



SLOVENSKI STANDARD

SIST EN 338:2016

01-junij-2016

Nadomešča:
SIST EN 338:2010

Konstruktivski les - Trdnostni razredi

Structural timber - Strength classes

Bauholz für tragende Zwecke - Festigkeitsklassen

Bois de structure - Classes de résistance

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ICS:

79.040 Les, hlodovina in žagan les Wood, sawlogs and sawn timber

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EUROPEAN STANDARD

EN 338

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2016

ICS 79.040

Supersedes EN 338:2009

English Version

Structural timber - Strength classes

Bois de structure - Classes de résistance

Bauholz für tragende Zwecke - Festigkeitsklassen

This European Standard was approved by CEN on 30 January 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 338:2016) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 338:2009.

Compared to EN 338:2009, the following modifications have been made:

- new table of strength classes for softwood species based on tension tests;
- extension with new classes in the table of strength classes for hardwood species based on edgewise bending tests;
- modification of some characteristic values for strength, stiffness and density;
- equations to determine the characteristic values of other strength properties from the grade determining properties has been transferred to EN 384.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

A strength class system groups together grades, species and sources with similar strength properties thus making them interchangeable. This then permits an engineer to specify a chosen strength class and use the characteristic strength values of that class in design calculations.

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1 Scope

This European Standard establishes a system of strength classes for general use in design codes.

It gives characteristic strength and stiffness properties and density values for each class to which EN 14081-1 refers.

This standard is applicable to all softwood and hardwood timber for structural use, within the scope of EN 14081-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 384, *Structural timber — Determination of characteristic values of mechanical properties and density*

EN 14081 (all parts), *Timber structures — Strength graded structural timber with rectangular cross section*

3 Terms and definitions

For the purposes of this document, the following term and definition apply.

3.1 population

timber of one species or species combination and one source for which the strength, stiffness and density properties apply

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4 Symbols and abbreviations

$E_{m,0,\text{mean}}$	mean characteristic value of modulus of elasticity in bending parallel to grain (in kN/mm ²);
$E_{t,0,\text{mean}}$	mean characteristic value of modulus of elasticity in tension parallel to grain (in kN/mm ²);
$E_{m,0,k}$	5-percentile characteristic value of modulus of elasticity in bending parallel to grain (in kN/mm ²);
$E_{t,0,k}$	5-percentile characteristic value of modulus of elasticity in tension parallel to grain (in kN/mm ²);
$E_{m,90,\text{mean}}$	mean characteristic value of modulus of elasticity in bending perpendicular to grain (in kN/mm ²);
$E_{t,90,\text{mean}}$	mean characteristic value of modulus of elasticity in tension perpendicular to grain (in kN/mm ²);
$f_{c,0,k}$	5-percentile characteristic value of compressive strength parallel to grain (in N/mm ²);
$f_{c,90,k}$	5-percentile characteristic value of compressive strength perpendicular to grain (in N/mm ²);
$f_{m,k}$	5-percentile characteristic value of bending strength (in N/mm ²);
$f_{t,0,k}$	5-percentile characteristic value of tensile strength parallel to grain (in N/mm ²);
$f_{t,90,k}$	5-percentile characteristic value of tensile strength perpendicular to grain (in N/mm ²);
$f_{v,k}$	5-percentile characteristic value of shear strength (in N/mm ²);

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G_{mean}	mean characteristic value of shear modulus (in kN/mm ²);
ρ_k	5-percentile characteristic value of density (in kg/m ³);
ρ_{mean}	mean characteristic value of density (in kg/m ³)

5 Classification of structural timber

This standard provides for a number of strength classes, each designated by a number indicating the value of the edgewise bending or tension strength in N/mm².

For softwood species based on edgewise bending tests, the characteristic values of strength, stiffness and density for the strength classes Cxx, where xx refers to the 5-percentile characteristic bending strength value, are given in Table 1.

For softwood species based on tension tests, the characteristic values of strength, stiffness and density for the strength classes Txx, where xx refers to the 5-percentile characteristic tension strength value, are given in Table 2.

NOTE 1 Timber belonging to T classes is mainly intended for glulam and other cases where tension is the dominating load.

NOTE 2 The T classes correspond to classes L, LS or LD as in EN 14081-4 with some differences in tabulated properties and is also referred to in EN 14080.

For hardwood species based on edgewise bending tests, the characteristic values of strength, stiffness and density for the strength classes Dxx, where xx refers to the 5-percentile characteristic bending strength value, are given in Table 3.

NOTE 3 C and T classes may also be used for hardwoods with similar strength and density profiles such as e.g. poplar or chestnut.

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The most common used strength classes in Europe are printed in bold.

Table 1 — Strength classes for softwood based on edgewise bending tests – strength, stiffness and density values

	Class	C14	C16	C18	C20	C22	C24	C27	C30	C35	C40	C45	C50
Strength properties in N/mm²													
Bending	$f_{m,k}$	14	16	18	20	22	24	27	30	35	40	45	50
Tension parallel	$f_{t,0,k}$	7,2	8,5	10	11,5	13	14,5	16,5	19	22,5	26	30	33,5
Tension perpendicular	$f_{t,90,k}$	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
Compression parallel	$f_{c,0,k}$	16	17	18	19	20	21	22	24	25	27	29	30
Compression perpendicular	$f_{c,90,k}$	2,0	2,2	2,2	2,3	2,4	2,5	2,5	2,7	2,7	2,8	2,9	3,0
Shear	$f_{v,k}$	3,0	3,2	3,4	3,6	3,8	4,0	4,0	4,0	4,0	4,0	4,0	4,0
Stiffness properties in kN/mm²													
Mean modulus of elasticity parallel bending	$E_{m,0,mean}$	7,0	8,0	9,0	9,5	10,0	11,0	11,5	12,0	13,0	14,0	15,0	16,0
5 percentile modulus of elasticity parallel bending	$E_{m,0,k}$	4,7	5,4	6,0	6,4	6,7	7,4	7,7	8,0	8,7	9,4	10,1	10,7
Mean modulus of elasticity perpendicular	$E_{m,90,mean}$	0,23	0,27	0,30	0,32	0,33	0,37	0,38	0,40	0,43	0,47	0,50	0,53
Mean shear modulus	G_{mean}	0,44	0,50	0,56	0,59	0,63	0,69	0,72	0,75	0,81	0,88	0,94	1,00
Density in kg/m³													
5 percentile density	ρ_k	290	310	320	330	340	350	360	380	390	400	410	430
Mean density	ρ_{mean}	350	370	380	400	410	420	430	460	470	480	490	520
NOTE 1 Values given above for tension strength, compression strength, shear strength, char. modulus of elasticity in bending, mean modulus of elasticity perpendicular to grain and mean shear modulus have been calculated using the equations given in EN 384.													
NOTE 2 The tension strength values are conservatively estimated since grading is done for bending strength.													
NOTE 3 The tabulated properties are compatible with timber at moisture content consistent with a temperature of 20 °C and a relative humidity of 65 %, which corresponds to a moisture content of 12 % for most species.													
NOTE 4 Characteristic values for shear strength are given for timber without fissures, according to EN 408.													
NOTE 5 These classes may also be used for hardwoods with similar strength and density profiles such as e.g. poplar or chestnut.													
NOTE 6 The edgewise bending strength may also be used in the case of flatwise bending.													