SLOVENSKI STANDARD
SIST EN 392:1996

01-avgust-1996

Lepljen lameliran les - Strižni preskus lepljenih stikov

Glued laminated timber - Shear test of glue lines

Brettschichtholz - Scherprüfung der Leimfugen

Bois lamellé collé - Essai de cisaillement des joints de collage

Ta slovenski standard je istoveten z: **EN 392:1995**

ICS:

79.060.99 Druge lesne plošče Other wood-based panels

SIST EN 392:1996 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 392

January 1995

ICS 79.060.00

Descriptors: Laminated boards, gluing, quality control, shear tests, shear strength

English version

Glued laminated timber - Shear test of glue lines

Bois lamellé collé - Essai de cisaillement des joints de collage

Brettschichtholz - Scherprüfung der Leimfugen

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Contents

Foreword

This European Standard was prepared by CEN TC 124 "Timber Structures" of which the secretariat 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of an identical text or by endorsement, at the latest by July 1995, and conflicting national standards shall be withdrawn at the latest by July 1995.

> NOTE: It is considered desirable maintain the same clause numbers consistently throughout this series of standards. Consequently, some clauses are void in this edition of this standard, but it is envisaged that future editions may need to include text in these clauses.

No existing European Standard is superseded.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This standard specifies a method for measuring the shear strength of the glue line parallel to the direction of grain. The standard is applicable in the field of continuous quality control of the glue line.

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 386	Glued laminated timber - Performance requirements and minimum production requirements
ISO 554:1976	Standard atmospheres for conditioning and/or testing - Specifications

3 Definitions

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

3.1 drill core: Specimen of cylindrical shape drilled out of the glulam.

3.2 **glued laminated timber (glulam):** Structural member formed by bonding together timber laminations with the grain essentially parallel.

3.3 **test bar:** Test piece of rectangular right-angled prismatic form.

3.4 **wood failure:** Rupture in or between wood fibres.

3.5 **wood failure percentage:** Percentage of the wood failure area in relation to the total sheared area.

4 Symbols

A area, in square millimetres;

a width of machined flat face of drill core, in millimetres;

b width of test bar, in millimetres;

d diameter, in millimetres;

F_u ultimate load, in newtons;

f_v shear strength, in newtons per square millimetre;

k modification factor;

l length of test piece, in millimetres;

t thickness of test piece, in millimetres.

5 Requirements

None.

6 Shear test of glue lines

6.1 Principle

A shear stress is applied at the glue line until failure occurs.

6.2 Apparatus

6.2.1 Testing machine

A calibrated testing machine capable of applying a compressive force to the shearing tool, referred to in 6.2.2. The accuracy of measuring the maximum load shall be better than ± 3 %.

6.2.2 Shearing tool

A shearing tool as illustrated in figure 1. The cylindrical bearing shall be self-aligning so that the test piece is loaded at the end grain with a stress field uniform in the width direction.

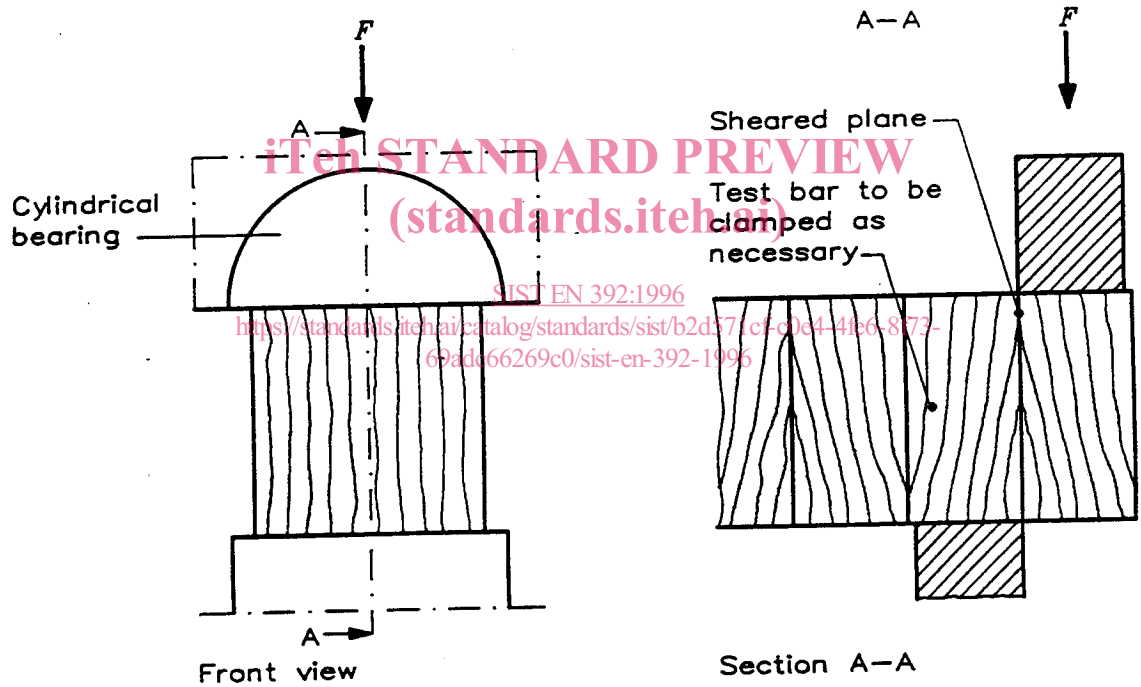


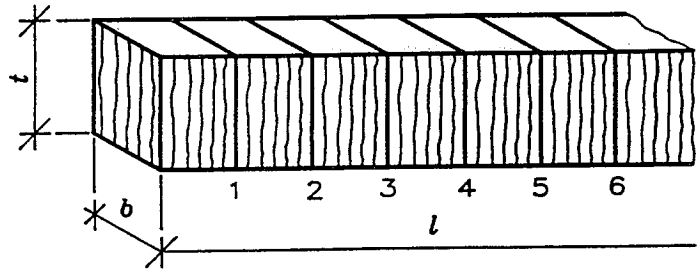
Figure 1: Shearing tool with a test bar inserted

6.3 Preparation of test pieces

6.3.1 Test pieces

Special care shall be taken in preparing the test pieces to ensure that the loaded surfaces are smooth and parallel to each other and perpendicular to the grain direction.

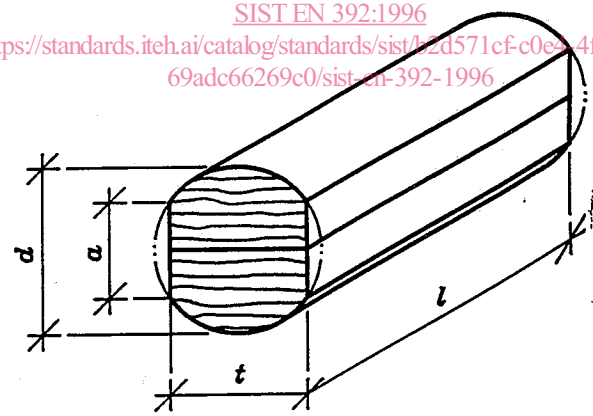
The test piece shall be of the form shown in either figure 2 or figure 3. That depicted in figure 2 shows the normal test piece.



Sizes: length, l
width, b: 40 mm to 50 mm
thickness, t: 40 mm to 50 mm

Note: If the test bar is cut from a position higher in the cross section the numbers of the lines does not start with 1, see 6.3.3

Figure 2: The normal test piece, a test bar, and the numbering of the individual glue lines for a test bar cut at the bottom of the cross-section



Sizes: length, l: 70 mm to 80 mm
diameter, d: approx. 35 mm
straight edges, a: approx. 23
thickness, t: approx. 26 mm

Figure 3: Drill core with machined parallel plane surfaces

6.3.2 Sampling

6.3.2.1 Test bars shall be cut from the full cross-sectional specimens as described in EN 386. At least three glue lines in each of the lower, middle and upper part shall be tested. If there are less than 10 laminations all glue lines shall be tested.

NOTE: It is recommended that the full cross-sectional specimens are taken within areas of the glulam member where sufficient cramping pressure has been established. In practice the specimens are frequently cut from the end of the glulam members where the cramping pressure may be variable and insufficient. If the required shear strength is obtained from test pieces of this nature, the quality of the glue lines in the member should be deemed adequate.

6.3.2.2 The shear testing shall include as far as possible the total cross-sectional width of the glulam member. The number of test bars to be taken shall be as given in table 1.

Table 1: Number of test bars

Width of full cross-section, see figure 4	≤ 100 mm	> 100 mm ≤ 160 mm	> 160 mm
Number of test bars	1	2	3

Sizes in millimetres

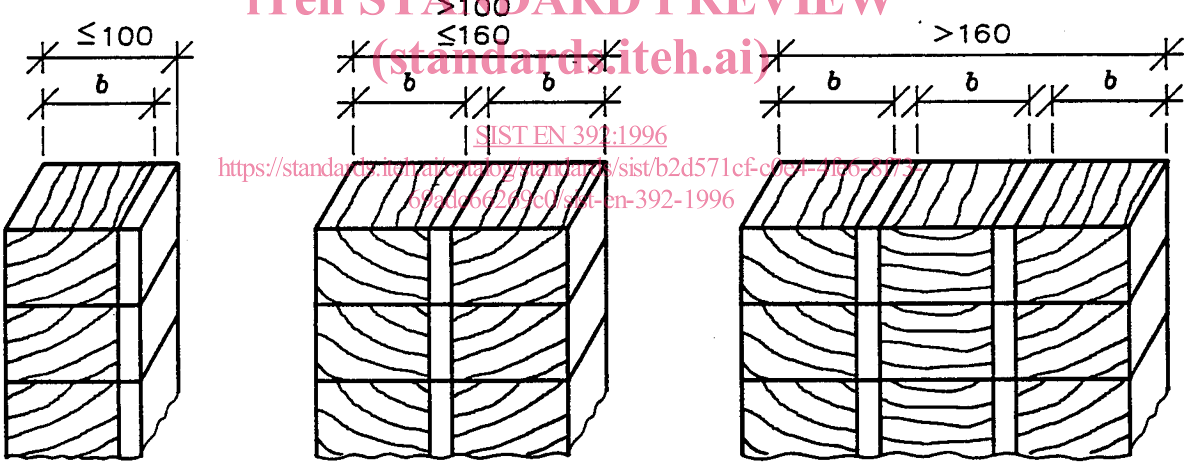


Figure 4: Test bars to be cut from a full cross-sectional specimen

6.3.2.3 If two or more members are cramped in one operation, see figure 6, the test bars necessary according to the testing quantity quoted in 6.3.2.2 have to be taken from each of the members.

6.3.2.4 For testing glue lines within the glulam member drill cores shall be sampled.

The drill cores shall be cut out perpendicular to the face of the glulam member in such a way that the glue line to be tested is situated in the middle of the core.

NOTE: For guidance of the drilling tool it is recommended that an appropriate support is used.

The drill cores shall be machined at two faces perpendicular to the glue line as shown in figure 3 and divided