



# SLOVENSKI STANDARD SIST EN 1194:2000

01-april-2000

Glued laminated timber - Strength classes and determination of characteristic values

Timber structures - Glued laminated timber - Strength classes and determination of characteristic values

Holzbauwerke - Brettschichtholz - Festigkeitsklassen und Bestimmung charakteristischer Werte

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Structure en bois - Bois lamellé-collé - Classes de résistance et détermination des valeurs caractéristiques

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**Ta slovenski standard je istoveten z: EN 1194:1999**

### **ICS:**

79.060.99	Öi ~ * ^ Á ^ • } ^ Á    z ^	Other wood-based panels
91.080.20	Lesene konstrukcije	Timber structures

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**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 1194

April 1999

ICS 79.060.99; 91.080.20

English version

## Timber structures - Glued laminated timber - Strength classes and determination of characteristic values

Structure en bois - Bois lamellé-collé - Classes de  
résistance et détermination des valeurs caractéristiques

Holzbauwerke - Brettschichtholz - Festigkeitsklassen und  
Bestimmung charakteristischer Werte

This European Standard was approved by CEN on 1 June 1998.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 124 "Timber structures", the secretariat of which is held by DS.

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 1999, and conflicting national standards shall be withdrawn at the latest by October 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This Standard is one of a series of standards for building materials. It was prepared by a working group under the joint convenorship of Association Française de Normalisation (AFNOR) and British Standards Institution (BSI).

This Standard includes a normative annex on calculation of characteristic properties and a normative annex on examples of combinations of laminations and marking of glued laminated timber.

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## Introduction

A strength class system enables combinations of grade and species to be classified together with a common set of strength properties. Such a system simplifies the process of marketing glued laminated timber by reducing the number of options at the specification/supply interface.

## 1 Scope

This standard specifies a system of strength classes for horizontally laminated structural glued laminated timber with four or more laminations. A number of strength classes are defined and characteristic strength and stiffness properties and densities are given. This standard is currently limited to softwood glued laminated timber.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 338	Structural timber - Strength classes
EN 384	Structural timber - Determination of characteristic values of mechanical properties and density
EN 385: 1995	Finger jointed structural timber - Performance requirements and minimum production requirements

EN 386	Glued laminated timber - Performance requirements and minimum production requirements
EN 408	Timber structures - Structural timber and glued laminated timber - Determination of some physical and mechanical properties
EN 1193	Timber structures - Structural and glued laminated timber - Determination of shear strength and mechanical properties perpendicular to the grain
ENV 1995-1-1	Eurocode 5 - Design of timber structures - Part 1-1: General rules and rules for buildings

### 3 Definitions

For the purposes of this standard, the following definitions apply :

**3.1 glued laminated timber:** Structural member formed by bonding together timber laminations with the grain running essentially parallel.

**3.2 characteristic values:** Refer to ENV 1995-1-1

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**3.3 homogeneous glued laminated timber:** Glued laminated timber with a cross-section where all laminations are of the same grade (strength class) and species (or species combinations).

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**3.4 combined glued laminated timber:** Glued laminated timber with a cross-section comprising inner and outer laminations of different grades (strength classes) and species (or species combinations).

**3.5 horizontally laminated glued laminated timber:** See horizontal glulam defined in EN 386. For elements stressed in bending, the load is applied perpendicular to the wide faces of the laminations.

**3.6 thickness:** Lesser dimension perpendicular to the longitudinal axis.

**3.7 width:** Greater dimension perpendicular to the longitudinal axis.

**3.8 depth:** Dimension perpendicular to the longitudinal axis of a beam, in the plane of the bending forces.

**4 Symbols**

Main symbols:

$E_0$	modulus of elasticity parallel to the grain, in newtons per square millimetre;
$f$	strength, in newtons per square millimetre;
$h$	depth of a bending specimen or width of a tension specimen, in millimetres;
$k$	factor;
$l$	length, in millimetres
$\rho$	density, in kilogrammes per cubic metre;

Subscripts:

c	compression;
g	properties of glued laminated timber;
j	properties of laminate end joints;
k	characteristic; <b>iTeh STANDARD PREVIEW</b>
l	properties of laminations; <b>(standards.iteh.ai)</b>
m	bending; <a href="https://standards.iteh.ai/catalog/standards/sist/3b80d7a0-847d-40e7-9c7b-e8b3c086cef6/sist-en-1194-2000">SIST EN 1194:2000 https://standards.iteh.ai/catalog/standards/sist/3b80d7a0-847d-40e7-9c7b-e8b3c086cef6/sist-en-1194-2000</a>
mean	mean value;
size	size factor;
t	tension;
v	shear;
0	parallel to grain;
90	perpendicular to grain;
05	5-percentile.

## 5 Strength classes

5.1 Table 1 and table 2 give the characteristic strength, stiffness and density properties for four standard strength classes.

NOTE 1: The compression strength perpendicular to grain corresponds to the test method given in EN 1193. These values are approximately half of those used in some timber design codes for the strength verification of supports.

NOTE 2: The shear strength values are derived from actual values used in existing timber design codes.

5.2 The values of bending strength are related to elements with a depth  $h$  of 600 mm. The values of tension strength parallel to grain are related to elements with a width  $h$  of 600 mm.

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**Table 1: Characteristic strength and stiffness properties in N/mm<sup>2</sup> and densities in kg/m<sup>3</sup>  
(for homogeneous glulam)**

Glulam strength class	GL 24h	GL 28h	GL 32h	GL 36h
Bending strength	24	28	32	36
Tension strength	16,5	19,5	22,5	26
	0,4	0,45	0,5	0,6
Compression strength	24	26,5	29	31
	2,7	3,0	3,3	3,6
Shear strength	2,7	3,2	3,8	4,3
Modulus of elasticity	11 600	12 600	13 700	14 700
	9 400	10 200	11 100	11 900
	390	420	460	490
Shear modulus	720	780	850	910
Density	380	410	430	450

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Table 2: Characteristic strength and stiffness properties in N/mm<sup>2</sup> and densities in kg/m<sup>3</sup>  
(for combined glulam)

Glulam strength class	GL 24c	GL 28c	GL 32c	GL 36c
Bending strength	24	28	32	36
Tension strength	14	16,5	19,5	22,5
	0,35	0,4	0,45	0,5
Compression strength	21	24	26,5	29
	24	2,7	3,0	3,3
Shear strength	22	2,7	3,2	3,8
Modulus of elasticity	11 600	12 600	13 700	14 700
	9 400	10 200	11 100	11 900
	320	390	420	460
Shear modulus	590	720	780	850
Density	350	380	410	430

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