



SLOVENSKI STANDARD

SIST EN 302-1:1998

01-februar-1998

Lepila za nosilne lesene konstrukcije - Preskusne metode - 1. del: Določanje trdnosti lepljenega stika pri vzdolžni natezno strižni obremenitvi

Adhesives for load-bearing timber structures - Test methods - Part 1: Determination of bond strength in longitudinal tensile shear

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 1: Bestimmung der Klebfestigkeit durch Längszugscherprüfung

Adhésifs pour structures portantes en bois - Méthodes d'essais - Partie 1: Détermination de la résistance du joint au cisaillement en traction longitudinale

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Ta slovenski standard je istoveten z: EN 302-1:1992

ICS:

83.180	Lepila	Adhesives
91.080.20	Lesene konstrukcije	Timber structures

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EUROPEAN STANDARD

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NORME EUROPÉENNE

EUROPÄISCHE NORM

June 1992

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Descriptors: Adhesives, timber construction, phenoplasts, aminoplasts, joining, adhesive bonded joints, shear tests, shear strength

English version

Adhesives for load-bearing timber structures - Test methods - Part 1: Determination of bond strength in longitudinal tensile shear

Adhésifs pour structures portantes en bois -
Méthodes d'essais - Partie 1: Détermination de
la résistance du joint au cisaillement en
traction longitudinale

Klebstoffe für tragende Holzbauteile -
Prüfverfahren - Teil 1: Bestimmung der
Klebfestigkeit durch Längszugscherprüfung

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This European Standard was approved by CEN on 1992-06-01. 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.

The European Standards exist 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

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

Page 2
EN 302-1:1992

Contents	Page
Foreword	3
1 Scope	4
2 Normative references	4
3 Principle	5
4 Apparatus	5
5 Method	5
5.1 Preparation of bonded assemblies	6
5.2 Preparation of test pieces	7
5.3 Number of test pieces	8
5.4 Treatment prior to tensile shear testing	8
5.5 Test procedure	9
6 Expression of results	10
7 Test report	10
7.1 The adhesive	10
7.2 Preparation of the test pieces and testing procedure	10
7.3 Test results	11

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SIST EN 302-1:1998

[https://standards.iteh.ai/catalog/standards/sist/3f1830aa-f10f-4d78-8c26-](https://standards.iteh.ai/catalog/standards/sist/3f1830aa-f10f-4d78-8c26-013dbb9675a7/sist-en-302-1-1998)

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1 Scope

This Part of EN 302 describes a method of determining the strength in longitudinal shear of adhesive bonds between lap joint test pieces made of beech (*Fagus sylvatica* L.). It is suitable for the following applications:

- a) for assessing the compliance of adhesives with EN 301;
- b) for assessing the suitability and quality of adhesives for load-bearing timber structures;
- c) for comparing the strengths of bonds with thin or thick glue-lines.

This test is intended primarily to obtain performance data for the classification of adhesives for load-bearing timber structures according to their suitability for use in defined climatic environments.

This method is not intended for use to provide numerical design data and does not necessarily represent the performance of the bonded member in service. It is not applicable to assessment of the suitability of adhesives for the manufacture of wood-based panels.

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2 Normative references

SIST EN 302-1:1998

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

Foreword

This European Standard was prepared by Technical Committee 103, Adhesives for wood and derived timber products.

This Standard is one of a series dealing with adhesives for use with timber structures, and is published in support of Eurocode No. 5, 'Common unified rules for timber structures'. The series consists of a classification and performance requirements for two types of phenolic and aminoplastic adhesive for use in different climatic conditions (EN 301), and four test methods (EN 302, Parts 1 to 4) to assess the performance of adhesives after specified heat and humidity treatments.

The other tests used in the classification of adhesives for timber structures are given in:

EN 302: Part 2 Determination of resistance to delamination
(laboratory method)

EN 302: Part 3 Determination of the effect of acid damage to wood fibres by temperature and humidity cycling on the transverse tensile strength

EN 302: Part 4 Determination of the influence of shrinkage on the shear strength

No existing European Standard is superseded.
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National standards identical to this European Standard shall be published at the latest by 1992-12-31 and conflicting national standards shall be withdrawn at the latest by 1992-12-31.

According to the CEN/CENELEC Common Rules, 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.

ISO 5893: 1985 Rubber and plastics test equipment - Tensile, flexural and compression types (constant rate of traverse) - Description.

- 1) FEPA 43-GB Standard for coated abrasive grains of fused alumina and silicon carbide

3 Principle

A symmetrical bonded single lap joint between two rectangular wooden adherends is strained to rupture by a longitudinal tensile force (parallel to the grain).

4 Apparatus

The testing machine shall be either:

- a) a constant rate of loading machine, capable of maintaining a rate of loading of $(2,0 \pm 0,5)$ kN/min; or
- b) a constant rate of traverse machine as described in ISO 5893: 1985.

The jaws shall grip the test piece with a wedge action. Each pair of jaws shall either be attached by loose-fitting pin joints which in turn are fitted by ball-and-socket joints to the straining heads or, one of the pairs of jaws shall be attached rigidly to the testing machine and the other jaw shall be suspended from a ball-and-socket joint allowing sufficient movement of the jaw so as to permit self-alignment of this jaw whilst the test pieces are being pulled.

5 Method

5.1 Preparation of bonded assemblies

Prepare two panels (see figure 1) from a thick unsteamed, straight-grained board of beech (*Fagus sylvatica* L) with a minimum density of (700 ± 50) kg/m³ at (12 ± 1) % moisture content. It is permissible to prepare panels from different boards unless it is essential to minimise differences in the wood in order to conduct special comparative tests (see Note 1).

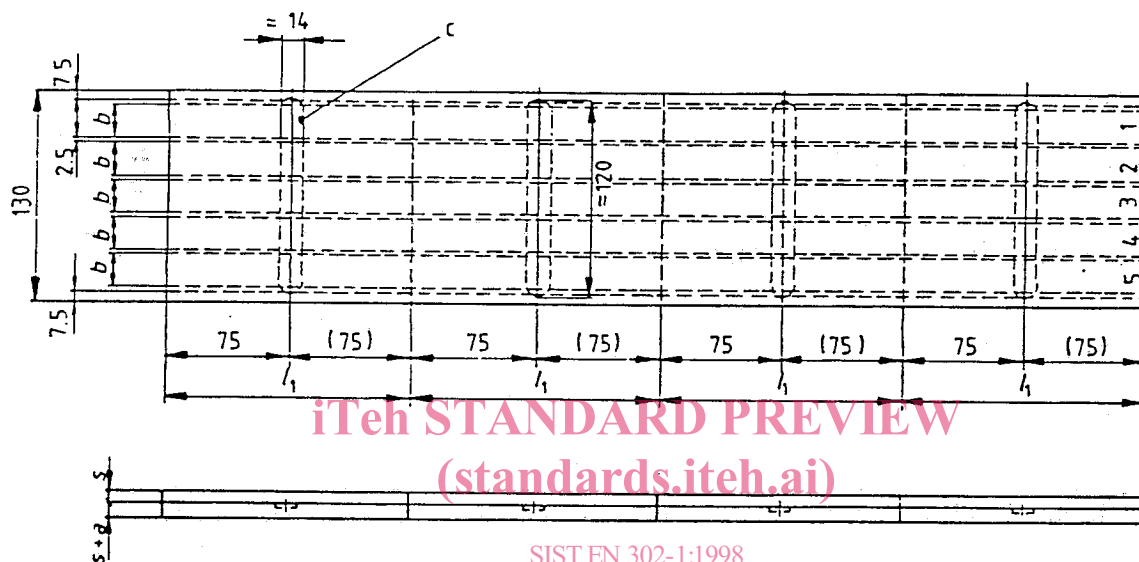
Ensure that the angle between the growth rings and the surface to be bonded is between 30° and 90°.

-
- 1) Fédération Européenne des Fabricants de Produits Abrasifs.
20, Avenue Reille
F - 75014 Paris
France

Cut the panels across the direction of the grain to a length equal to a multiple of 300 mm with the necessary allowance for cross-cutting and along the grain to a width of approximately 130 mm making an allowance for the width of cut as shown in figure 1.

For tests on thin glue-lines, use two panels of $(5,0 \pm 0,1)$ mm thickness.

For tests on thick $(1,0 \pm 0,1)$ mm glue-lines, use one $(6,0 \pm 0,1)$ mm thick panel and one $(5,0 \pm 0,1)$ mm thick panel.



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- a = $(1,0 \pm 0,1)$: thickness of glue line
 b = $(20,0 \pm 0,1)$: width of test piece
 c = grooves for thick glue line
 l_1 = (150 ± 5) : length of test piece
 s = $(5,0 \pm 0,1)$: thickness of the panels

All dimensions are in millimetres

Figure 1: Example of a bonded panel marked for division into individual test pieces using 2,5 mm saw-cuts

Make grooves $(1,0 \pm 0,1)$ mm deep and (14 ± 1) mm wide in the 6 mm thick panel used for testing thick glue-lines as shown in figure 1.

NOTE 1: When comparing strengths of an adhesive when used in thick and thin glue-lines, the differences in bond strength caused by differences in the wood should be minimized. In such cases, it is recommended that the panels to be tested are cut from the same board in the direction of the grain in the following order: two 5 mm panels for the joints with thin glue-lines; one 5 mm panel for the thick glue-line joint; one 6 mm panel for the thick glue-line joint. The panels are usually cut slightly oversize and planed down to the required thickness before use.

For conventional tests, condition the panels at a temperature of $(20 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \% \text{ r.h.}$ referred to subsequently as "the standard atmosphere, [20/65]".

NOTE 2: For special materials or service conditions, conditioning environments other than that given above may be used if recommended by the manufacturer of the adhesive.

Prepare bonded assemblies using both thin (approximately 0,1 mm) and thick $((1,0 \pm 0,1) \text{ mm})$ glue-lines.

Not more than 24 h before bonding, either lightly plane or lightly sand each surface to be bonded (using an abrasive paper of grain size P100 complying with FEPA standard 43-GB). Remove any dust carefully. Do not touch or soil the prepared surfaces.

Comply with the adhesive manufacturer's instructions regarding the processing conditions, including the preparation of the adhesive, the coverage of the adhesive, whether the adhesive should be applied on one or both surfaces, the open and closed assembly time and the magnitude and duration of the assembly pressure and report them in the test report.

Bond the panels with the pressure uniformly distributed over the bonded surface.

5.1.1 Thin glue-lines (Close contact joints)

Bond two 5 mm thick panels as shown in figure 1 under pressure to produce a 10 mm thick bonded assembly.

SIST EN 302-1:1998

5.1.2 Thick glue-lines (Gap joints)

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Pour the adhesive into the grooves of the grooved panel so that it will be squeezed out when pressure is applied. Assemble under pressure one 6 mm thick grooved panel with one 5 mm thick ungrooved panel, to produce an 11 mm thick bonded assembly (see figure 1).

5.2 Preparation of test pieces

After bonding and pressing and before cutting and testing, condition the assembly for a minimum of 7 days in the standard atmosphere [20/65].

NOTE: A longer conditioning time may be used if recommended by the adhesive manufacturer.

Cut five strips of width $b = 20 \text{ mm}$ from each bonded assembly along the grain, avoiding areas within 7,5 mm of the outside long edges of the panel as shown in figure 1. Cut these strips into test pieces of length $l_1 = (150 \pm 5) \text{ mm}$ as shown in figure 2.

Make flat bottomed cuts of $(2,5 \pm 0,5) \text{ mm}$ wide in the bonded sections across the grain so that an overlap of width $l_2 = (10,0 \pm 0,1) \text{ mm}$ is defined in the middle section (see figure 2). The cuts are to separate the wood layers; they shall not go beyond the adhesive layer.