SLOVENSKI STANDARD
SIST EN 301:2023

01-april-2023

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

Ta slovenski standard je istoveten z: **EN 301:2023**

ICS:

83.180	Lepila	Adhesives
91.080.20	Lesene konstrukcije	Timber structures

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EUROPEAN STANDARD

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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

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This European Standard was approved by CEN on 18 December 2022.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 301:2023) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by UNE.

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of an identical text or by endorsement, at the latest by August 2023, and conflicting national standards shall be withdrawn at the latest by August 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 301:2017.

EN 301:2023 includes the following significant technical changes with respect to EN 301:2017:

a) Table 2 — 2 mm glue line – EN 302-3 Mandatory despite pH-value – beech used in the test;

b) Table 2 — Gap filling adhesives – EN 302-8 – tested with 1 mm glue line;

c) 5.1 b) test with representative samples of preservative treated Scots pine or Silver fir, which also covers preservative treated Norway spruce, has been added.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

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);

— six test methods (EN 302-1, EN 302-2, EN 302-3, EN 302-4, EN 302-8 and Annex A of this document) 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 cannot 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.

1 Scope

This document establishes a classification for phenolic and aminoplastic polycondensation adhesives according to their suitability for use for load-bearing timber products 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 products only.

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

The performance requirements of this document are applicable to the adhesive only, not to the manufacturing timber products. This document does not cover the performance of adhesives for on-site gluing (except for factory-like conditions) or the production of wood-based panels, except solid wood panels, or modified and stabilized wood with considerably reduced swelling and shrinkage properties, e.g. acetylated wood, heat treated wood and polymer impregnated wood.

This document is primarily intended for use by adhesive manufacturers and for use in timber products bonded with adhesives, to assess or control the quality of adhesives. The requirements are applicable to the type testing of the adhesives. Production control activities are outside the scope of this document.

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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 302-8, *Adhesives for load-bearing timber structures — Test methods — Part 8: Static load test of multiple bond line specimens in compression shear*

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 12092, *Adhesives — Determination of viscosity*

EN 13183-2, *Moisture content of a piece of sawn timber — Part 2: Estimation by electrical resistance method*

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

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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 polymerization 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 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

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, modified – Indoor conditions have been added in Note 1 to entry.]

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

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 modified – Covered exterior conditions have been added in Note 1 to entry.]

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 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 can be achieved by pressing together two plane wood members with a clamping pressure of (0,8 ± 0,1) N/mm² without additional 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.

— **Type II** to be used in service class 1 only.

These two types of adhesive are further divided into three application area 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 are in addition classified as application area GP and FJ in mixed application without further testing.

NOTE The definition of “General purpose” and “Type” can be different in other standards.

Table 1 specifies the thirteen adhesive classes for which this document is applicable to and their designation codes. The designation code 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.

All application areas and use shall be part of the designation code.

EXAMPLE Designation code EN 301 I 70 GP 0,6M and designation code 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 class **(Designation code)**	**Application area**	**Max. test temp.**[c] °C	**Max. glue line thickness** **Test** mm	 **Use** mm	**Service classes**[a]
	Face lamination and finger jointing for general use				
EN 301 I 70 GP 0,6M	General purpose	70	1,0	0,6	1,2,3
EN 301 I 70 GP 0,3S	General purpose	70	1,0	0,3	1,2,3
	Special use				
EN 301 I 90 GF 1,5M	Gap filling	90	2,0	1,5	1, 2, 3
EN 301 I 90 GP 0,6M	General purpose	90	1,0	0,6	1, 2, 3
EN 301 I 90 GP 0,3S	General purpose	90	1,0	0,3	1, 2, 3
EN 301 I 90 FJ 0,1M	Finger joint	90	0,3	0,1	1, 2, 3
EN 301 I 90 FJ 0,1S	Finger joint	90	0,3	0,1	1, 2, 3
EN 301 I 70 FJ 0,1M	Finger joint	70	0,3	0,1	1, 2, 3
EN 301 I 70 FJ 0,1S	Finger joint	70	0,3	0,1	1, 2, 3
EN 301 II 50 GP 0,6M	General purpose	b	1,0	0,6	1
EN 301 II 50 GP 0,3S	General purpose	b	1,0	0,3	1
EN 301 II 50 FJ 0,1M	Finger joint	b	0,3	0,1	1
EN 301 II 50 FJ 0,1S	Finger joint	b	0,3	0,1	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 302-8.