



SLOVENSKI STANDARD

SIST EN 302-1:2004

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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 strength

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 1: Bestimmung der Längszugscherfestigkeit

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

Ta slovenski standard je istoveten z: EN 302-1:2004

ICS:

83.180	Lepila	Adhesives
91.080.20	Lesene konstrukcije	Timber structures

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 302-1

July 2004

ICS 83.180

Supersedes EN 302-1:1992

English version

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

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

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 1:
Bestimmung der Längszugscherfestigkeit

This European Standard was approved by CEN on 16 April 2004.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 302-1:2004) has been prepared by Technical Committee CEN/TC 193 "Adhesives", the secretariat of which is held by AENOR.

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 January 2005, and conflicting national standards shall be withdrawn at the latest by January 2005.

This document supersedes EN 302-1:1992.

EN 301 and EN 302 Parts 1 to 4 and Parts 6 and 7 have the following titles.

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

EN 302 *Adhesives for load-bearing timber structures — Test methods —*

Part 1: *Determination of bond strength in longitudinal tensile shear strength*

Part 2: *Determination of resistance to delamination (Laboratory method)*

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

Part 4: *Determination of the effects of wood shrinkage on the shear strength*

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Part 6: *Determination of the conventional pressing time*

Part 7: *Determination of the conventional working life*

ENV 302-5:2001 has the title '*Adhesives for load-bearing timber structures — Test methods — Part 5: Determination of the conventional assembly time*'.

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

EN 302-1:2004 (E)

1 Scope

This part of EN 302 specifies a method of determining the shear strength of adhesive bonds. It is applicable to adhesives used in load-bearing timber structures.

This method is not intended for use to provide numerical design data, nor is it applicable to the assessment of adhesives for the manufacture of wood-based panels.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 5893, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Specification.*

3 Principle

The shear strength of adhesive bonds is determined by applying a longitudinal tensile force to a single lap joint with thin and thick glue lines between two rectangular wooden adherends made of beech (*Fagus sylvatica* L). The joints are strained to rupture.

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4 Safety

Persons using this standard shall be familiar with normal laboratory practice.

This document does not purport to address all the safety problems, if any, associated with its use.

It is responsibility of the user to establish health and safety practices and to ensure compliance with any European and national regulatory conditions.

5 Apparatus

The testing machine shall be either:

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

The jaws of the testing machine shall grip the test pieces with a wedge action, ensure self-aligning of the test piece and prevent slippage during loading.

6 Method

6.1 Preparation of the bonded assemblies

6.1.1 General

By planing prepare two panels (see Figure 1) from an untreated straight-grained board of beech (*Fagus sylvatica* L.) with a density of (700 ± 50) kg/m³ at (12 ± 1) % moisture content. All panels to be used for the same cyclic treatment (including different glue line thicknesses) shall be prepared from the same board. Ensure that the angle between the growth rings and the surface to be bonded is between 30° and 90°.

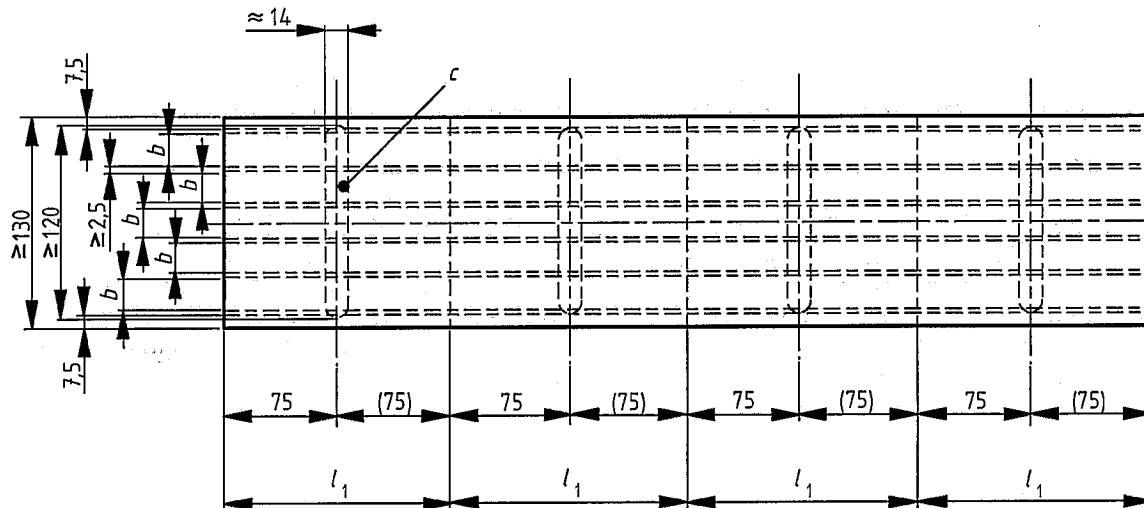
Cut the panels across the direction of the grain to a length of at least 300 mm with the necessary allowance for cross-cutting (saw blade thickness) and along the grain to a width of at least 130 mm with the necessary allowance for the width of cut as shown in Figure 1. For test on thin glue lines (0,1 mm), use two panels of $(5,0 \pm 0,1)$ mm thickness. For test 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. 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.

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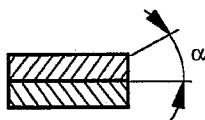
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Dimensions in millimetres



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Key

- a = $(1,0 \pm 0,1)$ mm thickness of thick glue line
- b = $(20,0 \pm 0,1)$ mm width of test piece
- c = grooves for thick glue line
- l_1 = (150 ± 5) mm length of test pieces
- s = $(5,0 \pm 0,1)$ mm thickness of the panels for thin glue line
- α = $30^\circ - 90^\circ$ angle between growth ring and surface to be bonded

Figure 1 — Example of a bonded panel marked for division into individual test pieces

NOTE 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 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.

Condition the panels at a temperature of (20 ± 2) °C and (65 ± 5) % r.h., referred to subsequently as "the standard atmosphere [20/65]".

Prepare bonded assemblies using both thin (approximately 0,1 mm) and thick ($(1,0 \pm 0,1)$ 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 the FEPA-43 document). 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 and application of the adhesive, the spreading of the adhesive, the open and closed assembly time and the magnitude and duration of the assembly pressure and report them in the test report. For thick glue lines only adhesives which components have been previously mixed are suitable. After adhesive application, and before pressure application, the board shall be bonded together as shown in Figure 1, ensuring that the same board is used to produce a bonded assembly joint.

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

6.1.2 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.

6.1.3 Thick glue lines (gap joints)

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).

6.2 Preparation of test pieces

After bonding and pressing and before testing, condition the assembly for 7 days in the standard atmosphere [20/65]. Test pieces shall be cut 3 days or more after bonding.

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

Cut five strips of width $b = 20$ 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 $l_1 = (150 \pm 5)$ mm as shown in Figure 2.

Make flat bottomed cuts of $\geq 2,5$ mm width in the bonded sections across the grain so that an overlap of width $l_2 = (10,0 \pm 0,1)$ mm is defined in the middle section (see Figure 2) centred in the groove in test pieces on thick glue lines. The cuts are to separate the wood layers and the adhesive layer, but they shall not go beyond the adhesive layer.