisory authority.

All exterior elements shall be in conformity with the requested standards.

The construction properties of the finished products must meet the following conditions:

To resist all possible permanent deformations from bending, twisting and warping during product handling.

To endure the pressure of the simulated wind during institute testing of 0.80kg/m without any permanent deformations. All black locksmith shall be red lead coated and delivered on the site. After finishing the installation, apply another layer of red lead coat, paint and varnish, which included in the unit price. Unless its separated in painting works.

All works shall be performed professionally and shall be of adequate quality, all in accordance with technical conditions for manufacturing the construction and locksmith and JUS.

The material for the production of the elements should be of good quality, so that the elements meet in the appropriate level of air-proof and water-proof conditions, conditions of thermal protection and sound protection in accordance with the applicable regulations and technical conditions from the Elaborate on Construction Physics. Production and installation should be performed in accordance with the Technical description, schemes and workshop details produced by the contractor and approved by the designer and the supervisory authority. Workshop details should be based on actual measures taken at the site and agreed in a register with the supervisory authority and the designer. Production and installation should be in accordance with the technology of the manufacturer on the system.

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3.2.0 PREFACE

This Technical Specification for works execution will be an integral part of the Tender Documentation, which being an Annex to the Contract on Works Execution, therefore will be considered as the integral part of the said Contract on Works Execution.

The Contractor is fully familiar with all details of the submitted Design, as well as with all local regulations, local standards (MEST), common practice of trade and circumstances for their execution, nevertheless, it is understood that, whenever local regulations, local standards (MEST), or any common practice of trade, are subject to any interpretation, clarification, ambiguity, or dispute, a ruling by the Supervisor will prevail, always provided that such ruling will be fully in compliance with and will be based on the subject local regulations, local standards (MEST), including, but not limited to:

ICS number	Standard number	Year	TITLE
91.200	MEST ISO 4463-1:2017	2017	Measurement methods for building - Setting-out and measurement - Part 1: Planning and organization, measuring procedures, acceptance criteria
	MEST ISO 7976-1:2017	2017	Tolerances for building - Methods of measurement of buildings and building products - Part 1: Methods and instruments
	MEST ISO 7976-2:2017	2017	Tolerances for building - Methods of measurement of buildings and building products - Part 2: Position of measuring points

As well as in accordance with common practice of trade, and any such ruling by the Supervisors and subsequent instruction in that respect, will not constitute any ground for variation order and/or any additional payment.

All works must be carried out precisely and professionally. Prior to application, the Supervisor must examine all material and all his comments referring to material and quality of work will be obligatory for the Contractor.

The agreed prices include all fully completed works, the final product, and ready for use.

ICS number	Standard number	Year	TITLE
03.120.10	MEST EN ISO 9000:2016	2016	Quality management systems - Fundamentals and vocabulary
	MEST EN ISO 9001:2016	2016	Quality management systems-Requirements
	MEST EN ISO 9004:2018	2018	Quality management - Quality of an organization - Guidance to achieve sustained success
	MEST ISO/TS 9002:2019	2019	Quality management systems - Guidelines for the application of ISO 9001:2015
	MEST ISO 10002:2009	2009	Quality management - Customer satisfaction - Guidelines for complaints handling in organizations
	MEST ISO 10005:2009	2009	Quality management systems - Guidelines for quality plans

The Contractor will be responsible for all damages caused by the Contractor during any works, to any third party, structure, main building or adjacent buildings, and all repair works and compensations of any kind will be at the Contractor's expense.

The Contracting Authority will provide to the Contractor the access to building site. All other matters in this regard will be the competence of the Contractor.

Supply of water, electricity and all other raw materials to the building site, all the time during the execution of the works, will be the sole liability of the Contractor, including all costs and necessary administrative procedures.

Prior to the commencement of the works, and also in the course of the execution of every work item, the Contractor will ask for any explanations and clarifications required, therefore, the Contractor will solely bear full material responsibility for all works not completed in accordance with the concept and details of this Design.

The Contractor will be responsible to keep records on the progress of works all according to Rulebook on the manner of keeping and content of the construction log and construction book (Official Gazette of Montenegro, no.068/18, from 19.10.2018:

- Inspection Book (forms laid down by the MNE Law)
- Construction Log (forms laid down by the MNE Law)
- Measurement Book (forms laid down by the MNE Law)
- All necessary certificates (for material, equipment and other) during the works execution

It is also considered that the Contractor's will be responsible for safeguarding of the building site and maintenance of existing structure and/or building all the time during the progress of the works until completion and acceptance of the building by the Contracting Authority.

Upon the completion of the works, the Contractor will remove from the building site and other used areas all his tools, machinery, surplus material, etc. so as to have the site neatly arranged as defined in the investment- technical documentation, and all other areas restored in same condition as before the construction.

Coding of each specific technical specification for any type of works given in this Technical Specification and subsequently in the BoQ, is based on the International Classification for Standards - ICS, providing comprehensive correlation between the international and local standards. "The Institute for Standardization of the Montenegro" ("Institut za Standardizaciju Crne Gore") <https://www.isme.me/catalog> within its Catalogue provides numerous updated tables enabling connection between international and local standards, as well as, updated review of old MNE standards which have been either withdrawn or replaced or simply renamed.

I DISMANTLING WORKS

1 Dismantling of indoor wooden doors on the first floor-elevation + 3.91

Dismantling of indoor wooden doors on the first floor-elevation + 3.91m. The calculation includes removal and transport to the place determined by the Investor. dim. of the door 90x205cm.

2 Dismantling of internal wooden doors as part of a wooden partition wall

Dismantling of internal wooden doors as part of a wooden partition (supported on both sides by solid wooden girders) on the first floor-elevation +3.91 of the old part. The calculation is per m2,

includes removal and transport to the place determined by the Investor.

dim. Of the partition wall 2,80x3,50m; single door, dimension 90/205cm.

3 Dismantling of indoor wooden doors on the second floor-elevation + 5,74

Dismantling of indoor wooden doors on the second floor-elevation + 5,74. The calculation includes removal and transport to the place determined by the Investor. dim. of the door 90x205cm.

4 Dismantling of wooden floor on the substructure, elevation +1.80

Dismantling of wooden floor on the substructure, in the classrooms-elevation +1.80. The calculation is per m2, with the taking out and removal of rubble to the landfill.

5 Dismantling wooden floor with the substructure, elevation +3.90

Dismantling of wooden floor with the substructure, in the classrooms, hallway and step landing at elevation +3.90. The calculation is per m2. Dismantled wooden floor and the substructure shall be loaded and hauled to the city landfill at AHD not exceeding 30 km, including payment of the fee for disposal of waste materials.

6 Dismantling of wooden floor on the substructure, elevation +5.74

Dismantling of wooden floor on the substructure in the classrooms, hallway and step landing at elevation +5.74. Dismantled wooden floor and the substructure shall be loaded and hauled to the city landfill at AHD not exceeding 30 km, including payment of the fee for disposal of waste materials. The item shall be calculated per m2 of the floor area of the room.

7 Dismantling of wooden beams-ceiling construction at levels of +3.91 and +5.74

Dismantling of wooden beams-ceiling construction at levels of +3.91 and +5.74. Dismantled wooden floor and the substructure shall be loaded and haul to the city landfill at AHD not exceeding 30 km; include payment of the fee for disposal of waste materials. The item shall be calculated per m2 of horizontal projection.

8 Temporary removal of furniture

Temporary removal of furniture from all rooms in which the ceiling construction is being replaced, and return after the installation of the ceiling, and the floor. The calculation is lump sum.

II DEMOLITION WORKS

9 Demolition of brick walls

Demolition of brick walls, d = 12cm, with lintels. The calculation is per m2, together with the taking out, loading and hauled to the city landfill at AHD not exceeding 30 km, including payment of the fee for disposal of waste materials

10 Careful demolition of partition walls

Careful demolition of partition walls (wooden structure with plaster on the reed), d = 12cm, on the second floor. Mandatory ceiling support. The calculation is per m2, with the removal of rubble to the landfill, located at AHD not exceeding 30 km, including payment of the fee for disposal of waste materials.

11 Demolition of the suspended ceiling

Careful demolition of the suspended ceiling (plaster on the reeds), where the wooden ceiling

construction should be replaced, and especially the ceiling below the elevation of +3.91, with the protection of the existing furniture and floor. The calculation is per m² of the total demolished area, with the removal of rubble to the landfill, located at AHD not exceeding 30 km, including payment of the fee for disposal of waste materials.

III STEEL WORKS

The steel structure is made entirely of steel S 235JR. Raw screws are strength classes 8.8. Anchors are strength classes 8.8. All screws and anchors should be supplied with appropriate washers and nuts, and according to MEST EN 15048-1, MEST EN ISO 898-1, MEST EN ISO 898-2, MEST EN ISO 3269, MEST EN ISO 7040, MEST EN ISO 7042, MEST EN ISO 7719. Welding electrodes should comply with all technical conditions from the relevant regulations and standards, and in accordance with the adopted procedure for welding structural elements.

All structural steel products must meet the requirements of the applicable European product standard, unless otherwise stated. Steel products to be used for the production of cold-formed elements should have properties corresponding to the cold-forming process.

When making all positions, the accuracy of measures and shapes should correspond to the provisions of the Ordinance on technical requirements for load-bearing steel structures ("Official Gazette of Montenegro", No. 025/18 of 20.04.2018) and the standard MEST EN 1090-2: - Execution of steel and aluminum structures - Part 2: Technical requirements for steel structures: Annex B.

In the workshop, it is obligatory to do a test assembly of individual assembly units.

The construction is done according to the details and specifications from the graphic documentation. The construction of steel structures should be in accordance with the Rulebook on technical requirements for load-bearing steel structures ("Official Gazette of Montenegro", No. 025/18 of 20.04.2018) and followed standards:

ICS Number	Standard Number	Year	TITLE
91.080.10	MEST EN 1090-1:2012	2012	Execution of steel structures and aluminum structures - Part 1: Requirements for conformity assessment of structural components
91.080.13	MEST EN 1090-2:2020	2020	Execution of steel structures and aluminum structures - Part 2: Technical requirements for steel structures
77.140.70, 77.140.75	MEST EN 10219-1:2009	2009	Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions
77.140.75	MEST EN 10210-1:2009	2009	Hot finished structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions
77.140.10, 77.140.50	MEST EN 10025-1:2008	2008	Hot rolled products of structural steels - Part 1: General technical delivery conditions
77.140.10	MEST EN 10343:2012	2012	Steels for quenching and tempering for construction purposes - Technical delivery conditions
25.160.20	MEST EN 13479:2018	2018	Welding consumables - General product standard for filler metals and fluxes for fusion welding of metallic materials
01.040.077, 77.080.20	MEST EN 10020:2011	2011	Definition and classification of steel grades
77.140.01	MEST EN 10021:2016	2016	General technical delivery conditions for steel

			products
77.140.70	MEST EN 10056-1:2017	2017	Structural steel equal and unequal leg angles - Part 1: Dimensions
	MEST EN 10056-2:2014	2014	Structural steel equal and unequal leg angles - Part 2: Tolerances on shape and dimensions
21.060.01	MEST EN 15048-1:2017	2017	Non-preloaded structural bolting assemblies - Part 1: General requirements
21.060.10	MEST EN ISO 898-1:2014	2014	Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread (ISO 898-1:2013)
21.060.20	MEST EN ISO 898-2:2014	2014	Mechanical properties of fasteners made of carbon steel and alloy steel - Part 2: Nuts with specified property classes - Coarse thread and fine pitch thread
21.060.01	MEST EN ISO 3269:2014	2014	Fasteners - Acceptance inspection
21.060.20	MEST EN ISO 7040:2014	2014	Prevailing torque type hexagon regular nuts (with non-metallic insert) - Property classes 5, 8 and 10
	MEST EN ISO 7042:2014	2014	Prevailing torque type all-metal hexagon high nuts - Property classes 5, 8, 10 and 12
	MEST EN ISO 7719:2014	2014	Prevailing torque type all-metal hexagon regular nuts - Property classes 5, 8 and 10
25.160.10	MEST EN 1011-1:2010	2010	Welding - Recommendations for welding of metallic materials - Part 1: General guidance for arc welding
	MEST EN 1011-2:2010	2010	Welding - Recommendations for welding of metallic materials - Part 2: Arc welding of ferritic steels
87.020, 91.080.13	MEST EN ISO 12944-1:2019	2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 1: General introduction
	MEST EN ISO 12944-2:2019	2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments
	MEST EN ISO 12944-3:2019	2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 3: Design considerations
87.020, 91.080.13, 25.220.10	MEST EN ISO 12944-4:2019	2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 4: Surface types and surface preparation
87.020	MEST EN ISO 12944-5:2018	2018	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 5: Protective paint systems
	MEST EN ISO 12944-6:2019	2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 6: Laboratory performance test methods
	MEST EN ISO 12944-7:2019	2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 7: Execution and supervision of paint work
	MEST EN ISO 12944-8:2019	2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 8: Development of specifications for new work and maintenance
77.140.15, 77.140.60, 77.140.65	MEST EN 10080:2009	2009	Steel for the reinforcement of concrete - Weldable reinforcing steel - General
	MEST EN 1991-1-3:2017	2017	Euro code 1 - Actions on structures - Part 1-3:

91.010.30					General actions - Snow loads
	MEST	EN	1991-1-3:2017/NA:2017	2017	Euro code 1 - Actions on structures - Part 1-3: General actions - Snow loads - National Annex
	MEST	EN	1991-1-4:2016/NA:2016	2016	Euro code 1: Actions on structures - Part 1-4: General actions - Wind actions - National Annex

List of applied regulations, recommendations and applicable standards

The following ordinances, regulations and standards were also used during the construction design:

- JUS U.E7.145/87 – Retaining steel structures connected by rivets and screws - Technical requirements
- Rulebook on technical standards for the construction of buildings in seismic areas (OJ No. 31/81, 49/82, 29/83, 21/88 and 52/90) and applicable technical rules related to the application of this Rulebook
- Rulebook on temporary technical regulations for construction in seismic areas (" Official Gazette of SFRJ ", No. 39/64)
- Seismological charts - Annex to the Rulebook on technical standards for the construction of buildings in seismic areas and applicable technical rules related to the application of these ordinances
- JUS U.E7.081. Stability testing of load - bearing steel structures - Centrally pressed bars of constant one - piece cross - section
- JUS U.E7.086. Stability testing of load - bearing steel structures - Determination of buckling length
- JUS U.E7.091. Stability check of load - bearing steel structures - Centrally pressed bars of constant multi particulate cross - section
- JUS U.E7.096. Stability check of load-bearing steel structures - rods exposed to pressure and bending
- JUS U.E7.101. Stability check of load - bearing steel structures - Lateral bending of girders
- JUS U.E7.145. i JUS U.E7.145/I/91. Load - bearing steel structures connected by rivets and screws - Technical requirements
- JUS U.E7.150. Welded load - bearing steel structures - Technical requirements

12 Production and installation of steel girder for the ceiling structure

Fabrication and installation of steel girders for the ceiling structure above the ground floor and the first floor. The carrier belts are made of metal square tube HOP 100/100 / 5mm. The construction of the access platform is made of tubes 40/40 / 3mm and pads (adapted to the level of the existing floor). The platform is made of ribbed sheet metal d = 3mm. All connections are made by welding a weld thickness of 3 mm. Anchoring can go through 8mm -10mm thick faceplates through M12 anchor bolts of strength class 8.8. Working in accordance to the project, general description, static calculation and details. A set of almost 1 kg is paid. all together with all necessary anchors, pads, ties, anti-corrosion protection and painting (2 + 2). Finishing of all visible surfaces of the steel structure in color RAL 7004. Steel construction elements to be installed are:

IPE 12
IPE 200

IPE 220
IPB1-240 (HEA 240)
IPB280 (HEB 280)
HOP 70x70x3
HOP 100x80x4
HOP 200x100x4
metal sheets, according to the specification in construction plans:
joints1,5%

IV JOINERY WORK - ALUMINIUM

General

If not stated otherwise, installation method will be dry, anchoring by screws through pre-drilled holes in frames. Connection between wall and frames filled with polyurethane foam.

ICS Number	Standard Number	Year	TITLE
91.060.50	MEST EN 1026:2017	2017	Windows and doors - Air permeability
	MEST EN 1027:2017	2017	Windows and doors - Water tightness - Test method
	MEST EN 1121:2009	2009	Doors - Behavior between two different climates - Test method
91.190	MEST EN 1935:2010	2010	Building hardware - Single-axis hinges - Requirements and test methods

All measures given under any item of Technical Specification are related to wall opening dimension (i.e. masonry dimensions). All provided dimension will be subject of on-site verification by the Contractor before commencing production or other works.

13 Door of the dim. 101/210 cm, glazed in the upper part

Fabrication and fitting of single-leaf doors in classrooms.

The frame is made of aluminum profiles without thermal break, in the color of other existing doors (brown).

The door leaf is made of veneered plywood. Veneer color and design chose by designer.

The doors in the classrooms are glazed in the upper part with Float-clear safety glass 331 on both sides (6 + 12 + 6). Dimension of the glass 80x60cm (according to the valid Rulebook for school facility)

Calculated per piece. Include the required quality fittings at the unit price.

14 Door of the dim. 101/210 cm

Fabrication and fitting of single-leaf doors in storage room. The frame is made of aluminum profiles without thermal break, in the color of other existing doors (brown).

The door leaf is made of veneered plywood. Veneer color and design in accordance with the existing door.

The unit price includes the required quality fittings. Calculated per piece.

V ASSEMBLY WORKS

Production of all suspended ceilings with appropriate professional workforce, with the full application of modern tools intended for this type of work.

All used materials, connecting and binding agents, protective equipment must have required quality and certificates.

Works must be carried out well, according to regulations, standards, technical documentation and certified constructive details. The method and direction of setting suspended ceiling performed according to the description and details of the project, with a mandatory consent of the designer. Samples of the ceiling must to be submitted to the designer for approval.

During the execution of works, respectively until finishing them, the contractor is obliged to take all necessary measures, in order not to damage these works. If it the case, the contractor will rat his own bring the works to the designed state at his own expense with the consent of the supervising authority. Calculation per unit indicated at each position of works. Unit price includes production of a complete position of works, (procurement of basic, binding and protection material, material for smoothing and impregnation, external and internal transport, construction, protective measures, all horizontal and vertical transfers, necessary scaffolding, cleaning and other activities that are necessary for high quality of these works). This description is an integral part of each individual position of works and it does not exclude the application of applicable regulations in the construction industry in this area.

ICS Number	Standard Number	Year	TITLE
91.100.10, 01.040.91	MEST EN 520:2017	2017	Gypsum plasterboards - Definitions, requirements and test methods
91.100.10, 91.100.60	MEST EN 13950:2016	2016	Gypsum board thermal/acoustic insulation composite panels - Definitions, requirements and test methods
91.060.30	MEST EN 13964:2016	2016	Suspended ceilings - Requirements and test methods
91.100.10	MEST EN 13963:2016	2016	Jointing materials for gypsum boards - Definitions, requirements and test methods

15 Procurement and Mounting a suspended ceiling made of mineral panels(19mm)

Procurement and Mounting of a Supply and installation of a high-acoustic suspended ceiling 19 mm thick, type AMF Thermatex Alpha or equivalent, system C, made of mineral panels coated with an absorption veil in white color. Flat ceiling panels are laid in a steel substructure 24 mm wide.

The panels have absorption class A ($\alpha_w = 0.95$) according to EN ISO 11654, resistant to relative humidity up to 95%.

Non-combustibility certificate according to JUS ISO 1182 required.

The ceiling should meet the hygienic ISO class 4. Light reflection of about 88%.

The ceiling should have a Blue Angel certificate for low-emission materials. The price of the ceiling includes the installation of mineral wool laminated on this side (60x60cm), d = 8cm.

Installation is in accordance with the manufacturer's instructions. Calculated per m².

16 Procurement and Mounting a suspended ceiling made of mineral panels(15mm)

Supply and installation of a suspended ceiling made of mineral panels in white color type AMF Thermatex Feinstratos or equivalent, system C, thickness 15 mm. Ceiling panels with straight edges

are laid in a steel substructure 24 mm wide, the circumferential profile is 19/24 mm.

The sound insulation of the ceiling is $D_n, c, w = 34$ dB according to EN 20140-9.

The panels are resistant to relative humidity up to 95% and have a certificate for non-combustibility according to JUS ISO 1182. Light reflection of about 88%. The ceiling should have a Blue Angel certificate for low-emission materials.

Calculation per m²

17 Procurement and Mounting a suspended ceiling made of moisture-resistant gypsum boards

Supply and installation of a suspended ceiling made of moisture-resistant gypsum boards, which are placed on a metal substructure, in toilets, and covered outside parts of the entrance building. Treat the gypsum board joint with a bandage tape. Calculation per m².

18 Supply and installation of a partition wall

Supply and installation of a partition wall with a single metal substructure made of galvanized steel profiles 75 mm type Knauf CW (MEST EN 14195) and UW (MEST EN 14195). The wall is unbearable. Wall height max 3.50 m (axial distance of the CW profile 62.50 cm). Total wall thickness 120 mm, double-sided cladding with 12.5 mm thick GK panels. Processing of joints of GK boards in quality K2 (standard surface quality according to the technical instruction Finishing systems 06/2015). Joint filling: Uniflott with the use of paper bandage tape. Fire resistance: EI 90. Self-supporting insulation 75 mm thick (glass wool type Knauf Insulation DECIBEL-Thermal conductivity coefficient λ_D 0.038 W / mK, Sound absorption α_w 0.90 EN ISO 354 / A1, Vapor diffusion resistance factor $\mu \sim 1$ EN12086). Note: To prevent sound transmission below the circumferential CW and UW profiles, apply Trenwandkit - sealant. Note: construction, assembly, processing of plate joints - all according to the technical sheet. Calculation per m².

VI FLOOR LAYING

General:

ICS Number	Standard Number	Year	TITLE
97.150 , 97.15	MEST CEN/TS 14472-3:2021	2021	Elastic, textile and laminate floor coverings - Design, preparation and installation - Part 3: Laminate floor coverings
97.150 , 97.15	MEST EN 13329:2018	2018	Laminate floor coverings - Elements with a surface layer based on aminoplastic thermoreactive resins - Specifications, requirements and test methods
97.150	MEST EN 13893:2012	2012	Elastic, laminate and textile floor coverings - Measurement of the dynamic coefficient of friction on dry floor surfaces
97.150, 97.15	MEST EN 14041:2019	2019	Elastic, textile and laminate floor coverings - Basic characteristics

19 Procurement and Laying of laminate, 12.3 mm thick

Supply and installation of laminate 12.3 mm thick, matt color, resistant to tear, scratching, bleaching, resistant to cigarette butts, easy to clean. Class AC4, for commercial use with general traffic. Double moisture resistance, which keeps it stable and resistant to warping. Laminate dimensions 1215x147x12,3mm. connecting elements by double folding. Class E1 designation (minimum

emission of harmful fumes-formaldehyde). HDF quality label (density and density). The price includes foam 3 mm thick. Mandatory separation of the laminate from the wall for the thickness of the "azmaphone" 1 cm in order to form a "floating floor" - preventing the transmission of sound. Calculation per m².

20 Installation of decorative edge batten

Supply and installation of a decorative edge batten with laminate flooring, 15mm thick, h = 6cm. Installation with glue and headless nails. The calculation is per m¹

21 Procurement and installation of OSB board

Procurement and installation of OSB boards of classification 4, d = 22mm as a base for laying laminate flooring over battens, and fixing for steel substructure. The calculation is per m²

22 Installation of acoustic insulation-

Supply and the installation of acoustic insulation-"azmafona"(multipurpose porous sound absorber produced in the form of a felt carpet based on finely combed cotton fibers bonded with resin) over a metal substructure, under OSB boards, d = 2cm, in order to prevent sound transmission. The calculation is per m². It is assumed that 20% of the room area is covered with an acoustic insulation.

23 Procurement and installation of slats

Supply and installation of slats dimensions 4x5cm as a base for laminate that is installed over a concrete slab (elevation +1.80). The slats are installed at a distance of 60 cm, in the opposite direction of laying the laminate. Felt is placed over the batten. The calculation is per m² of horizontal projection.

VII PAINTING WORK

24 Applying the water-repellent coating in white color on interior wall surfaces

Treatment of internal wall surfaces of rooms in which the ceiling construction is replaced, with a water-washable coating in white color, with previous proper smoothing of surfaces with smoothing compound, above the wall surfaces treated with oil paint. Calculation per m².

25 Applying the extremely durable acrylic-based wall paint.

Applying the extremely durable acrylic-based wall paint, very resistant to scratches and physical damage. It allows repeated wiping and washing and is immune to stains and stains. Excellent color coverage, offers 400% increased resistance compared to classic dispersions. After a thorough wash, it returns to the state "as new", so it reduces the need for new painting for several years. ISO 11998 is first class as the best rating for scrubbing. Color choice by designer. Calculated per m².

26 Applying the water-repellent coating in white color, on the Ceilings Surfaces

Treatment of ceiling surfaces of rooms in which interventions are performed, and visible concrete beams, with water-washable coating in white color, with previous proper smoothing of surfaces with smoothing compound.

VIII FASADE WORKS

General:

ICS Number	Standard Number	Year	TITLE
83.100, 93.010	MEST EN 14933:2010	2010	Thermal insulation and light weight fill products

			for civil engineering applications - Factory made products of expanded polystyrene foam (EPS) – Specification
91.100.60	MEST EN 14309:2016	2016	Thermal insulation products for building equipment and industrial installations - Factory made expanded polystyrene foam (EPS) products – Specification
91.100.60	MEST EN 13163:2017	2017	Thermal insulation products for buildings - Factory made expanded polystyrene foam (EPS) products – Specification

27 Facade cladding with EPS, d = 8cm

Supply and cladding of the ceiling of the part of the entrance with EPS am d = 8cm. EPS anchor with 5 anchors / m². Finishing with glue in I, II layer, with a glass veil in the middle layer. The calculation is per m². The required scaffolding included in the price.

28 Ceiling surface painting with “bavalit”

Treatment of the ceiling surface of the building coated with Styrofoam, with “bavalit”- two-component mineral mortar made on the basis of cement, hydrated lime, mineral fillings and other additives (color and method of processing in everything according to the one on existing facade), with previous required penetration. Calculation per m², including scaffolding.

IX MISCELANUOUS WORKS

29 Metal decorative batten d = 22mm

Procurement and transport and installation of metal decorative batten between different floors. Properly fix and silicone battens. The calculation is per m¹

30 Cleaning / cutting of existing cracks and filling them with epoxy mortar.

Cleaning / cutting of existing cracks on the beam-terrazzo floor at the level of +5.74 and filling them with epoxy mortar type EPORIP-Mapei. Sanding and cleaning the surface. Primer coating to block moisture, type Primer MF.

31 Final cleaning of the facility

Final cleaning of the facility - all rooms in which interventions were performed. The calculation on lump sum.

Volume 3 – Section B – Electrical works (High Current) Technical specification

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LIST OF APPLIED REGULATIONS AND STANDARD

In developing the design, the designer used the following technical regulations, standards and literature:

- **Law on Spatial Planning and Construction ("Official Gazette MN" no. 64/17)**
- Energy Law ("Official Gazette MN" no. 5/16)
- Law on Occupational Safety ("Official Gazette MN" no. 34/14)
- Law on Protection and Rescue ("Official Gazette MN", no. 013/07 from 18.12.2007, 005/08 from 23.01.2008, 086/09 from 25.12.2009, 032/11 from 01.07.2011, 054/16 from 15.08.2016)
- Lawyer on technical standards for low voltage electrical installations ("Official Gazette SFRY" no. 53/88, no. 54/88 and "Official Gazette FRY" No. 28/95)
- MEST HD 60364-1:2011 Low - voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions
- MEST HD 60364-4-41:2011 Low-voltage electrical installations - Part 4-41: Safety protection - Protection against electric shock
- EST HD 60364-4-42:2011 Low-voltage electrical installations - Part 4-42: Safety protection - Protection against electric shock
- MEST HD 60364-4-42:2011/A1:2016 Low-voltage electrical installations - Part 4-42: Safety protection - Protection against thermal effects
- MEST HD 60364-4-43:2011 Low-voltage electrical installations - Part 4-43: Safety protection - Overcurrent protection
- MEST HD 60364-4-442:2014 Low-voltage electrical installations - Part 4-442: Safety protection - Protection of low voltage installations against temporary overvoltages due to earth fault in high voltage system and due to failures in low voltage system
- MEST HD 60364-4-444:2011 Low-voltage electrical installations - Part 4-444: Safety protection - Protection against voltage and electromagnetic interference
- MEST HD 60364-5-51:2011 Electrical installations of buildings - Part 5-51: Selection and installation of electrical equipment - General rules
- MEST HD 60364-5-52:2011 Electrical installations of buildings - Part 5-52: Selection and installation of electrical equipment - Wired systems
- MEST HD 60364-5-53:2016 Electrical installations of buildings - Part 5-53: Selection and installation of electrical equipment - Switchgear and controlgear
- MEST HD 60364-5-534:2011 Low - voltage electrical installations - Part 5-534: Selection and erection of electrical equipment - Isolation, interruption and control - Clause 534: Surge protection devices
- MEST HD 60364-5-54:2014 Low - voltage electrical installations - Part 5-54: Selection and installation of electrical equipment - Earthing and protective conductors
- MEST HD 60364-5-551:2011 Low - voltage electrical installations - Part 5-551: Selection and erection of electrical equipment - Other equipment - Clause 551: Low voltage generators

- MEST HD 60364-5-557:2016 Low - voltage electrical installations - Part 5-557: Selection and installation of electrical equipment - Auxiliary circuits
- MEST HD 60364-5-559:2014 Low - voltage electrical installations - Part 5-55: Selection and installation of electrical equipment - Other equipment - Item 559: Luminaires and lighting installations
- MEST HD 60364-5-56:2011/A11:2014 Low - voltage electrical installations - Part 5-56: Selection and lifting of electrical equipment - Security services
- MEST HD 60364-7-701:2011 Low - voltage electrical installations - Part 7-701: Requirements for special installations or locations - Locations where there are bathtubs or showers
- MEST HD 60364-7-704:2011 Low - voltage electrical installations - Part 7-704: Requirements for special installations or locations - Construction and removal of construction sites
- MEST HD 60364-7-705:2013 Low - voltage electrical installations - Part 7-705: Requirements for special installations and locations - Agricultural and horticultural facilities
- MEST HD 60364-7-706:2011 Low - voltage electrical installations - Part 7-706: Requirements for special installations or locations - Locations for laying conductors with limited displacement
- MEST HD 60364-7-708:2013 Low - voltage electrical installations - Part 7-708: Requirements for special installations or locations - Auto-camps, camps and similar locations
- MEST HD 60364-7-709:2013 Low - voltage electrical installations - Part 7-709: Requirements for special installations or locations - Marinas and similar locations
- MEST HD 60364-7-710:2013 Low - voltage electrical installations - Part 7-710: Requirements for special installations or locations - Medical service locations
- MEST HD 60364-1:2011 Low - voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions
- MEST EN 62305-1:2012 Protection against atmospheric discharges - Part 1: General principles
- MEST EN 62305-2:2013 Lightning protection - Part 2: Risk management
- MEST EN 62305-3:2012 Protection against atmospheric discharges - Part 3: Physical damage to buildings and danger to life
- MEST EN 62305-4:2012 Protection against atmospheric discharges - Part 4: Electrical and electronic systems inside buildings
- MEST EN 62262:2012 Degrees of protection by the housing against external mechanical shocks (IR code) for electrical equipment
- MEST EN 60529:2010/A2:2015 Degrees of protection provided by the enclosure (IP code)
- MEST EN 50525-1:2011 Electric cables - Low voltage power cables of rated voltages up to and including 450/750 V (U0 / U) - Part 1: General requirements
- MEST EN 50525-3-21:2012 Electric cables - Low voltage power cables of rated voltages up to and including 450/750 V (U0 / U) - Part 3-21: Special performance cables for fire - Flexible cables with non-halogen cross-linked insulation and low smoke emission
- MEST EN 61534-1:2012 Parapet distribution - Part 1: General requirements
- MEST HD 22.1 S4:2011 Insulated conductors and cables with cross - linked

- insulation for rated voltages up to and including 450 V / 750 V - Part 1: General requirements
- MEST HD 22.9 S3:2012 Cables with cross - linked insulation of rated voltages up to and including 450/750 V - Part 9: Single-core halogen-free installation insulated conductors with low smoke emission
 - MEST EN 50274:2010 Low - voltage switchgear and controlgear - Protection against electric shock - Protection against accidental direct contact with dangerous active parts
 - MEST EN 61439-1:2012 Low - voltage switchgear and controlgear - Part 1: General rules
 - MEST EN 61439-2:2012 Low - voltage switchgear and controlgear - Part 2: Switchgear and controlgear
 - MEST EN 61439-3:2012 Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by uninformed persons (DBO)
 - MEST EN 60947-1:2012 Low - voltage switchgear and controlgear - Part 1: General rules
 - MEST EN 60947-2:2010 Low - voltage switchgear and controlgear - Part 2: Circuit breakers
 - MEST EN 60947-3:2009 Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, disconnectors and fuse combinations
 - MEST EN 60947-4-1:2012 Low - voltage switchgear and controlgear - Part 4-1: Contactors and motor - starters - Electromechanical contactors and motor - starters
 - MEST EN 60947-4-2:2015 Low - voltage switchgear and controlgear - Part 4-2: Contactors and motor - starters - Semiconductor controls for AC motors and motor - starters
 - MEST EN 61439-6:2015 Low - voltage switchgear and controlgear assemblies - Part 6: Busbar systems
 - MEST EN 50085-1:2008 Carrier and cable management systems for electrical installations - Part 1: General requirements
 - MEST EN 60269-1:2010 Low - voltage fuses - Part 1: General requirements
 - MEST EN 60570:2010 Electric rail distribution for powering lamps
 - MEST EN 60669-1:2012 Switches for household and similar fixed electrical installations - Part 1: General requirements
 - MEST EN 61386-1:2012 Cable conduit systems - Part 1: General requirements
 - MEST EN 62423:2015 Differential current circuit breakers type B with built-in overcurrent protection and without built-in overcurrent protection for household and similar use (type B RCCB and type B RCBO)
 - MEST HD 62640:2015 Differential current devices with or without overcurrent protection

1. TECHNICAL REQUIREMENTS

These conditions are an integral part of the project and as such binding Investor and Contractor, to the preparation of projected installations, among other things, to comply with these conditions, and because they contain many elements that are not listed in the technical description and the rest of the text, and are important for performing work. Thus, during the execution of the projected installation, it is necessary to comply with specified below.

1. Complete electrical installation has to perform according to the given plan, the terms and conditions applicable JUS regulations for electrical installations low and strong current, apropos Ordinance on technical standards for low voltage electrical installations ("Official Gazette SFRY" no. 53/88, 54/88 and 29/95).
2. Before starting work, the Contractor shall be thoroughly familiar with the project and that all their complaints, if any, timely delivery to Investor, or the Supervisor.
3. The investor shall, during the whole construction to provide professional supervision of works.
4. Contractor is required to go before the start of works on site with the object, so if you find that some changes are necessary due to construction changes, notify the supervisory authorities and from it obtain the necessary approval for any changes in electrical installation.
5. If it happens during the works is a justifiable need for certain discrepancies or minor changes in the project, the contractor shall, for each such variation or modification obtain the prior approval of the supervisory authority. The supervisory authority shall, if necessary introduce the designer and the proposed change and seek his approval.
6. On the basis of the project, the contractor will start work only after review and approval by the supervisory authority.
7. All installation materials and equipment that will be used to perform these installations must comply with the standards and be of premium quality. Material that does not meet these conditions may not be used.
8. During construction is necessary to cause as little damage to the already completed works and existing construction. Also, coordination of tasks to be implemented, in order to avoid mutual work interference of various phases
9. During the works, the Contractor shall keep proper construction diary, with all that this provides diary, and all requests and statements, both by the supervisory authority, as well as by the Contractor, shall be communicated through the building diary.
10. For safety of works, the contractor guarantees 2 years from the date of technical verification of performed work on building. All accidents and malfunctions, which in this period occurred, either because of the use of poor materials or making unsound, the contractor must be removed without any compensation.
11. When the work is completed, the contractor shall make the necessary test installation and obtain the appropriate certificates.

1.1 General Provisions

1. Apparatus and equipment for electrical installations must be suitable for installation at the rated voltage. Electrical equipment must submit a current that flow during normal operation as well as in emergency situations, during the time that allow by characteristics of protection device.

Electrical equipment, when you switch on and off, must not damage other equipment. Equipment, including wires and cables shall be placed so that it can easily be checked, maintained and approaching its terminals and that it can be easily handled. Previously applies to equipment installed in the housing.

2. Nameplates and other assets to be used for identification must be attached to the switching apparatus to indicate their purpose. Control elements of the signaling elements must be placed in an easily accessible and visible location.

3. Insulated wires and cables must be laid so that the mark are easily distinguishable in testing, repair or replacement. Earthlings conductor (PE) or protective-neutral conductor (PEN) denote the combination of green and yellow, and neutral (N)-light blue color. These colors should not be used for any other marking. Tagging can be done at the end of the conductor near the circuit, especially when the conductors are not insulated.

4. Protection device must be mounted and labeled so you can easily distinguish their associated circuitry. Protection device must be installed in the switch block/ switchboards.

5. Diagrams, tables or diagrams of low voltage installations shall be installed in locations where there are more circuits, so that means the nature and composition of circuits and devices characteristics recognition for the protection, inclusion and exclusion, as well as the location of their installation and isolation.

6. In the switch block / board / must be set up and grouped electrical equipment of the same type of current and voltage so that there can be mutual harmful interference.

1.2 Electrical distribution

1. Connection cables and other electrical equipment must be constructed so as to be safe and set to allow the possibility of constant testing. A compound must be guaranteed by corresponding conductor material and its cross section. A compound must be accessible after removing the cover by tools, and access must have a minimum degree of protection IP 2X, according standard JUS N.A5.070.

2. Insulated wires and cables must not be continued in the pipe installation and installation channels. The same can be joined only in installation boxes, cable connectors or switching blocks of a merger must be isolated isolation level that corresponds to the type of electrical distribution. Exceptionally, in the wall-mounted elements of cast concrete connection can be kind and wall socket boxes, provided that the depth of the box allows accommodation of compounds of the same circuit.

3. Connection between the installation and connection of electrical installation with electrical equipment must be designed so as not to be exposed to the forces pulling or twisting. If the encircling force can not be avoided must be provided for the discharge system.

4. A compound must be designed so that there is no reduction in cross-sectional or damage wires and insulation. At the end of the installation, particularly the entrances and exits, as

well as installation in areas of penetration through walls must be carried into execution a permanent seal.

5. If the installation is located in the vicinity of other non-electrical installations, among them such a space must be provided to maintain an installation does not endanger other installations. Minimum distance allowed is 30 mm. If the installation is located near the heating system, the hot air pipe or chimney, the installation must be insulated or thermal insulation or screens must be placed outside the influence of heat.

6. Installations should not be placed under the non-electrical installations where possible condensation of water or other liquids. Installations can not be placed in the same installation channel, tube or the like., With other non-electric installations, and if this can not be avoided, it must be ensured protection against indirect contact by automatic disconnection of power supply or using equipment for insulation Class II and must be set appropriate protection against harmful effects of other installations. The metal parts of electrical distribution exposed to condensation shall be protected against corrosion inside and out, and must have secured condensate.

7. If the installation is placed on the wall, the minimum allowable voltage between the elements of the installation and the wall is 5 mm. Installation low voltage must not be placed in the same envelope or pipe, or near installations with a voltage higher unless the divorce between the two is serving a sections insulation test voltage electric high voltage distribution. In the same pipe installation or installation channel can be set up only one conductor circuit, unless the conductors and auxiliary control circuits.

8. The installation must be set so that in case of failure does not endanger the environment. Junction boxes or wires that are placed under the mortar must be of insulating material or metal lined with insulating and sealing of insulating material. For fixing the installation can be used to apply resources and procedures that do not cause deformation or damage to the insulation, such as plastering, clips of insulating material adapted to the shape and cross-section cable, bonding or riveting nails with washers of insulating material.

9. Cables lie directly under the plaster wall and have covered the entire length of mortar thickness 4 mm min. exceptionally, may not be covered if the mortar are laid in cavities of the walls and ceilings made of concrete or similar material that will not burn or help the burning.

10. Cables and installation conductors laid in pipe installation in a wall or cables laid directly beneath the plaster and mortar must be kept vertically and / or horizontally, so that they are parallel edges of the room. When installed horizontally must be placed at a distance of 30 cm to 110 cm from the floor and 200 cm from the floor to the ceiling. In vertical lying of cables distance from the edges of windows and doors must be min 15 cm. Cable route, which supply fixed water heater, must coincide with the axis of the heater. Oblique cable laying and installation of conductors permitted in the ceiling, but not in the walls.

11. Laying cables on the wall is allowed if the cable has thermoplastic insulation with a coated filled and if you take the clamps on the wall if the floor to a height of 2 m above the floor additionally mechanically protected. Junction boxes and other accessories that attaches to the wall with cable laying, must have sealing glands and the degree of protection at least IP 5X specified for wet rooms and adequate level of protection specified for other rooms.

12. Cables unfilled, such as the type of PP / R, may be taken only in dry areas, and under plaster, in cavity walls and ceilings made of concrete and the like. non-combustible material and coverage without mortar. Listed cables must not be laid in a bundle, placed in ducts or under plaster boards, regardless of the manner in which is fixed and can not be installed on combustible materials or when covered with mortar.

1.3 Switchboard

1. Switchboard closed or hermetic type is mounted on 1.7 m from the floor, and an open table at 2.5 m above the floor. Switchboards installations must meet the following requirements:

- Exterior Switchboards must not infringe on the idea of interior designer;
- Must be mounted on wall or free-standing or wall;
- The door must have a lock with universal key;
- All terminals in the internal equipment must be accessible from the front. In normal operation all terminals and accessories under load must be protected against contact.

2. Equipment for control or protection must be away from the body of Switchboard 20 mm, and a smaller distance is only allowed if isolated partitions are applied.

1.4 Inspection and testing

Each installation must during installation or when completed, but before delivery to the user, to be examined and tested. During checking and testing of installation it is necessary to make security measures for the security of person and protection against electrical damage.

1.5 General remarks and obligations

1. During the preparation of this project, all the requirements of the applicable technical regulations, standards and the Law were taken into account.

2. Electrical equipment and materials provided by this project must correspond to the appropriate MEST.

3. The Contractor, ie the Investor is obliged to inform the competent inspection body about the beginning of the works at least seven days before the beginning of the works.

4. The investor is obliged to make all prescribed normative acts in the field of occupational safety and to acquaint workers with working conditions and sources of harm and danger, as well as protection measures.

5. The investor is obliged to determine jobs with special working conditions, if such jobs exist.

6. Wherever the regulations require it, it is necessary to place visibly marked inscriptions with warnings on:

- voltage height,
- purpose of certain equipment, and
- other important notices.

7. When intervening in TS, RT and installations, the expert is obliged to apply protective equipment and means.

2. TEHNICAL DESCRIPTION

2.1 Introduction

The building of the Secondary School of Economics, the adaptation of which is planned, is located in Vladike Knezevića Volodina Street, on the part of the cadastral parcel number 1811/1, KO Bijelo Polje. It consists of two tracts: the building of the first-older school, and an extended part with a gym as the second tract. These two tracts are connected by a footbridge at the level of the first floor. The number of storeys of the existing building of the first tract that is being processed is $S + P + 2$, but the building has been demolished, so the segments with classrooms are approached from the stairwell. The gross area of the first tract is 4560m².

The subject of this main project is the adaptation of the old part of the school building, in the part of replacing the existing wooden mezzanine structure above the ground floor and first floor, replacement of suspended ceilings, replacement of existing walls, as well as all partition walls that need to be replaced due to interventions on the mezzanine ceilings.

Through the electrical part of the project, lighting installations in those rooms that are the subject of adaptation were processed.

2.2 Disassembly of existing installations

The adaptation project removes part of the mezzanine structure between the ground floor and the first floor, as well as part of the mezzanine structure between the first floor and the second floor. In order to perform these construction works, it is necessary to relocate and remove part of the electrical equipment and installations. In this regard, it is necessary to permanently dismantle the existing lamps and switches in the rooms that are being adapted. Disassembly should be reported carefully, taking care not to damage the equipment, and it should be handed over to the investor. Since the ceiling is being changed, the wires for powering the dismantled electrical equipment should be removed, and after creating a new ceiling structure, new wires should be laid for powering the new lighting fixtures that the project envisaged.

2.3 Power supply of newly designed electrical equipment

The basic distribution of electricity in the building is done from the main switchboard GRT which is located on the ground floor. It supplies local switchboards from which electricity is further distributed to consumers.

The cross-section and type of cable that supplies the GRT, as well as its route, could not be determined at the time of project design. Also, the cross-sections and types of cables connecting the GRT with the local switchboards, as well as their routes, could not be determined at the time of project development. Precise data on the installed or simultaneous power of electrical consumers in the building could not be obtained from the users of the building, nor can these values be viewed without a great analysis of the entire system. The project started from the fact that the electric power of newly designed consumers who connect to this system is incomparably less than the experientially estimated simultaneous power of the facility, and that there is no need for a more serious analysis of simultaneous electrical power of the facility, knowing that consumers who connect to the system work to jeopardize the reliability of electricity supply to the facility.

The project envisages that the electricity consumers on the ground floor and first floor, which were processed by this project, will be supplied from the existing local switchboards, which are marked in the project with: RT-P1, RT-P2, RT-P3 and RT-S2.

Local switchboards: RT-P1, RT-P2, RT-P3 and RT-S2 are made of metal, with locking doors. They contain DIN rails on which circuit breakers are mounted. There is enough space in these boards to upgrade the circuit breakers that will power the newly designed consumers. Based on the installed power of new consumers, conductors and circuit breakers are dimensioned from the switchboard to the consumer.

The lack of project documentation, as well as the ignorance of a large number of input data necessary for performing technical calculations through which it would be proven that the newly designed consumers meet the basic criteria necessary for dimensioning conductors and protective devices has led to no technical calculations in this project. It has been empirically estimated that the connected new consumers, with their power and mode of operation, cannot lead to disturbances in the operation of the electrical system of this facility.

2.4 Method of laying cables and conductors

Conductors in the building from the board to the consumer (lamps, sockets, ...) are laid as follows:

- on the walls under the plaster,
- below the suspended ceiling on the clamps (mutual distance of the clamps 0.3 m, fixing the clamp to the ceiling with screws) and in flexible hoses,
- in the floor the conductors are laid through plastic pipes,
- in plasterboard walls through flexible hoses,
- in the passage between the slabs, the cables are routed through flexible hoses, as well as in all places where the cables are laid in reinforced concrete walls.

A parapet distribution system is provided in the computer room, so that the conductors in that room are laid in the parapet channel.

The diameter of the pipe (hose) through which the cables will pass depends on the cross section of the cable. The measures are given in the table:

Cable cross section (mm ²)	Pipe diameter (mm)
3x1.5	Ø13.5
3x2.5, 5x1.5	Ø13.5
3x4.0, 5x2.5	Ø16
3x6.0, 5x4.0	Ø23

The connection of all conductors must be performed in junction boxes that are built-in (cover flush with the wall).

The conductors used are with PP-Y type insulation of the appropriate number of cores.

Sections and number of supply conductor cores:

- lighting fixtures are 3x1,5mm²,
- single-phase consumers 3x2,5mm²

2.5 Lighting in the renovated part of the building

The lighting of the stairs and halls on the first floor is done with lamps with LED light source. They will be switched on via switches mounted in the porter's lodge located on the ground floor. These switches should be mounted next to other switches through which the school lighting is switched on.

The existing lighting system will remain on the other floors.

Before starting the works, the contractor is obliged to look at the entire system, including the lighting of the floors and stairs, and to enable the functionality of this system after the completion of all works.

Lighting of classrooms and other rooms is done with lamps with LED light source. Their switching on will be done locally, through switches mounted in the room where the lamps are. The switches are mounted at a height of 1.7 meters from the level of the finished floor.

In the event of a power failure, the lighting of the room will be done through anti-panic lighting lamps that have the possibility of three-hour autonomous operation. These lamps are in a temporary connection, ie they are switched on only in the event of a power failure.

Provodnik za napajanje svetiljki je PP-Y 3x1,5 mm², a polaganje je pod malter, a dijelom u fleksibilnim cijevima koje treba postaviti iznad spuštenog plafona.

3. ATTACHMENT OCCUPATIONAL SAFETY MEASURES

Based on the provisions of the Law on Occupational Safety and Health, during the preparation of technical documentation for this facility, the Annex on Occupational Safety was formed, which indicates the dangers and harms that may occur when working on electrical installations.

3.1 Overview of hazards that may occur during the construction, use and maintenance of the installation of low voltage power grid

Workers on the construction of the installation of low-voltage electricity network, as well as passers-by near the construction site in certain circumstances are threatened by a number of dangers, against which appropriate protection measures must be taken.

From a number of work hazards that may occur, we list the following:

1. Danger of excessive contact voltage due to contact with parts of the device or plant that are not part of the circuit, but in the event of a fault can come under dangerously high voltage.
2. Danger of accidental contact with parts of the installation that are under too high - dangerous voltage, and are part of the circuit.
3. Danger of excessive step voltage, and is related to the design and arrangement of earthing conductors in the vicinity of the plant due to incorrect design and large fault currents.
4. The danger of overvoltage refers to the possibility of an overvoltage wave entering

the transformer station plant from the overhead line.

5. The danger of atmospheric discharges refers to the possibility of direct lightning strikes in installations or the inductive influence of atmospheric discharges on installations and lighting poles.
6. Danger of static electricity when working on cable and overhead lines, as well as on lighting poles.
7. Danger of excessive contact voltages when working on lines or devices due to unimplemented protection measures or negligence of other participants in the work.
8. Risk of excessive voltages during operation due to incorrect marking of lines or due to failure of personnel performing work.
9. When transporting heavy loads of cables, cable cabinets, poles, etc. loading or unloading, there may be landslides on workers.
10. When performing earthworks, underground installations may be encountered or workers may fall to the ground.
11. When lifting or lowering loads, assembling parts of equipment with unsuitable atmospheric and other conditions, that equipment may fall.
12. When climbing objects, poles or working in the crane basket, workers may fall from a height.
13. When digging a cable duct across the road, a traffic accident with serious consequences can occur.
14. When laying cables along the canal, workers may fall into the canal or pit for the foundation of the pillar.
15. When laying the cable in the duct through the existing underground installations, excessive step voltage, contact or other hazards may occur, in connection with the nature of these installations.
16. Injuries can occur if hand tools are handled improperly or due to the use of inappropriate tools.
17. When working with flight lamps (petrol or gas), working with cleaning or painting chemicals, fire, poisoning or other injuries to workers may occur due to careless handling, non-compliance with technological and other instructions or protective measures.

3.2 Obligations of the contractor in the preparation of workers before the start of work

Prior to the commencement of works on the construction or repair of the electric power facility, the Contractor is obliged to perform appropriate preparation of workers in terms of working ability, expertise, training and equipment and means of safety at work, which should include the following:

1. Workers who work in non-electric plants and devices must be physically and mentally healthy, they must be regularly subjected to medical examinations for work at higher altitudes.
2. Workers must have the necessary qualifications required to perform the jobs. Occasionally, knowledge is tested in the field of occupational safety.
3. Workers must not be under the influence of alcohol or any other means that may affect their ability to work.
4. Workers must cooperate at work and help each other if the need arises.
5. Workers must perform accurately, both in terms of time and quality of work, all

operations set by the immediate supervisor.

6. Workers must have the correct prescribed equipment for hygienic and technical protection at the workplace, such as helmets, protective gloves, rubber boots, belts and other equipment prescribed by the Ordinance on safety at work.
7. Workers without the above equipment and proper means of work are not allowed to perform work in the workplace, and therefore the manager is responsible.
8. The works on the construction of electric power plants must be prepared by the works managers so that the workers are not endangered, that safety measures have been applied against possible electric shocks, lightning strikes, falls, traffic accidents and the like.
9. If the installations are connected to the existing electricity network, which is in operation or could be in the course of works, then the works managers must coordinate the works in such a way that the dispatching services of the competent "Electricity Distribution" allow them to work in voltage-free condition. etc.) for safe operation.

3.3 Mandatory protection of equipment and means during the execution of works

When performing works, it is obligatory that each worker owns and applies personal means and equipment for safety at work according to the purpose.

It is necessary to provide the following equipment:

- Proper protective clothing for each worker (suit, helmet, boots, etc.), which is prescribed for the performance of work, and the following means and devices:
- first aid kit,
- portable fire extinguishers on electrical installations,
- fencing and marking means,
- devices for measuring and indicating electrical size,
- portable devices for auxiliary grounding and switching of the installation,
- protective insulation (for the stand),
- portable lamps,
- if necessary, means of transport with a driver on duty.

3.4 Protective measures provided in the design to eliminate hazards or minimize hazards

During the design, the legal provisions were applied, as well as the provisions of the Ordinance and regulations governing the construction, use and maintenance of installations, which must be applied by the organization for works, use and maintenance in accordance with its internal regulations based on the Law on Occupational Safety.

Possible injuries during the execution of works, use of the facility, or maintenance of the plant and installation are:

- a. of a mechanical nature
 - b. due to the action of electric current
 - c. less often due to other actions (chemical, etc.)
-
- a. Injuries of a mechanical nature, which include falls, fractures, sprains, burns, etc., ie the possibilities of their occurrence are not determined in detail in this study. Measures to limit the possibility of all injuries can be effectively implemented on the construction site during the execution of works by fully implementing all

protective measures. In order to limit the possibilities of such injuries, it is necessary, in addition to a number of pre-prescribed preventive measures and consideration of possible causes, to pay special attention to the organization of the entire job and individual work tasks for each worker, the organization of occupational safety and personal and collective means of protection. work, training of workers both in terms of safety at work and in terms of performing work tasks, proper use of proper devices and equipment for work, health and psychophysical ability of each individual worker.

If, in addition to all preventive measures taken on the construction site, a physical injury occurs, they must be eliminated in accordance with the procedure for providing "first aid" and the organization of the rescue service in the event of an accident at work.

- b. Injuries and damage caused by the action of electric current can occur as a result of a malfunction or irregularity. They are prevented or limited by the application of:
- Protection against contact of parts by insulating or matching the device under high voltage, protective covers (transparent), with the possibility of visual inspection of the condition of the device and manipulation from the outside.
 - Protection against accidental contact of live parts was carried out by placing these parts out of reach from a possible point of view of the so-called. Protective removal. All interventions on devices and power plants are performed in a voltage-free state.
 - Protection against excessive contact voltage was carried out in accordance with the Rulebook on technical standards for the protection of LV networks (Official Gazette of the SFRY No. 13/78).
 - Step overvoltage protection achieved by properly shaping the potential ground of the earthing power plant and connecting the earthing of the plant to the combined earthing, if permitted.

3.5 Study of applied fire protection measures

The treated facility, if the necessary conditions are met, is not considered a danger zone. However, in addition to all the safety measures taken, which are prescribed by legal norms, there are potential causes of fire hazards on electrical installations.

The nomenclature of potential fire causes is grouped as follows:

1. Short circuit in installation, overheating of lines and devices
2. Dangerous contact voltage in the event of a fault in the installation
3. Dangerous voltage due to direct lightning strike or surge surge
4. Incorrect selection and placement of equipment installed in electrical installations
5. Improper handling
6. Inadequate and untimely maintenance

In order to achieve the necessary process of fire protection, ie to reduce the potential causes of fire to a minimum, it is necessary to take a number of measures, procedures and activities, from providing a project solution to the end of life - operation of the facility.

Elimination of potential causes of fire in electrical installations

The listed potential causes of fires are, as already mentioned, very diverse in their categorization, and each of these groups deserves special treatment:

1. *Short circuit in installation, overheating of lines and devices*

The installation and electrical equipment is designed so that it can withstand the dynamic and thermal stresses caused by the short-circuit current in this part of the electrical installation. From short circuits and overheating of lines and devices, the installation is protected by fuses, and short-circuit currents are significantly lower than allowed, so there is no risk of fire on the supply cables.

2. *Dangerous contact voltage in the event of a fault in the installation*

In accordance with the applicable regulations, protection against dangerous contact voltage was implemented through the TN-C-S system and by equalizing the potentials of all metal structures, which are connected to a common earthing switch (lightning protection installation of the building).

3. *Dangerous voltage due to direct lightning strike or surge surge*

There is protection of the entire facility from lightning strikes or surges, and it is an integral part of this project.

4. *Incorrect selection and placement of equipment installed in electrical installations*

The arrangement of equipment - cabinets, safety - protective elements is done so that the equipment itself is located in easily accessible places and is not exposed to moisture, evaporation, elevated and reduced temperatures, or ambient disturbances, which often affect the proper operation of elements installed in the cabinet and other equipment, which means that the layout of the equipment directly affects the possibility of short circuits on parts of the plant that are not under constant supervision, and thus the occurrence of fire.

5. *Improper handling*

In order to minimize the impact of the human factor, as one of the elements of the potential cause of fire, it is necessary:

- to train people from the aspect of handling and exploitation
- create a "Work Manual" which will be the basis for the work of the operator, and at the same time define the domain of their powers.

The "operating instructions" must be in place before obtaining a use permit.

6. *Inadequate and untimely maintenance*

Poor maintenance and poor handling are in most cases the causes of accidents. The development of "Maintenance Instructions" must strictly define:

- method of equipment replacement
- way of revising the scheme
- preparation of the performance condition through documentation
- education and service authorization
- way of keeping documentation

Zabraniti intervencije na opremi i el. instalacijama bez saglasnosti ovlaštene organizacije, pogotovo kada se radi o elementima koji direktno utiču na sigurnost rada.

Neatestirana oprema se ne smije ugrađivati.

3.6 Attestation documentation

During the functional test in order to issue a use permit, the following certificates must be available:

1. Insulation resistance
2. Loop resistance
3. Ground resistance
4. Mechanical protection of electrical cabinets
5. Performed functional control
6. Factory equipment certificates

SPECIFICATION

1. Dismantling of existing lamps and switches

BoQ Item	EL.001	Unit	pcs
Unit Price Definition	<i>Dismantling of existing lamps and switches</i>		
Description	Dismantling of existing lamps and switches in the rooms that are being adapted. Remove disassembled equipment carefully, taking care not to damage it. The dismantled equipment is handed over to the Investor or, if he does not want it, at the expense of the contractor, to the location intended for storage of such waste.		

2 Dismantling of existing conductors

BoQ Item	EL.002	Unit	pcs
Unit Price Definition	<i>Dismantling of existing conductors</i>		
Description	Dismantling of existing conductors in the rooms that are being adapted and taking them to waste. Only those conductors that belong to the circuits that are being disconnected (and these are the lighting circuits in all adapted rooms) are dismantled. The dismantled conductors are handed over to the Investor or, if he wishes them, at the expense of the contractor, to the location intended for the storage of such waste.		

3. Procurement of equipment and upgrade in the existing local switchboards RT-P1, RT-2 and RT-P3

BoQ Item	EL.003	Unit	pcs
Unit Price Definition	Procurement of equipment and upgrade in the existing local switchboards RT-P1, RT-2 and RT-P3		
Description	Procurement of equipment and upgrade of the following elements in the existing local switchboards RT-P1, RT-2 and RT-P3, which are located on the ground floor of the building - miniature circuit breaker iC60H 10A, 1P, B characteristic, 230V~ (Schneider Electric).		

4. Procurement of equipment and upgrade

BoQ Item	EL.004	Unit	pcs
Unit Price Definition	Procurement of equipment and upgrade		
Description	Procurement of equipment and upgrade of the following elements in the existing local switchboard RT-S2, which is located on the first floor of the building: 3.3.4.1 miniature circuit breaker iC60H 6A, 1P, B characteristic, 230V~ (Schneider Electric) 3.3.4.2 miniature circuit breaker iC60H 10A, 1P, B characteristic, 230V~ (Schneider Electric) 3.3.4.3 contactor iCT 16A, 1NO, control voltage 230V ~ (Schneider Electric) 3.3.4.4 P/F wire, DIN rails and other small material		

5 Procurement, delivery and laying of PP-Y 3x1.5 mm² conductors

BoQ Item	EL.005	Unit	pcs
Unit Price Definition	<i>Procurement, delivery and laying of PP-Y 3x1.5 mm² conductors</i>		
Description	Procurement, delivery and laying of PP-Y 3x1.5 mm ² conductors for lighting fixtures. The cable is laid mostly above the suspended ceiling in a flexible hose, and a smaller part of the route under the mortar with prior trimming of the wall surfaces, and later repairing them to their original condition (the price includes smoothing and painting). The average length per connection is 8 m.		

6 Delivery and installation of flexible hoses

BoQ Item	EL.006	Unit	pcs
Unit Price Definition	<i>Delivery and installation of flexible hoses</i>		
Description	Delivery and installation of flexible hoses (sleeves) with a diameter of Ø13.5 mm.		

7. Delivery and mount recessed LED lamps

BoQ Item	EL.007	Unit	pcs
Unit Price Definition	<i>Delivery and mount recessed LED lamps</i>		
Description	Deliver and mount recessed LED lamps (on drawings marked with S1) on bulb points: LED power 13W, CRI80, 1100lm, 4000K, in IP44 protection, housing made of plastic, PMMA diffuser and matt faceted aluminum reflector, white or better technical characteristics of the LUGSTAR SPOT LB LED 13W 1100LM 4000K WHITE 44 lamp, manufactured by LUG.		

8 Supplied and mounted on bulb places LED recessed lamps

BoQ Item	EL.008	Unit	pcs
Unit Price Definition	<i>Supplied and mounted on bulb places LED recessed lamps</i>		
Description	Supplied and mounted on bulb places LED recessed lamps (on the drawings marked with S2) characteristics: LED 38W, 4350lm, 4000K, dimensions 600x600mm, white, lifespan L70B50: 50,000 h, similar to type OFFICE LB LED 600X600 P / T ED 38W 4300LM 4000K WHITE ALUMINUM MAT, manufacturer LUG. The price includes connecting the lamp to the conductor until it is put into a functional condition.		

9 Supply and install recessed ceiling lamps

BoQ Item	EL.009	Unit	pcs
Unit Price Definition	<i>Supply and install recessed ceiling lamps</i>		
Description	Supply and install recessed ceiling lamps (on drawings marked with S3) characteristic: LED 20W, 1750lm, 4000K, dimension Ø 170 mm, white, IP20, similar to LUGSTAR SPOT LB LED 20W, 1750lm, 4000K, IP20, manufacturer LUG. The price includes connecting the lamp to the conductor until it is put into a functional condition.		

10 Supply and mount recessed LED lamps 50W

BoQ Item	EL.010	Unit	pcs
Unit Price Definition	<i>Supply and mount recessed LED lamps 50W</i>		
Description	Supply and mount recessed LED lamps (on drawings marked with S4) characteristics: LED 50W, 5500lm, 4000K, dimensions 600x600mm, white, lifespan L70B50: 50,000 h, similar to LUGCLASSIC SQUARE LED g / k 50W 5500LM 4000K PLEXIGLAS, manufacturer LUG. The price includes connecting the lamp to the conductor until it is put into a functional condition.		

11 Supply and mount recessed LED lamps 34W,

BoQ Item	EL.011	Unit	pcs
Unit Price Definition	<i>Supply and mount recessed LED lamps 34W</i>		
Description	Supply and mount recessed LED lamps (on drawings marked with S5) characteristic: LED 34W, 3700lm, 4000K, dimensions 350x350mm, white, diffuser: opal plexiglass, lifespan L70B50: 50,000 h, similar to LUGCLASSIC SQUARE LED k 34W 3700LM 4000K OPAL PLEXIGLAS, manufacturer LUG. The price includes connecting the lamp to the conductor until it is put into a functional condition.		

12 Supplied and mounted on bulb points LED surface-mounted panic lamps

BoQ Item	EL.012	Unit	pcs
Unit Price Definition	<i>Supply and mount on bulb points LED surface-mounted panic lamps</i>		
Description	Supplied and mounted on bulb points LED surface-mounted panic lamps (in the drawings marked with P1) feature: own power supply from Ni-Cd battery 3.6 V / 1 Ah, 3 hours of autonomy, degree of protection IP20, possibility of working in permanent / standby connection, the output flux of the lamp is 100lm / 38lm of the same or better technical characteristics than the lamp EASY LIGHT, manufactured by Olympia Electronics.		

13 Delivery and installation of the following set of rated current switches 10A, 230V AC

BoQ Item	EL.013	Unit	pcs
Unit Price Definition	<i>Delivery and installation of the following set of rated current switches 10A, 230V AC</i>		
Description	Delivery and installation of the following set of rated current switches 10A, 230V AC (P / Ž). Include the following elements in the price: box, bracket, mask, and the switches listed below (match the color of the mask and switches with the interior designer). The program should be similar to the UNICA type - Schneider Electric, BTICINO, LEGRAND, VIMAR or GEWIS. The price also includes the realization of electrical connections. The switch set consists of: 3.3.13.1 two modules with one ordinary switch 3.3.13.2 mask of two modules with two ordinary switches 3.3.13.3 mask of three modules with three ordinary switches.		

14 Delivery and installation of motion detectors

BoQ Item	EL.014	Unit	pcs
Unit Price Definition	<i>Delivery and installation of motion detectors</i>		
Description	Delivery and installation of motion detectors for installation in a suspended ceiling, with a time setting of up to min 5 minutes, with a detection range of 360 degrees, a minimum detection diameter of 9 meters, with one channel.		

15 Other small unspecified work and materials and unforeseen works

BoQ Item	EL.015	Unit	pcs
Unit Price Definition	<i>Other small unspecified work and materials and unforeseen works</i>		
Description	Other small unspecified work and materials and unforeseen works, which include interventions on existing conductors that are not permanently removed, but remain in operation after adaptation, but during construction should be temporarily relocated or dismantled or bridged, depending on the situation on the ground.		