SLOVENSKI STANDARD
SIST EN 16254:2023

01-april-2023

Lepila - Emulzijsko polimerizirani izocianat (EPI) za nosilne lesene konstrukcije - Razvrstitev in zahtevane lastnosti

Adhesives - Emulsion polymer isocyanate (EPI) for load-bearing timber structures - Classification and performance requirements

Klebstoffe - Emulsionspolymerisiertes Isocyanat (EPI) für tragende Holzbauteile - Klassifizierung und Leistungsanforderungen

Adhésifs - Isocyanate de polymère en émulsion (EPI) pour structures portantes en bois - Classification et exigences de performance

Ta slovenski standard je istoveten z: **EN 16254:2023**

ICS:

83.180	Lepila	Adhesives
91.080.20	Lesene konstrukcije	Timber structures

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EUROPEAN STANDARD

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EN 16254

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English Version

Adhesives - Emulsion polymer isocyanate (EPI) for load-bearing timber structures - Classification and performance requirements

Adhésifs - Isocyanate de polymère en émulsion (EPI) 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

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European foreword

This document (EN 16254:2023) 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of an identical text or by endorsement, at the latest by August 2023, and conflicting national standards shall be withdrawn at the latest by August 2023.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 16254:2013+A1:2016.

EN 16254:2023 includes the following significant technical changes with respect to EN 16254:2013+A1:2016:

a) the title has been changed;

b) the designation of adhesive types has been modified and aligned with EN 301 and EN 15425;

c) the reference to EN 15416-2 has been replaced by reference to EN 302-8;

d) for the delamination test according to EN 302-2 with preservative treated wood, a test with Scots pine (*Pinus sylvestris*) and Silver fir (*Abieas alba*) covers also Norway spruce (*Picea abies* L.);

e) for adhesive type FJ, the test according to EN 302-2 is required only with short closed assembly time, and the test according to EN 15416-5 is only required with thin glue line;

f) Annex A on storage treatments for tests according to EN 302-1 has been deleted and replaced by reference to EN 302-1, the storage time for the temperature treatment (A6, A7, A8) has therefore been reduced from 72 h to 24 h;

g) for bonding of finger-joints in additional wood species, the test according to EN 302-2 may be replaced by the delamination test on finger-joints from EN 301, which is specified as new Annex A.

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 dealing with emulsion polymer isocyanate (EPI) adhesives for use with timber structures, and is published in support of product standards for bonded 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 16254);

— eight test methods (EN 302-1, EN 302-2, EN 302-3, EN 302-4, EN 302-8, EN 15416-1, EN 15416-3 and the test method given in Annex A of this document ("finger-joint delamination test") used to assess the performance of adhesives after specified heat and humidity treatments; and

— three test methods (EN 302-7, EN 15416-4 and EN 15416-5) 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 document may have negative environmental impact. As technological advantages lead to better alternatives for these materials, they will be eliminated from this European Standard to the extent possible.

At the end of the test, it is recommended that the users of this document take care to carry out an appropriate disposal of the wastes, according to local regulations.

1 Scope

This document establishes a classification for emulsion polymer isocyanate (EPI) adhesives according to their suitability for use in load-bearing timber products in defined climatic exposure conditions, and specifies performance requirements for such adhesives for the industrial manufacture of load-bearing timber products only.

The performance requirements of this document are applicable to the adhesives only, not to the 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. This document 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 document for its type is 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 302-7, *Adhesives for load-bearing timber structures — Test methods — Part 7: Determination of the working life under referenced conditions*

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 923, *Adhesives — Terms and definitions*

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*

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

EN 15416-1, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 1: Long-term tension load test perpendicular to the bond line at varying climate conditions with specimens perpendicular to the glue line (Glass house test)*

EN 15416-3, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 3: Creep deformation test at cyclic climate conditions with specimens loaded in bending shear*

EN 15416-4, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 4: Determination of open assembly time under referenced conditions*

EN 15416-5, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 5: Determination of minimum pressing time under referenced conditions*

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
emulsion polymer isocyanate (EPI) adhesive
water based emulsion polymer or a mixture of water based emulsion polymers cross-linked with an isocyanate as hardener

3.2
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 soft-woods 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.]

3.3
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.]

3.4
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.]

3.5
glue line
adhesive layer between the wood members

3.6
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/mm^2 without additional groves, spacers or similar devices.

3.7
thick glue line
glue line of nominal thickness in the range of 0,2 mm to 0,5 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.

4 Classification

Adhesives for structural purpose 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.

EPI-adhesives according to EN 16254 are classified by type (climate condition in use), maximum test temperature and maximum glue line thickness in use. These three classification criteria are subdivided as follows:

Type I: to be used in service class 1 and 2.

Type II: to be used in service class 1 only.

Maximum test temperature: 50 °C, 70 °C or 90 °C.

Maximum glue line thickness in use: 0,1 mm, 0,2 mm and 0,3 mm.

Depending on the maximum glue line thickness in use, the adhesives are assigned to different application areas as described below and shown in Table 1.

— **General purpose adhesives (GP)**: to be used for bond lines between laminations (maximum glue line thickness 0,3 mm) and for finger-joints in laminations and structural timber.

— **Small dimension adhesives (SD)**: to be used in beams with a maximum cross section 45 000 mm^2 (maximum glue line thickness 0,2 mm) and for finger-joints in laminations and structural timber. The beam width shall not exceed 180 mm and the beam height shall not exceed 300 mm.

— **Finger-jointing adhesives (FJ)**: to be used for finger-jointing of laminations and structural timber only (maximum glue line thickness 0,1 mm).

The application of EPI shall always be in mixed state. These adhesives shall be applied according to the manufacturer's instructions.

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

Each area of application and use shall be given in the designation code of the adhesive.

Adhesives tested for working properties according to Clause 7 are specified by the letter “w” at the end of the designation code (example: EN 16254 I 90 GP 0,3 w).

Table 1 — Adhesive classes

Adhesive class (designation code)	Application area	Max. test temperature[a]	Max. glue line thickness		Service classes
			Test	Use	
		°C	mm	mm	
	Normal use				
EN 16254 I 70 GP 0,3	General purpose	70	0,5	0,3	1, 2
	Special use				
EN 16254 I 90 GP 0,3	General purpose	90	0,5	0,3	1, 2
EN 16254 I 90 SD 0,2	Small dimension	90	0,3	0,2	1, 2
EN 16254 I 90 FJ 0,1	Finger-jointing	90	0,3	0,1	1, 2
EN 16254 I 70 SD 0,2	Small dimension	70	0,3	0,2	1, 2
EN 16254 I 70 FJ 0,1	Finger-jointing	70	0,3	0,1	1, 2
EN 16254 II 50 GP 0,3	General purpose	50	0,5	0,3	1
EN 16254 II 50 SD 0,2	Small dimension	50	0,3	0,2	1
EN 16254 II 50 JF 0,1	Finger-jointing	50	0,3	0,1	1

[a] Tested according to EN 302-8 and EN 302-1, designation A6, A7 and A8.

A classification to a certain "maximum test temperature" will automatically be valid for lower temperatures.

Table 2 specifies the tests that shall be performed for each application area. References are given to the actual subclause in this document and to the European Standard the tests are based on.

Table 2 — Necessary tests for adhesive use in difference application areas

Application area	Glue line thickness in test mm	EN 302-1 (based on 6.2)[a]	EN 302-2 (based on 6.3)	EN 302-3 (based on 6.4)	EN 302-4 (based on 6.5)	EN 302-8 (based on 6.6)[b]	EN 15416-3 (based on 6.7)	EN 15416-1 (based on 6.8)
General purpose	0,1[d]	X	X			X		X
	0,3						X	
	0,5	X		X	X			X
Small dimension	0,1[d]	X	X			X		X
	0,2						X	
	0,3	X		X	X			X
Finger-jointing	0,1[d]	X	X[c]	X		X	X	X
	0,3	X						

[a] Climate treatment A1 to A5 and A6 or A7 or A8, depending on maximum test temperature (see Table 1 and EN 302-1).

[b] Maximum test temperature according to Table 1.

[c] Only with short closed assembly time.

[d] As defined in 3.6, close contact.