



SLOVENSKI STANDARD

SIST EN 386:2002

01-julij-2002

Nadomešča:
SIST EN 386:1996

Lepljeni lamelirani les - Zahteve za uporabo in minimalne zahteve za proizvodnjo

Glued laminated timber - Performance requirements and minimum production requirements

Brettschichtholz - Leistungsanforderungen und Mindestanforderungen an die Herstellung

Bois lamellé collé - Exigences de performance et exigences minimales de fabrication

Ta slovenski standard je istoveten z: EN 386:2001

[SIST EN 386:2002](#)

[http://www.sist.si/log/star/11/11bc-df2f-4daa-a7fd-583fe1838156/sist-en-386-2002](#)

ICS:

79.060.99 Druge lesne plošče Other wood-based panels

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 386

October 2001

ICS 79.060.99

Supersedes EN 386:1995

English version

Glued laminated timber - Performance requirements and minimum production requirements

Bois lamellé collé - Exigences de performance et exigences minimales de fabrication

Brettschichtholz - Leistungsanforderungen und Mindestanforderungen an die Herstellung

This European Standard was approved by CEN on 3 September 2001.

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 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 Management Centre has the same status as the official versions.

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Contents

	page
Foreword.....	3
Introduction	4
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 Symbols	6
5 Requirements	6
5.1 General.....	6
5.2 Timber	6
5.3 Adhesives.....	7
5.4 End joints in laminations	7
5.5 Glue line integrity and strength	7
6 Manufacturing requirements	8
6.1 Production conditions	8
6.2 Timber	10
6.3 Adhesives.....	11
6.4 Manufacture	11
7 Quality Control	13
7.1 Factory production control.....	13
7.2 Organization of factory production control.....	14
7.3 Documentation of the quality control system	14
7.4 Inspection and testing	15

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 supersedes EN 386:1995.

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 April 2002, and conflicting national standards shall be withdrawn at the latest by April 2002.

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.

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Introduction

Glued laminated timber is obtained by bonding together a number of laminations having their grain essentially parallel. In this way a member with a rectangular solid cross-section can be produced.

The purpose of the requirements in this standard is to obtain reliable and durable bonding, so that the bonds in the glued laminated timber will maintain their integrity throughout the intended life of the structure. The requirements will need to be supplemented to take into consideration special production conditions, materials or functional requirements. The requirements apply to structural members of service classes 1 and 2. For timber structures of service class 3 special precautions shall be taken, for example weather resistant adhesives shall be used. The requirements for these are given in EN 301.

1 Scope

This standard specifies requirements for the components of glued laminated timber members and minimum requirements for the production of such members for structural use.

This standard is applicable to products with a finished lamination thickness of not more than 45 mm.

Although most glued laminated timber is made from coniferous species this standard also applies to broad leaved species if information is available to enable them to be satisfactorily bonded.

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 (including amendments).

EN 301, *Adhesives, phenolic and aminoplastic for load-bearing timber structures - Classification and performance requirements.*

EN 385:2001, *Finger jointed structural timber - Performance requirements and minimum production requirements.*

EN 391:2001, *Glued laminated timber - Delamination test of glue lines.*

EN 392, *Glued laminated timber - Shear test of glue lines.*

prEN 14081-1:2000, *Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements.*

prEN 14081-2:2000, *Timber structures - Strength graded structural timber with rectangular cross section - Part 2: Machine Grading - Additional requirements for initial type testing.*

prEN 14081-3:2000, *Timber structures - Strength graded structural timber with rectangular cross section - Part 3: Machine Grading - Additional requirements for factory production control.*

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions given in EN 391 and the following apply:

3.1

adhesive type

adhesive types I and II, see EN 301

3.2

glued laminated timber (glulam)

structural member formed by bonding together timber laminations with their grain running essentially parallel

3.3

horizontal glulam

glued laminated timber with the glue line planes perpendicular to the long length of the cross section, see Figure 1a

3.4

vertical glulam

glued laminated timber with the glue line planes perpendicular to the short length of the cross section, see Figure 1b

3.5

service class 1

service class characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 65 % for a few weeks per year

NOTE In service class 1 the average equilibrium moisture content in most softwoods will not exceed 12 %.

3.6

service class 2

service class characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 85 % for a few weeks per year

NOTE In service class 2 the average equilibrium moisture content in most softwoods will not exceed 20 %.

3.7

service class 3

service class characterized by climatic conditions leading to higher moisture contents than service class 2

3.8

maximum delamination percentage

see EN 391

3.9

total delamination percentage

see EN 391

3.10

wood failure percentage

see EN 392

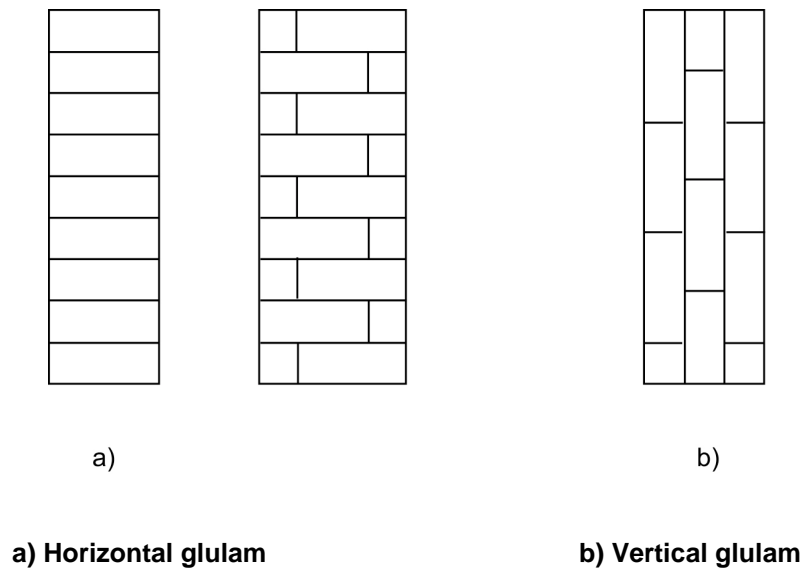


Figure 1 - Glue lines in cross sections showing the normal position of the glue lines

4 Symbols

A	area, in square millimetres;
f_m	bending strength of a single end joint, in newtons per square millimetre;
$f_{m,k}$	characteristic bending strength of the end joints in the lamination, in newtons per square millimetre;
$f_{m,dc,k}$	declared characteristic flatwise bending strength of the end joints, in newtons per square millimetre;
$f_{m,15,k}$	characteristic bending strength of 15 tested end joints, in newtons per square millimetre;
f_v	shear strength, in newtons per square millimetre;
r	radius of curvature, in millimetres;
t	lamination thickness, in millimetres.

5 Requirements

5.1 General

The used timber is defined by its strength class or strength properties and the bonding operations shall result in reliable and durable bonds.

These general requirements shall be considered satisfied if both the requirements in this clause and the minimum production requirements in clause 6 are fulfilled.

5.2 Timber

The timber shall be strength graded in conformity with either prEN 14081-1, prEN 14081-2 or prEN 14081-3.

5.3 Adhesives

The adhesive shall enable joints of such strength and durability to be produced in order that the integrity of the bond is maintained throughout the intended lifetime of the structure.

Acceptable strength and durability can be achieved by the use of an adhesive of type I and shall meet the requirements for this type given in EN 301. Or, for structures in service class 1 or 2 an adhesive of type II according to EN 301 can be used, provided the temperature of the member in the structure will always be below 50 °C.

NOTE 1 For the lamination and the end jointing, the adhesive should be chosen considering the climatic conditions in service, the timber species, the preservative used (if any) and the production methods.

NOTE 2 Such strength and durability can be achieved by a polycondensation adhesive of the phenolic or aminoplastic type as defined in EN 301.

For adhesives of other types than covered by EN 301 a bond with equivalent durability and strength shall be achieved. Special considerations shall be given to creep failure, the ability to maintain structural integrity during fire and elevated temperature and moisture conditions in ordinary service.

5.4 End joints in laminations

The characteristic bending strength $f_{m,k}$ obtained from flatwise bending tests of the end joints shall meet the following requirement:

$$f_{m,k} \geq f_{m,dc,k}$$

where

$f_{m,dc,k}$ is the declared characteristic bending strength.

The flatwise bending tests shall be performed in conformity with EN 385.

The characteristic bending strength shall be determined from the Log-Normal probability distribution function.

5.5 Glue line integrity and strength

5.5.1 The requirements for glue line integrity shall be based on testing of the glue line in a full cross-sectional specimen, cut from the manufactured glulam member. The specimens shall be representative of the manufacture.

5.5.2 For structures of service class 3, delamination tests shall be made in conformity with method A of EN 391.

For structures of service class 1 or 2 the testing shall be either delamination tests in conformity with method A of EN 391 or block shear tests in conformity with EN 392.

NOTE For routine quality control the test methods specified may be substituted by the following: Delamination method A may be substituted by delamination method B of EN 391:2001. For members to be used in service class 1 or 2 block shear tests may be substituted by delamination method C of EN 391:2001.

5.5.3 Depending on the method and number of cycles the total delamination percentage of each cross-sectional specimen shall be less than the values given in Table 1.