European Standardisation

Standards for the design of timber structures

Personal Statement

What is the inspiration to work, research and teach on the field of timber engineering and fire safety?

Timber

is worldwide the leading biogene based construction material and perhaps one of the key materials to find sustainable solutions for spaceship earth!

Standardisation helps

- Trade
- Quality control
- Design and construction of structures

in the European Union and all over the world!

Target of the European Commission

A unique set of standards for the design of building structures until 2010

Drafting of the codes:
Technical committees of CEN
(CEN = Comité Européen de Normalisation)

Implementation of the codes:
National legal bodies with support from the national standardisation bodies, e.g. DIN

The European Commission

Defines the regulations (standards)

But NOT the requirements.

The requirements, especially safety requirements (e.g. fire safety) are established by the national legal bodies!!

National Standardisation Bodies (e.g. DIN, BSI)

are participating in the standardisation process, set up „mirror committees“ to comment to European Standards and

implement finalized and translated standards as national standards, e.g.

DIN EN 1995-1-1: Eurocode 5 – Design of timber structures

The following types of standards are available:

- Test standards
- Product standards
- Design standards
- Value standards
- Umbrella standards

Test standards

define methods to evaluate characteristic material properties, e.g.

EN 380 Timber Structures – Test methods – General principles for static load testing

EN 789 Timber Structures – Test methods – Determination of mechanical properties of wood based panels

EN 14358 Timber Structures – Evaluation of characteristic 5-percentile values

Product standards

define the product, product classes and (in a harmonized standard) the attestation of conformity procedure, e.g.

EN 300 Oriented Strand Board – Definitions, classification and specifications (without Annex ZA)

EN 14081-1 Strucutural timber with rectangular cross sections – Part 1, Grading requirements to strength graded timber (with Annex ZA)

EN 14080 Glued laminated timber products – requirements (with Annex ZA)

Note

Product standards give requirements for the production control, but contain no characteristic values for the design of timber structures. These values are given in separate (value) standards, e.g.

EN 338 Structural Timber – Strength Classes

EN 12369-1 Wood based panels – Characteristic values for the design of timber structures – Part 1: OSB, chipboard and fibreboards

Note

Because not all product standards give requirements for the evaluation of conformity and CE-marking, these regulations are given in separate umbrella standards, e.g.

EN 13986 Wood based panels for use in construction– Characteristics, evaluation of conformity and marking

Note

Cause this umbrella standards could effect the national safety level, the memberstates could implement additional applicaton standards, e.g. to

DIN EN 13986 Wood based panels for use in construction– Characteristics, evaluation of conformity and marking

in Germany

DIN V 20000-1 Application of construction products in structures – Part 1: Wood based panels

Design standards

Define the procedures of design of timber structures based on the characteristic values given in product standards which are evaluated according to the valid test standards

EN 1995-1-1 Eurocode 5 – Design of timber structures – Part 1-1: General rules and rules for buildings

Design standards

comprise a set of standards regarding actions and general regulations, e.g.

EN 1990 Eurocode – Basis of structural design

EN 1991-1-1 Eurocode 1 – Actions on structures – Part 1-1: General Actions - Densities, self-weight, imposed loads for buildings

EN 1991-1-2 Eurocode 1 – Actions on structures – Part 1-2: General Actions - Actions on structures exposed to fire

Note

The design methods used in the Eurocodes are linked to the test standards. If the test method changes a different design method could be necessary!

A complete final set of standards is scheduled for October 2010!

Engineers use the design codes for calculating a timber structure –

How do they know, that the material taken into account is the material used on site?

⇒ CE - mark

The CE – mark shows

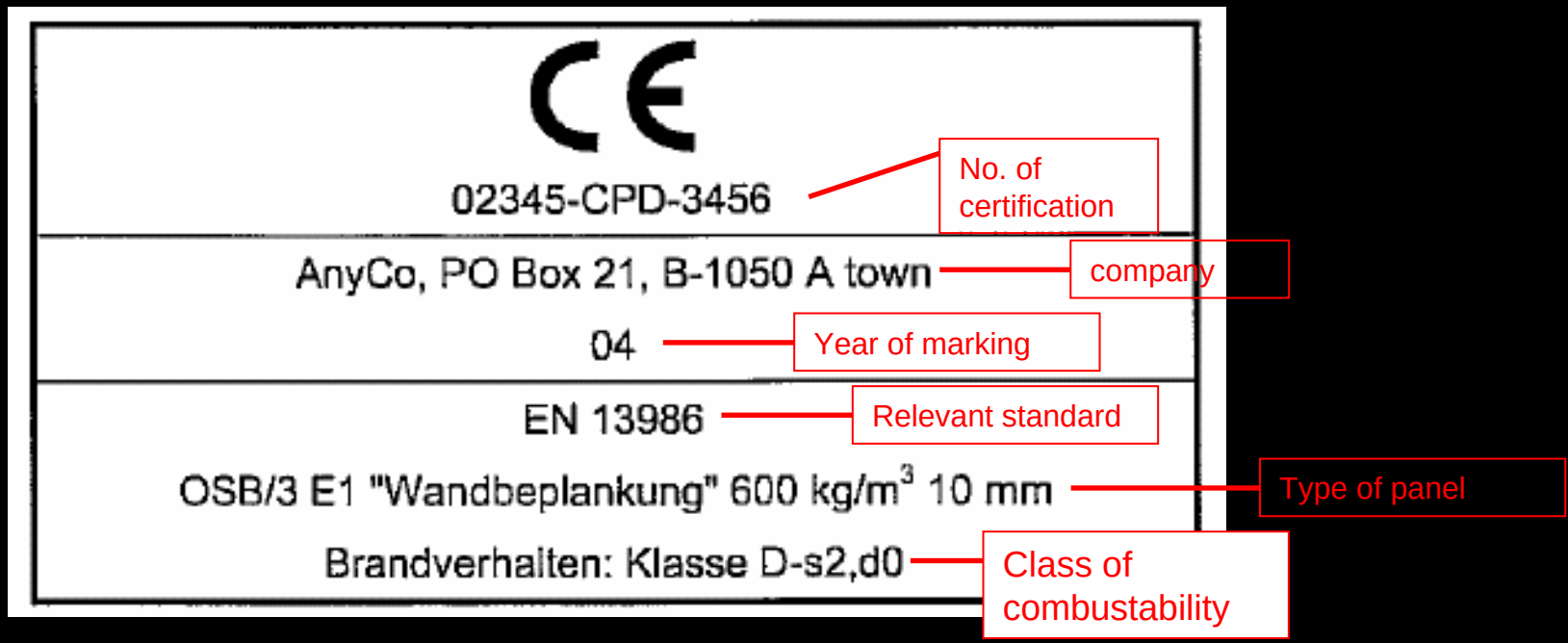
that the product is in accordance

with the relevant product standard.

The mark contains classes or declared characteristic values to be used in the design procedure

CE – marking

Example for a CE mark of a wood based panel (OSB)



CE – marking is based on internal and external factory production control according to the attestation of conformity procedure given by the European Commission.

It is accepted by the national authorities to use the characteristic values of the product in accordance with the legal regulations

CE – marking is necessary

for free trade but also

for the legal control.

It shows the (end-)user the conformity and usability of the product.

Approvals

In addition to materials and structures according to standards, new construction materials or building kits can be used with an

European Technical Approval (ETA) given by an notified body (e.g. DIBT, VTT, BRE)
⇒ **CE-Zeichen**

An exampel: Oriented Strand Board

Product standard

DEUTSCHE NORM Juni 1997

Platten
aus langen, schlanken, ausgerichteten Spänen (OSB)
Definitionen, Klassifizierung und Anforderungen
Deutsche Fassung EN 300 : 1997

DIN
EN 300

An exampel: Oriented Strand Board

Harmonised (umbrella) product standard

2 Normative Verweisungen

Diese Europäische Norm enthält d … tlegungen aus anderen Publika-
tionen. Diese normativen Verweisu … tiert, und die Publikationen sind
nachstehend aufgeführt. Bei datie… en oder Überarbeitungen nur zu
dieser Europäische Norm, falls sie … tet sind. Bei undatierten Verwei-
sungen gilt die letzte Ausgabe der … ch Änderungen).

EN 120, *Holzwerkstoffe — Bestim… …sverfahren genannt Perforator-methode*.

EN 300, *Platten aus langen, schla… …onen, Klassifizierung und Anfor-derungen*.

CE

Tabelle 2 — Charakteristische Werte von Platten nach EN 300: OSB/2: Platten für tragende Zwecke zur Verwendung im Trockenbereich und OSB/3: Platten für tragende Zwecke zur Verwendung im Feuchtbereich

Dicke, mm	Charakteristische Rohdichte (kg/m³) und Festigkeit (N/mm²)								
	Rohdichte	Biegung		Zug		Druck		Schub quer zur Plattenebene	Schub in Plattenebene
t_{nom}	ρ	f_m		f_t		f_c		f_v	f_r
		0	90	0	90	0	90		
> 6 bis 10	550	18,0	9,0	9,9	7,2	15,9	12,9	6,8	1,0
> 10 bis 18	550	16,4	8,2	9,4	7,0	15,4	12,7	6,8	1,0
> 18 bis 25	550	14,8	7,4	9,0	6,8	14,8	12,4	6,8	1,0

Dicke, mm	Mittlere Steifigkeitswerte, N/mm²							
	Biegung		Zug		Druck		Schub quer zur Plattenebene	Schub in Plattenebene
t_{nom}	E_m		E_t		E_c		G_v	G_r
	0	90	0	90	0	90		
> 6 bis 10	4930	1980	3800	3000	3800	3000	1080	50
> 10 bis 18	4930	1980	3800	3000	3800	3000	1080	50
> 18 bis 25	4930	1980	3800	3000	3800	3000	1080	50

Als 5 %-charakteristischer Wert der Steifigkeit sollte das 0,85-fache des in Tabelle 2 angegebenen Mittelwertes genommen werden. Andere, nicht in der Tabelle 2 aufgeführte Eigenschaften müssen den in EN 300 für die Typen OSB/2 oder OSB/3 gestellten Anforderungen entsprechen.

An exampel: Oriented Strand Board

German application standard

Tabelle 5 — Umrechnungsbeiwerte der charakteristischen Werte bei Anwendung des Bemessungsprinzips der zulässigen Spannungen

	1	2
1	Holzwerkstoff	Sicherheitsbeiwert
2	Massivholzplatten, Sperrholz	3
3	Spanplatten	4
4	Andere Holzwerkstoffe	5

E.g. γ-values for the calculation of material properties using a deterministic design