SLOVENSKI STANDARD
SIST EN 302-3:2004

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Nadomešča:
SIST EN 302-3:1998

Lepila za nosilne lesene konstrukcije - Preskusne metode - 3. del: Ugotavljanje vpliva kislinskih poškodb lesnih vlaken, nastalih zaradi cikličnih obremenitev s temperaturo in vlago, na prečno natezno trdnost

Adhesives for load-bearing timber structures - Test methods - Part 3: Determination of the effect of acid damage to wood fibres by temperature and humidity cycling on the transverse tensile strength

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 3: Bestimmung des Einflusses von Säureschädigung der Holzfasern durch Temperatur- und Feuchtezyklen auf die Querzugfestigkeit

Adhésifs pour structures portantes en bois - Méthodes d'essai - Partie 3: Détermination de l'influence de l'attaque d'acide des fibres de bois, résultant de traitements cycliques de température et d'humidité sur la résistance a la traction transversale

Ta slovenski standard je istoveten z: **EN 302-3:2004**

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EUROPEAN STANDARD
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EN 302-3

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English version

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Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 3: Bestimmung des Einflusses von Säureschädigung der Holzfasern durch Temperatur- und Feuchtezyklen auf die Querzugfestigkeit

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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Foreword

This document (EN 302-3:2004) 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 302-3:1992.

This document 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 adhesives for use in different climatic conditions (EN 301), four test methods (EN 302 Parts 1 to 4) used to assess the performance of adhesives after specified heat and humidity treatments, and three test methods (ENV 302-5 and EN 302 Parts 6 and 7) to characterise the working properties of the adhesive.

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*

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*

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.

1 Scope

This part of EN 302 specifies a method for determining the effect on bond strength of damage to wood fibres caused by the action of acids from the adhesive during climatic cycling.

It is suitable for the following applications:

a) assessing the compliance of adhesives with EN 301;

b) for assessing the suitability and quality of adhesives for load-bearing timber structures;

c) for determining if the adhesive after bonding has a damaging influence on the strength of the wood due to chemical action.

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 test is carried out on spruce (*Picea abies* L.).

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

NOTE Attention is drawn to the fact that the performance requirement established in EN 301 for the acid fibre damage test applies only if either:

1) the adhesive mixture, or

2) one of the adhesive components, when applied separately,

shows a pH value lower than 4,0, as determined by EN 1245.

2 Normative references

The following referenced document is 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.

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

3 Principle

A gap joint between wooden adherends is submitted to defined temperature and humidity cycles and then strained to failure by a transverse tensile load.

4 Safety

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

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

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

5 Apparatus

5.1 Testing machine

The testing machine shall be either:

a) a constant rate of loading machine, capable of maintaining a rate of loading of (10 ± 1) kN/min; or

b) a constant rate of traverse machine as described in ISO 5893.

Special mounts are required (see Figure 1). One or both mounts shall be attached to the straining heads by a coupling which permits self-alignment of the mounts whilst the test pieces are being pulled.

5.2 Climatic cabinets

The cabinets shall be enclosures capable of maintaining the test pieces under the following conditions:

a) (10 ± 2) °C at approximately 100 % relative humidity;

b) (50 ± 2) °C at approximately 100 % relative humidity;

c) (50 ± 2) °C at not more than 20 % relative humidity, and an air speed of (0,5 ± 0,3) m/s.

6 Method

6.1 Selection of timber

Carry out this test using spruce (*Picea abies* L.) having a density of (425 ± 25) kg/m³ measured at (12 ± 1) % moisture content as determined by oven drying.

Prepare one piece of spruce 60 mm x 60 mm in cross section and at least 800 mm in length that is free from knots, straight-grained and with growth rings not wider than 2 mm and at 30° to 60° to the surfaces of the specimen.

6.2 Preparation of the bonded assemblies

Cut the piece of wood lengthwise into 2 equal pieces of rectangular cross section and store them under controlled climatic conditions to constant mass. Constant mass is defined as the mass attained when the results of two successive weighings over an interval of 24 h differ by not more than 0,1 % of the mass of the specimen.

NOTE 1 Unless an alternative moisture content is recommended by the adhesive manufacturer, condition the timber in a standard atmosphere ((20 ± 2) °C and (65 ± 5) % relative humidity) for at least seven days prior to bonding, to achieve a moisture content of (12 ± 1) %.

Not more than eight hours before bonding, either lightly plane each surface to be bonded. Remove any dust carefully. Do not touch or soil the prepared surface.

For glue mixes in which the adhesive and hardener are blended before application, the glue line thickness shall be 0,5 mm, achieved by using 0,5 mm thick spacers.

If the adhesive and hardener are applied separately, the glue line thickness shall be 0,1 mm, achieved by using 0,1 mm thick spacers.

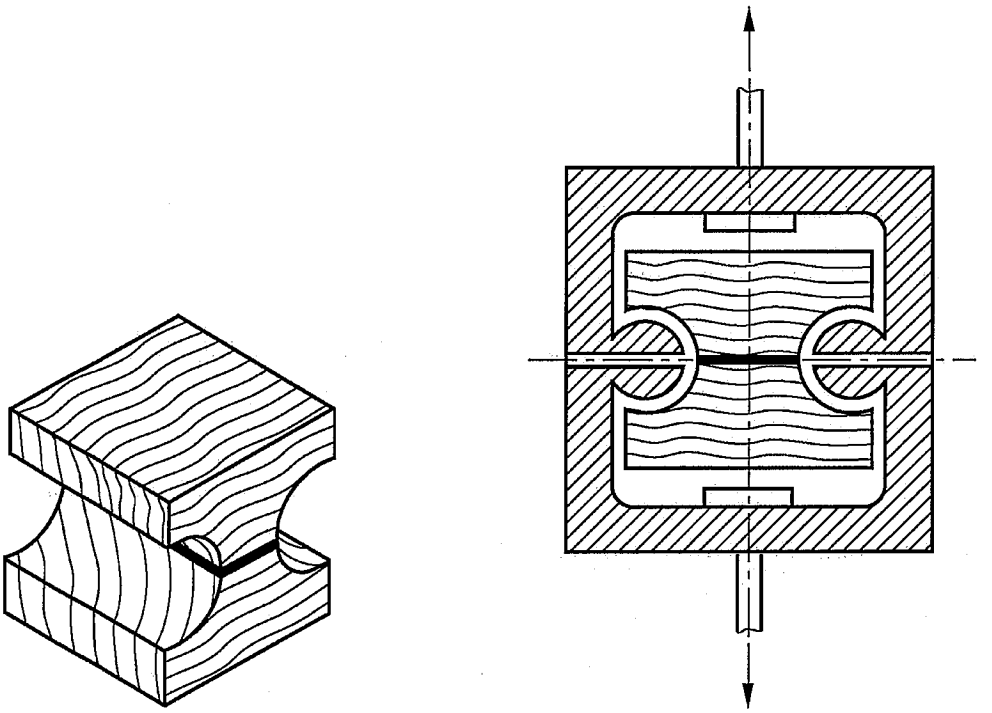

Figure 1 — Test piece and mounts for assessing the transverse tensile strength of bonded wooden assemblies

Dimensions in millimetres

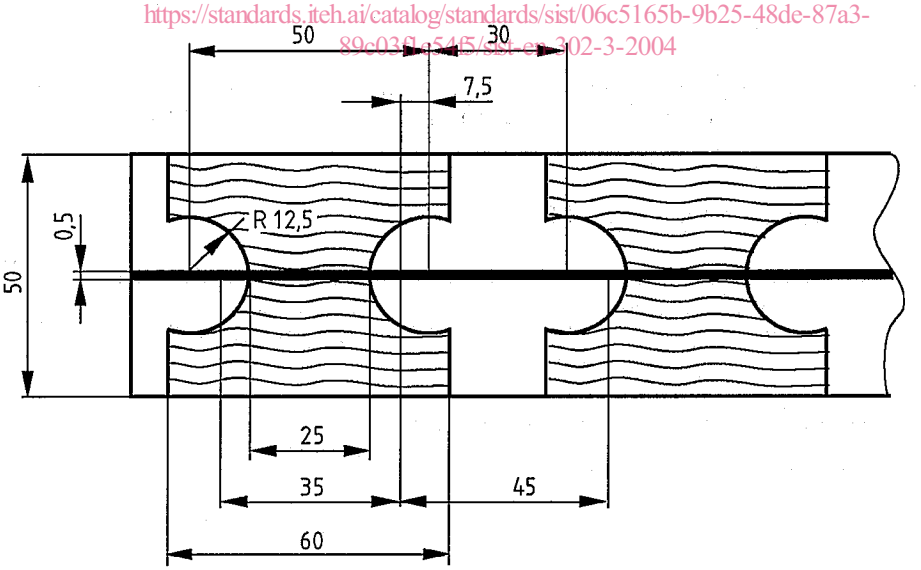

Figure 2 — Tensile test pieces cut out of the bonded wooden assembly

Prepare sufficient veneer spacers 60 mm x 45 mm x (0,5 ± 0,05 or 0,1 ± 0,02) mm (at least 10 will be required for a piece of wood 800 mm long). Lay these on the cut surface of the wood spaced (35,0 ± 0,5) mm apart with the lengths across the width of the cut surface. Fill the gaps between the spacers with adhesive. Ensure that adhesive is not lost from the test area. Clamp the pieces of wood together with the same orientation with respect to each other as they had before cutting. Apply a pressure of (0,6 ± 0,1) MPa relative to the area of

the spacers. Maintain this pressure at (20 ± 2) °C and (65 ± 5) % relative humidity for the time recommended by the adhesive manufacturer, or 24 h, whichever is the longer.

After bonding and pressing, condition the assembly for a minimum of seven days and a maximum of 14 days at (20 ± 2) °C and (65 ± 5) % relative humidity.

NOTE 2 A longer conditioning time may be used if recommended by the adhesive manufacturer.

Record the time elapsed between the preparation of the bonded assembly and the start of temperature cycling.

6.3 Preparation of the test pieces

Using a sharp 25 mm diameter wood drill and a piece of wood under the assembly to prevent fraying at the edges of the hole, drill holes along the length of the assembly in the plane of the bond at distances between centres of alternately (50,0 ± 0,5) mm and (30,0 ± 0,5) mm, so that a series of bond lines (25 ± 1) mm in length is produced (see Figure 2). Take care to ensure that the holes are accurately positioned. Plane the assembly symmetrically to (50,0 ± 0,5) mm x (50,0 ± 0,5) mm and cut out the test pieces (60 ± 1) mm long as shown in Figure 2.

6.4 Number of test pieces

Test a sufficient number of test pieces to provide eight valid results for the cyclic treatment and eight test pieces for the control test pieces. Results from tests for all test pieces in which a solid wood failure occurred at strength values below the requirement, or in which visual examination shows that the adhesive was not correctly applied, are invalid and shall be disregarded.

6.5 Climatic and cyclic storage conditions

Store at least eight test pieces that are not from adjacent positions in the bonded assembly in the standard atmosphere ((20 ± 2) °C and (65 ± 5) % relative humidity) until testing (control). Select at least eight test pieces for the cyclic treatment, which consists of four cycles, each of which comprises three parts:

Table 1 — Climatic and cyclic storage conditions

Part	Duration (h)	Temperature (°C)	Relative humidity (%)
A	24	50 ± 2	87,5 ± 2,5
B	8	10 ± 2	87,5 ± 2,5
C	16	50 ± 2	≤ 20

NOTE Conditions A and B are commonly achieved by storing the test pieces at the appropriate temperature in containers partly filled with water and with provision for releasing excess pressure. It is essential that the test pieces are not allowed to touch each other or the water. The conditions given in C are commonly achieved by storing the test pieces, freely spaced, in an oven.

After the cycle treatments, store all the test pieces in the standard atmosphere ((20 ± 2) °C and (65 ± 5) % relative humidity) until constant mass has been reached (successive weighings differing by not more than 0,1 percentage units of the mass of the specimen).

6.6 Test procedure

Attach the mounts to the testing machine (5.1). Insert the test piece in the mounts and apply a tensile force until the test piece is broken either: