



SLOVENSKI STANDARD
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**Lepila na osnovi fenolov in aminoplastov za nosilne lesene konstrukcije -
Razvrstitev in zahteve za delovanje**

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

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**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.

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

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Foreword

This document (prEN 301:2015) 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 301:2013.

Compared to EN 301:2013 the following changes have been made:

- a) provisions for delamination tests on preservative treated softwood and other conifers species;
- b) provisions for what to test when systems are used with a range of hardener dosage;
- c) provisions for small modifications of already approved adhesives;
- d) delamination tests of hardwood and preservative treated wood added;
- g) Annex A: Delamination test for finger joints more precisely described;
- h) Annex A: Expression of results included.

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Introduction

This document is one of a series of standards dealing with phenolic and aminoplastic adhesives for use with timber structures, and is published in support of product standards for load-bearing timber structures in connection with EN 1995-1-1 *Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings*. The series consists of one standard for classification and performance requirements (EN 301), five test methods (EN 302-1, EN 302-2, EN 302-3 and EN 302-4 and EN 15416-2) used to assess the performance of adhesives after specified heat and humidity treatments, and three test methods (EN 302-5, EN 302-6 and EN 302-7) to characterize the working properties of the adhesive.

SAFETY STATEMENT — Persons using this document should be familiar with the normal laboratory practice, if applicable. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any regulatory conditions.

ENVIRONMENTAL STATEMENT — It is understood that some of the material permitted in this standard may have a negative environmental impact. As technological advantages lead to acceptable alternatives for these materials, they will be eliminated from this standard to the greatest extent possible.

At the end of the test, the user of the standard should take care to carry out an appropriate disposal of the wastes, according to local regulations.

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

The performance requirements of this European Standard apply to the adhesive only, not to the timber structure. This European 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 European 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 this European Standard.

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 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 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 13183-2, *Moisture content of a piece of sawn timber — Part 2: Estimation by electrical resistance method*

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EN 13183-3, *Moisture content of a piece of sawn timber — Part 3: Estimation by capacitance method*

EN 14080, *Timber structures — Glued laminated timber and glued solid timber — Requirements*

EN 15416-2:2007, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 2: Static load test of multiple bondline specimens in compression shear*

EN 15425:2008, *Adhesives — One component polyurethane for load bearing timber structures — Classification and performance requirements*

3 Terms and definitions

For the purposes of this document, 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 –NH₂ 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 1 to entry: Such adhesives usually also contain extenders and/or fillers.

3.4

service class 1

climatic conditions characterised 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

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

[SOURCE: EN 1995-1-1:2004, 2.3.1.3]

3.5

service class 2

climatic conditions characterised 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

Note 1 to entry: In service class 2, to which most covered exterior conditions belong, the average moisture content in most softwoods will not exceed 20 %.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3]

3.6

service class 3

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

Note 1 to entry: Exterior conditions typically belong to service class 3.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3, modified – Note 1 to entry has been added.]

3.7**glue line**

adhesive layer between the wood members

3.8**thick glue line**

glue line of nominal thickness in the range of 0,3 mm to 2,0 mm at the time of bonding

Note 1 to entry: Thick glue lines are achieved by using spacers, grooves or similar devices with a thickness of 0,3 mm to 2,0 mm when two plain members are glued together.

3.9**close contact glue line**

glue line of thickness maximum 0,1 mm

Note 1 to entry: 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 devices.

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.

NOTE The application of the adhesive types in the different service classes can be restricted by national regulations applicable at the end use site of the bonded timber structure.

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. Gap filling adhesives can in addition be classified as application type **GP** usable for glue lines between laminations and for finger jointing of laminations and structural timber.

Table 1 specifies the thirteen 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 Celsius: **70** or **90** for type **I**, or maximum use temperature in degrees Celsius: **50** for type **II**;
- use: **M** for mixed application, and **S** for separate application of adhesive and hardener.

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Each application area and use shall be part of the designation.

EXAMPLE EN 301 I 70 GP 0,6M and EN 301 I 70 FJ 0,1S if classified as general purpose adhesive for mixed application and classified as finger joint adhesive for separate application.

Table 1 — Adhesive classes

Adhesive type Designation	Application	Max. test temp. ^c °C	Max. glue line thickness mm		Service classes ^a
			Test	Use	
EN 301 I 70 GP 0,6M EN 301 I 70 GP 0,3S	Face lamination and finger jointing for general use General purpose General purpose	70 70	1,0 1,0	0,6 ^d 0,3	1,2,3 1,2,3
EN 301 I 90 GF 1,5M EN 301 I 90 GP 0,6M EN 301 I 90 GP 0,3S	Special Gap filling ^d General purpose General purpose	90 90 90	2,0 1,0 1,0	1,5 0,6 ^d 0,3	1, 2, 3 1, 2, 3 1, 2, 3
EN 301 I 90 FJ 0,1M EN 301 I 90 FJ 0,1S	Finger joint Finger joint	90 90	0,3 0,3	0,1 0,1	1, 2, 3 1, 2, 3
EN 301 I 70 FJ 0,1M EN 301 I 70 FJ 0,1S	Finger joint Finger joint	70 70	0,3 0,3	0,1 0,1	1, 2, 3 1, 2, 3
EN 301 II 50 GP 0,6M EN 301 II 50 GP 0,3S	General purpose General purpose	^b ^b	1,0 1,0	0,6 ^d 0,3	1 1
EN 301 II 50 FJ 0,1M EN 301 II 50 FJ 0,1S	Finger joint Finger joint	^b ^b	0,3 0,3	0,1 0,1	1 1
^a The application of the adhesive types in the different service classes can be restricted by national regulations applicable at the end use site of the bonded timber structures. ^b Maximum temperature in use is 50 °C, does not need to be tested. ^c Tested according to EN 15416–2. ^d Only mixed application.					

Table 2 specifies the tests, which shall be performed for each class. In case an adhesive serves for several applications as specified in Table 2, the necessary tests given for each application need to be fulfilled.