SLOVENSKI STANDARD
SIST EN 387:2002

01-julij-2002

Nadomeġļ a:
SIST ENV 387:2000

Lepljeni lamelirani les - Polni zobati spoji - Zahteve za uporabo in minimalne zahteve za proizvodnjo

Glued laminated timber - Large finger joints - Performance requirements and minimum production requirements

Brettschichtholz - Universal-Keilzinkenverbindungen - Leistungsanforderungen und Mindestanforderungen an die Herstellung

Bois lamellé collé - Aboutages a entures multiples de grandes dimensions - Exigences de performance et exigences minimales de fabrication

Ta slovenski standard je istoveten z: EN 387:2001

ICS:

79.060.99	Druge lesne ploġļ e	Other wood-based panels

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English version

Glued laminated timber - Large finger joints - Performance requirements and minimum production requirements

Bois lamellé collé - Aboutages à entures multiples de grandes dimensions - Exigences de performance et exigences minimales de fabrication

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

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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.

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.

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

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Contents

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of an identical text or by endorsement, at the latest by April 2002, and conflicting national standards shall be withdrawn at the latest by April 2002.

This European Standard supersedes ENV 387:1999.

Annex A is informative.

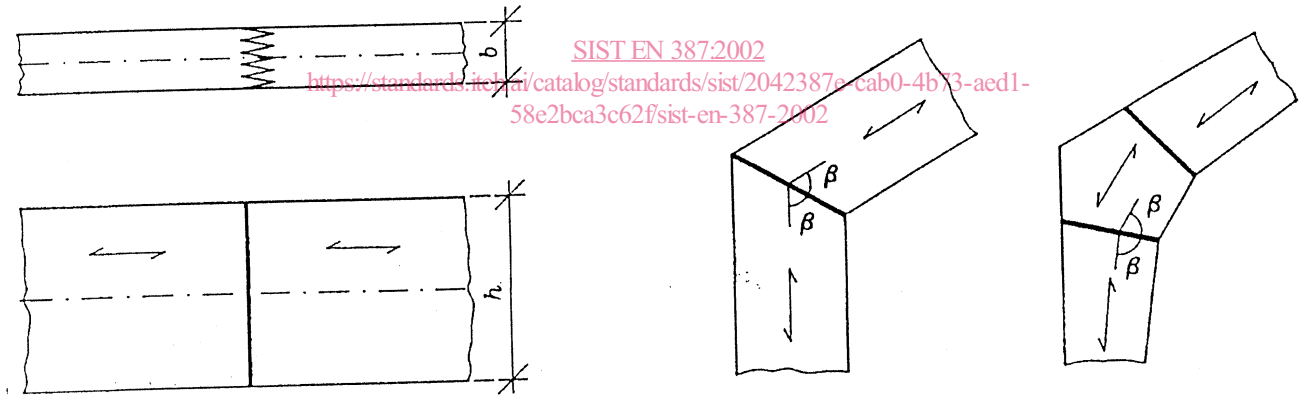
According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal,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

Introduction

This standard concerns the production of large finger joints, which are finger joints across the whole cross section of a structural member of glued laminated timber also with corner pieces of laminated veneer lumber or plywood. The requirements are to ensure the production of reliable and durable bonding, so that large finger joints may be used in timber structures of service classes 1 or 2. For timber structures of service class 3 special precautions should be taken, among these only adhesives of the phenolic resin type, which meet the requirements for adhesive type I of EN 301 should be used. It is assumed that the production of large finger joints will take place at a factory in order to ensure a stable and reliable product.

1 Scope

This standard specifies requirements for large finger joints and minimum requirements for the production of these in structural members of glued laminated timber also with corner pieces of laminated veneer lumber or plywood with a finger length of at least 45 mm. The glued laminated timber and the laminated veneer lumber shall be made from conifers and poplar. Such finger joints may be employed for joints in straight beams or for frame corners, see Figure 1.



Key

1 Direction of grain

Figure 1 - Large finger joints in a beam and at frame corners

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.*

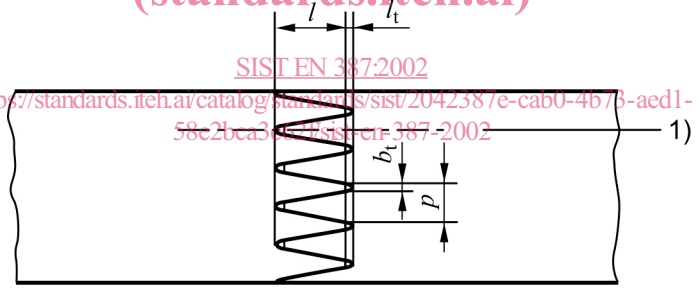
EN 386:2001, *Glued laminated timber - Performance requirements and minimum production requirements.*

EN 408, *Timber structures - Structural timber and glued laminated timber - Determination of some physical and mechanical properties.*

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply:

3.1
large finger joint
finger joint through the full cross-sectional area at the ends of glulam members bonded together at any angle including corner pieces of laminated veneer lumber or plywood



Key

l Finger length
p Pitch
b_t Tip width
l_t Tip gap
1) Finger symmetry direction

Figure 2 - Typical profile of finger joint

3.2
finger length
distance between the slot base and the tip of the finger, measured along the centre line of the finger, see Figure 2

3.3
glued laminated timber (glulam)
structural member formed by bonding together timber laminations with the grain running essentially parallel

3.4
laminated veneer lumber (LVL)
structural member formed by bonding together veneers with the grain running essentially parallel

3.5
pitch
distance between fingers, centre to centre, see Figure 2

3.6
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 %.

3.7
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 %.

3.8
service class 3
service class characterized by climatic conditions leading to higher moisture contents than service class 2

3.9
tip width
distance between finger faces, measured at the tip of the finger, see Figure 2

3.10
tip gap
distance between finger tip and finger base in a bonded finger joint, see Figure 2

4 Symbols

b width of cross section, in millimetres;

b_t tip width, in millimetres;

d diameter of cylindrical specimen, in millimetres;

f_m bending strength, in newtons per square millimetre;

$f_{m,k}$ characteristic bending strength, in newtons per square millimetre;

$f_{m,dc,k}$ characteristic bending strength declared by the manufacturer, in newtons per square millimetre;

h depth of cross section, in millimetres;

l finger length, in millimetres;

l_t tip gap, in millimetres;

M bending moment, in newton millimetres;

p pitch, in millimetres;

β angle between the cross section at the joint and the grain direction, see Figure 1.

5 Requirements

5.1 General

The cutting and bonding operations of large finger joints shall result in reliable and durable bonds of required strength.

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

5.2 The large finger joint

The symmetry direction of the fingers shall be parallel to the grain, see Figure 2.

The thickness of the glue line shall nowhere be larger than 0,5 mm. Glue lines at knots shall be disregarded.

The tip gap shall be between 1 mm and 6 mm over the full joint depth after pressing.

The total area with damaged fingers shall be less than 5 % of the cross section. The damaged fingers shall not be concentrated in the tension zone.

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 planned lifetime of the structure.

Acceptable strength and durability can be achieved by the use of an adhesive of type I which 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.

The adhesive shall be gap filling for gaps of at minimum 1,0 mm.

NOTE 1 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.

NOTE 3 The use of the phenolic resin type adhesives as defined in EN 301 is recommended.

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 Bending strength

The characteristic edgewise bending strength $f_{m,k}$ of the large finger joints in straight beams shall meet the following requirement:

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

$f_{m,dc,k}$ is a characteristic bending strength of a straight beam as declared by the manufacturer.

This requirement shall be deemed to be satisfied if the initial bending test of the large finger joints according to 8.4 have met this requirement and if the fit of the fingers in the end product meets the requirement in 5.2.