



SLOVENSKI STANDARD
oSIST prEN 301:2012
01-januar-2012

**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, Phenoplaste und Aminoplaste, für tragende Holzbauteile - 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: prEN 301

ICS:

83.180	Lepila	Adhesives
91.080.20	Lesene konstrukcije	Timber structures

oSIST prEN 301:2012

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 301 rev

November 2011

ICS 83.180

Will supersede EN 301:2006

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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 193.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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SIST EN 301:2014

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Foreword

This document (prEN 301:2011) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by AENOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 301:2006.

This document is one of a series dealing with phenolic and aminoplastic adhesives for use with timber structures, and is published in support of EN 1995-1-1 *Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings*. The series consists one standard for classification and performance requirements (EN 301), five test methods (EN 302 Parts 1 to 4 and EN 15416-2) used to assess the performance of adhesives after specified heat and humidity treatments, and three test methods (EN 302 Parts 5 to 7) to characterize the working properties of the adhesive.

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prEN 301:2011 (E)

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 factory manufacture or factory-like manufacturing conditions of load-bearing timber structures only.

This standard only specifies the performance of an adhesive for use in an environment corresponding to the defined conditions.

The performance requirements of this standard apply to the adhesive only, not to the structure. This standard does not cover the performance of adhesives for on-site gluing (except for factory-like conditions) nor the production of wood-based panels, except solid wood panels, or modified and stabilized wood with considerably reduced swelling and shrinkage properties, e.g. such as acetylated wood, heat treated wood and polymer impregnated wood.

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. The requirements apply to the type testing of the adhesives. Production control activities are outside the scope of the standard.

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

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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.¹⁾

<https://standards.iteh.ai/catalog/standards/sist/1bb8f22e-c895-4131-9e10-fa47cf2b522e/sist-prEN-302-1>, *Adhesives for load-bearing timber structures – Test methods – Part 1: Determination of bond strength in longitudinal tensile shear strength*¹⁾

prEN 302-2, *Adhesives for load-bearing timber structures — Test methods — Part 2: Determination of resistance to delamination*¹⁾

prEN 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*¹⁾

prEN 302-4, *Adhesives for load-bearing timber structures — Test methods — Part 4: Determination of the effects of wood shrinkage on the shear strength*¹⁾

prEN 302-5, *Adhesives for load-bearing timber structures — Test methods — Part 5: Determination of conventional assembly time*¹⁾

prEN 302-6, *Adhesives for load-bearing timber structures — Test methods — Part 6: Determination of the conventional pressing time*¹⁾

prEN 302-7, *Adhesives for load-bearing timber structures — Test methods — Part 7: Determination of the conventional working life*¹⁾

¹⁾ Under enquiry

EN 391, *Glued laminated timber — Delamination test of glue lines*

EN 408, *Timber structures — Structural timber and glued laminated timber — Determination of some physical and mechanical properties*

EN 923, *Adhesives — Terms and definitions*

EN 1245, *Adhesives — Determination of pH*

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*

EN 15416-2, *Adhesives for load bearing timber structures — Test methods — Part 2: Static load test of multiple bondline specimens in compression shear*

EN 15425, *Adhesives — One component polyurethane for load bearing timber structures — Classification and performance requirements*

3 Terms and definitions

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

3.1

aminoplastic resin

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

3.2

phenolic resin

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

3.3

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.

3.4

service class 1

climatic conditions characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 65 % for a few weeks per year

[EN 1995-1-1]

NOTE In service class 1, which comprises typical indoor conditions, the average moisture content in most softwoods will not exceed 12 %.

prEN 301:2011 (E)**3.5****service class 2**

climatic conditions characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 85 % for a few weeks per year

[EN 1995-1-1]

NOTE In service class 2, to which most covered exterior conditions belong, the average moisture content in most softwoods will not exceed 20 %.

3.6**service class 3**

climatic conditions leading to higher moisture contents than in service class 2

[EN 1995-1-1]

NOTE Exterior conditions typically belong to service class 3.

3.7**glue line**

adhesive layer between the wood members

[EN 1995-1-1]

3.8**bond line**

glue line and the contact layer of adhesive in the wood surface

3.9**close contact glue line (cc)**

glue line of thickness maximum 0,1 mm

NOTE Close contact glue line is achieved by pressing together two plane wood members with a clamping pressure of $(0,8 \pm 0,1)$ N/mm² without grooves, spacers or similar device.

4 Classification

Adhesives (general purpose, finger jointing or gap filling) 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 different climatic conditions:

- **Type I** to be used in service classes 1, 2 and 3 (EN 1995-1-1);
- **Type II** to be used in service class 1 only.

These two types of adhesive are further divided into three subclasses according to the end use:

- **General-purpose adhesive (GP)** to be used for glue lines between laminations, for finger joints in laminations and structural timber, and for large finger joints;
- **Finger jointing adhesive (FJ)** to be used for finger jointing of laminations and structural timber only;

- **Gap filling adhesive (GF)** to be used for fibre parallel gluing, e.g. glue lines between glulam components of block glued glulam and for large finger joints or for glue lines between laminations and for finger jointing of laminations and structural timber.

Table 1 specifies the seven adhesive classes for which this European standard applies and their designations. The designations consist of

- type: **I** or **II**;
- application: **GP**, **FJ** or **GF**;
- maximum test temperature in degrees Celcius: **70** or **90** for type **I**, or maximum use temperature in degrees Celcius: **50** for type **II**;
- use: **M** for mixed application, and **S** for separate application of adhesive and hardener.

Table 1 — Adhesive classes

Adhesive type	Application	Max. test temp. ^c °C	Max. bond line thickness mm		Service classes	Designation
			Test	Use		
I	Face lamination and finger jointing for general use General purpose	70	1,0	0,6 ^a	1, 2, 3	IGP70M IGP70S
I	Special General purpose	90	1,0	0,6 ^a	1, 2, 3	IGP90M IGP90S
I	Finger joint	90	0,3	0,1	1, 2, 3	IFJ90M IFJ90S
I	Gap filling	90	2,0	1,5	1, 2, 3	IGF90M
I	Finger joint	70	0,3	0,1	1, 2, 3	IFJ70M IFJ70S
II	General purpose	^b	1,0	0,6 ^a	1	IIGP50M IIGP50S
II	Finger joint	^b	0,3	0,1	1	IIFJ50M IIFJ50S

^a 0,3 for separate application.
^b Maximum temperature in use is 50 °C, not tested.
^c Tested according to EN 15416-2.

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Table 2 specifies the tests which shall be performed for each class.

Table 2 — Necessary tests for adhesive subclasses

Application	Bond line thickness in test mm	EN 302-1	EN 302-2	EN 302-3	EN 302-4	EN 15416-2
General purpose (GP)	0,1	X ^b	X ^{b, c}			X ^a
	0,5			X ^c	X	
	1,0	X				
Finger joint (FJ)	0,1	X ^b	X ^b	X		X ^a
	0,3	X ^b				
Gap filling (GF)	0,1	X	X			X ^e
	0,5			X	X	
	1,0	X				
	2,0	X	X	X ^d		

a For Type I adhesive at 70°C or 90°C. The test is not required for adhesive Type II. When tested at 90°C, the adhesive will also automatically pass 70°C. Phenolic resin (PRF) adhesives do not need to be tested.

b For separate application finger jointing, to be tested with nominal ratio $\pm 30\%$ hardener. Before approval of the adhesive an additional type testing in a production line has to be performed.

c For separate application of face lamination or finger jointing additional test with separate spread of adhesive and hardener.

d Using beech wood, see EN 15425 (subclause 5.4 in the 2008 edition).

e GF adhesives are only to be tested at 90 °C.

5 Requirements

5.1 General

Adhesives complying with this European Standard shall meet the performance requirements specified in 5.2 to 5.7 when tested in accordance with the following test methods:

- The tensile shear test (see 5.2 and EN 302-1) using bonded test pieces made from beech (*Fagus sylvatica* L.).
- The delamination test (see 5.3 and EN 302-2) on bonded test pieces made from spruce (*Picea abies* L.). If the adhesive is to be used on wood from other conifers species like larch (*Larix deciduas*), Douglas fir (*Pseudotsuga taxifolia*) and pines with coloured heartwood other than scots pine (*Pinus sylvestris*), from hardwood species and/or preservative treated wood, also prepare four laminated members using representative samples from those species or wood treated that way.
- The fibre damage test (see 5.4 and EN 302-3) on bonded test pieces made from spruce (*Picea abies* L.).
- The shrinkage stress test (see 5.5 and EN 302-4) on bonded test pieces made from spruce (*Picea abies* L.).