SLOVENSKI STANDARD
SIST EN 301:2006

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Lepila na osnovi fenolov in aminoplastov za nosilne lesene konstrukcije – Razvrstitev in zahteve

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

Klebstoffe für tragende Holzbauteile - Phenoplaste und Aminoplaste - Klassifizierung und Leistungsanforderungen

Adhésifs de nature phénolique et aminoplaste, pour structures portantes en bois - Classification et exigences de performance

Ta slovenski standard je istoveten z: **EN 301:2006**

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English Version

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

Adhésifs de nature phénolique et aminoplaste, pour structures portantes en bois - Classification et exigences de performance

Klebstoffe für tragende Holzbauteile - Phenoplaste und Aminoplaste - Klassifizierung und Leistungsanforderungen

This European Standard was approved by CEN on 16 March 2006.

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.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 301:2006) 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of an identical text or by endorsement, at the latest by December 2006, and conflicting national standards shall be withdrawn at the latest by December 2006.

This document supersedes EN 301:1992.

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 (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*

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard establishes a classification for phenolic and aminoplastic polycondensation adhesives according to their suitability for use for load-bearing timber structures in defined climatic exposure conditions, and specifies performance requirements for such adhesives for the manufacture of load-bearing timber structures only.

The performance requirements of this standard apply to the adhesive only, not to the structure. This standard does not primarily cover the performance of adhesives for the production of wood-based panels.

This standard is primarily intended for the use of adhesive manufacturers and for the use in timber structures bonded with adhesives, to assess or control the quality of adhesives. This standard only specifies the performance of an adhesive for use in an environment corresponding to the defined conditions.

Such an adhesive meeting the requirements of this standard for its type is adequate for use in a load-bearing structure, provided that the bonding process has been carried out according to an appropriate product standard.

2 Normative references

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

EN 302-1, *Adhesives for load-bearing timber structures - Test methods - Part 1: Determination of bond strength in longitudinal tensile shear strength*

EN 302-2, *Adhesives for load-bearing timber structures - Test methods — Part 2: Determination of resistance to delamination*

EN 302-3, *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*

EN 302-4, *Adhesives for load-bearing timber structures — Test methods — Part 4: Determination of the effects of wood shrinkage on the shear strength*

EN 302-6, *Adhesives for load-bearing timber structures — Test methods — Part 6: Determination of the conventional pressing time*

EN 302-7, *Adhesives for load-bearing timber structures — Test methods — Part 7: Determination of the conventional working life*

EN 923:2005, *Adhesives — Terms and definitions*

EN 1245, *Adhesives — Determination of pH — Test method*

EN 1995-1-1, *Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings*

EN 12092, *Adhesives — Determination of viscosity*

ENV 302-5, *Adhesives for load-bearing timber structures — Test methods — Part 5: Determination of the conventional assembly time*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 923:2005 and the following apply.

3.1
polycondensation adhesive
adhesive mixture, made from a resin formed by a polymerisation reaction involving the elimination of water, usually with a hardener

NOTE Such adhesives usually also contain extenders and/or fillers.

3.2
phenolic resin
thermosetting synthetic resin derived from a condensation reaction of a phenol with an aldehyde

3.3
aminoplastic resin
thermosetting synthetic resin derived from a condensation reaction of the –NH groups or $–NH_2$ groups of amines or amides with aldehydes

4 Classification

Adhesives for structural purposes shall produce joints of such strength and durability that the integrity of the bond is maintained in the assigned service class throughout the expected life of the structure.

Two types of adhesive, I and II, are classified according to their suitability for use in the climatic conditions given in Table 1.

Table 1 — Adhesive types for use in different climatic conditions

Adhesive type	Temperature	Climatic equivalent to:	Examples	Equivalent to EN 1995-1-1 service classes:
I	> 50 °C	Not specified	Prolonged exposure to high temperature.	1, 2, 3
I	≤ 50 °C	> 85 % R.H. at 20 °C	Full exposure to weather.	1, 2, 3
II	≤ 50 °C	≤ 85 % R.H. at 20 °C	Heated and ventilated building. Exterior protected from weather. Short periods of exposure to weather.	1, 2
NOTE 85 % R.H. at 20 °C will result in a moisture content of ca. 20 % in softwoods and most hardwoods, and a somewhat lower moisture content in wood-based panels.				

5 Requirements

5.1 General

Adhesives complying with this European Standard shall meet the performance requirements specified in 5.2 to 5.5 when tested in accordance with the following test methods from EN 302 Parts 1 to 4.

a) The tensile shear test (see 5.2 and EN 302-1) using bonded test pieces made from beech (*Fagus sylvatica* L.).

b) The delamination test (see 5.3 and EN 302-2) on bonded test pieces made from spruce (*Picea abies* L.). If the adhesive is specifically claimed to be suitable for use with wood from hardwood species and/or specially treated wood, then the adhesive shall also be tested on bonded test pieces made from that species or wood treated in that way.

c) The fibre damage test (see 5.4 and EN 302-3) on bonded test pieces made from spruce (*Picea abies* L.).

d) The shrinkage stress test (see 5.5 and EN 302-4) on bonded test pieces made from spruce (*Picea abies* L.).

All these tests are to be carried out with ready for use glue mixes, i.e. adhesive and hardener mixed just before application. These adhesives should be applied according to the manufacturer's instructions.

In the case of separate application of adhesive and hardener, the delamination test (EN 302-2) and the fibre damage test (EN 302-3) shall in addition be performed with separate spread of adhesive and hardener.

5.2 Tensile shear test

Mean tensile shear failing strengths (N/mm²), measured in accordance with EN 302-1, of close contact joints (approximately 0,1 mm) and gap joints (1,0 ± 0,1 mm) in beech test pieces treated as specified in EN 302-1 shall be not less than those given in Table 2.

Table 2 — Minimum mean tensile shear failing strengths for close contact and gap joints on beech test pieces in N/mm²

Treatment serial number	Minimum mean shear strength in N/mm²			
	0,1 mm joint		1,0 mm joint	
	Type I	Type II	Type I	Type II
A1	10,0	10,0	8,0	8,0
A2	6,0	6,0	4,0	4,0
A3	8,0	8,0	6,4	6,4
A4	6,0	not required	4,0	not required
A5	8,0	not required	6,4	not required

5.3 Delamination test

The resistance to delamination of bonded laminated specimens treated as specified in EN 302-2, determined by the test method in EN 302-2, shall be as given in Table 3.

Table 3 — Requirements for resistance to delamination in %

Conditioning treatment	Adhesive type	Maximum delamination in any specimen in %
High temperature treatment	I	5,0
Low temperature treatment	II	10,0

5.4 Fibre damage test

The requirement established for the acid fibre damage test (below) shall only apply if either:

a) the adhesive mixture; or

b) one of the adhesive components when applied separately

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

The mean tensile transverse strength of the untreated control pieces determined by the method in EN 302-3 shall be not less than 2 N/mm².

The mean tensile transverse strength of the test joints after exposure to the cyclic treatment specified in EN 302-3 shall be not less than 80 % of the average value obtained for the control pieces.

5.5 Shrinkage test

The mean compressive shear strength after the shrinkage test, as determined by the method in EN 302-4, shall be not less than 1,5 N/mm².

6 Working properties of the adhesive

6.1 General

If required, the working properties of the adhesive shall be determined by the test methods given in 6.2 and 6.3.

6.2 Physical properties of adhesive prepared for use

a) Dynamic viscosity of the adhesive as prepared for use, as determined by EN 12092.

b) pH of the adhesive mix and/or of the adhesive and the hardener as determined by EN 1245.

6.3 Use of the adhesive

a) Adhesive spread and instructions on whether or not the adhesive has to be spread on both surfaces to be bonded, and if the components are applied separately or not;

b) Conventional assembly time, according to ENV 302-5, expressed in minutes;