



SLOVENSKI STANDARD

SIST EN 302-6:2023

01-april-2023

Lepila za nosilne lesene konstrukcije - Preskusne metode - 6. del: Določanje najkrajšega časa stiskanja pri referenčnih pogojih

Adhesives for load-bearing timber structures - Test methods - Part 6: Determination of the minimum pressing time under referenced conditions

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 6: Bestimmung der Mindestpresszeit bei Referenzbedingungen

Adhésifs pour structures portantes en bois - Méthodes d'essai - Partie 6 : Détermination du temps de pressage minimal dans des conditions de référence

Ta slovenski standard je istoveten z: **EN 302-6:2023**

ICS:

| | | |
|-----------|---------------------|-------------------|
| 83.180 | Lepila | Adhesives |
| 91.080.20 | Lesene konstrukcije | Timber structures |

SIST EN 302-6:2023

en

EUROPEAN STANDARD

EN 302-6

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2023

ICS 83.180

Supersedes EN 302-6:2013

English Version

Adhesives for load-bearing timber structures - Test methods - Part 6: Determination of the minimum pressing time under referenced conditions

Adhésifs pour structures portantes en bois - Méthodes d'essai - Partie 6 : Détermination du temps de pressage minimal dans des conditions de référence

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 6: Bestimmung der Mindestpresszeit bei Referenzbedingungen

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

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

CEN members are the national standards bodies of 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 United Kingdom.



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

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

| Contents | | Page |
|------------------------|--|------|
| European foreword..... | | 3 |
| Introduction | | 4 |
| 1 | Scope..... | 6 |
| 2 | Normative references..... | 6 |
| 3 | Terms and definitions | 6 |
| 4 | Symbols..... | 7 |
| 5 | Principle | 7 |
| 6 | Apparatus..... | 7 |
| 7 | Procedure..... | 8 |
| 7.1 | General..... | 8 |
| 7.2 | Preparation of bonded assemblies | 8 |
| 7.3 | Preparation of test specimens..... | 8 |
| 7.4 | Test procedure | 8 |
| 8 | Expression of results..... | 9 |
| 8.1 | Tensile shear strength..... | 9 |
| 8.2 | Failure mode..... | 9 |
| 9 | Calculation of minimum pressing time | 9 |
| 10 | Test report..... | 9 |
| 10.1 | Adhesives | 9 |
| 10.2 | Preparation of test pieces and testing procedure | 9 |
| 10.3 | Test results | 10 |

European foreword

This document (EN 302-6:2023) 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 302-6:2013.

The main changes compared to the previous edition are listed below:

- a) the list of standards in the Introduction has been updated;
- b) one new Clause (Symbols) has been introduced;
- c) Clause 7 Procedure has been changed;
- d) Clause 8 Expression of results has been added;
- e) Clause 9 Calculation of minimum pressing time has been added;
- f) Clause 10 Test report has been changed.

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.

EN 302-6:2023 (E)**Introduction**

This document is one of a series dealing with adhesives for use with timber structures, and is published in support of the EN 1995 series, *Eurocode 5: Design of timber structures*. The series consists of five classification and performance requirements for adhesives for load-bearing timber structures, phenolic and aminoplastic adhesives (EN 301), one component polyurethane adhesives (EN 15425), emulsion polymer isocyanate adhesives (EN 16254), two component epoxy and polyurethane adhesives for glued in rods (EN 17334) and for on-site repair of cracked timber structures (EN 17418) and all together twelve test methods (EN 302-1, EN 302-2, EN 302-3, EN 302-4, EN 302-5, EN 302-6, EN 302-7 and EN 302-8, EN 15416-1, EN 15416-3, EN 15416-4 and EN 15416-5).

These European Standards 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 longitudinal tensile shear strength*
- *Part 2: Determination of resistance to delamination*
- *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 5: Determination of maximum assembly time under referenced conditions*
- *Part 6: Determination of the minimum pressing time under referenced conditions*
- *Part 7: Determination of the working life under referenced conditions*
- *Part 8: Static load test of multiple bond line specimens in compression shear*

EN 15416, *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)*
- *Part 3: Creep deformation test at cyclic climate conditions with specimens loaded in bending shear*
- *Part 4: Determination of open assembly time under referenced conditions*
- *Part 5: Determination of minimum pressing time under referenced conditions*

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

EN 16254, *Adhesives — Emulsion polymer isocyanate (EPI) for load-bearing timber structures — Classification and performance requirements*

EN 17334, *Glued-in rods in glued structural timber products — Testing, requirements and bond shear strength classification*

EN 17418, *Two-component epoxy and polyurethane adhesives for on-site repair of cracked timber structures — Testing, requirements and repair strength verification*

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 can have a negative environmental impact. As technological advantages lead to better alternatives for these materials, they will be eliminated from this standard to the greatest extent possible.

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 302-6:2023](https://standards.iteh.ai/catalog/standards/sist/968e3c68-2ebc-4d5a-9345-4cdd55ea48bb/sist-en-302-6-2023)

<https://standards.iteh.ai/catalog/standards/sist/968e3c68-2ebc-4d5a-9345-4cdd55ea48bb/sist-en-302-6-2023>

EN 302-6:2023 (E)**1 Scope**

This document specifies a method of determining the minimum pressing time for two glue line thicknesses, close contact glue line and thick glue line (between 0,3 mm and 8 mm), at three temperatures. It is applicable to adhesives used in load-bearing timber products.

This document is only intended for obtaining a reliable base of comparison of pressing time between adhesives. The method gives results that cannot be applied to the safe manufacture of timber structures without modifications for the influences of timber density/absorbency, moisture content, factory temperature and relative air humidity.

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 384:2016+A2:2022, *Structural timber - Determination of characteristic values of mechanical properties and density*

EN 923, *Adhesives - Terms and definitions*

ISO 5893, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Specification*

ISO 6344-2, *Coated abrasives — Determination and designation of grain size distribution — Part 2: Macrogrit sizes P12 to P220*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 302-1, 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**pressing time**

time for which an adhesive joint is pressed

3.2**minimum pressing time**

shortest pressing time (expressed as the mean of 10 individual results) that gives tensile shear strength of at least 4 N/mm² at a given temperature under the referenced conditions

3.3

thick glue line

glue line of nominal thickness in the range of 0,3 mm or more 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 or more when two plain members are glued together.

3.4

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 $(0,8 \pm 0,1)$ N/mm² without additional grooves, spacers or similar devices.

4 Symbols

A bonded test surface, in mm²

f_v shear strength, in N/mm²

F_{\max} applied load at failure, in N

5 Principle

Standard beech lap joints are tested in tensile shear after various curing times at three specified temperatures until it is found that the strength has reached a value of 4 N/mm².

6 Apparatus

6.1 Temperature cabinets, which shall be:

- capable of maintaining the air at a temperature of (15 ± 2) °C;
- capable of maintaining the air at a temperature of (20 ± 2) °C;
- capable of maintaining the air at a temperature of (30 ± 2) °C.

6.2 Testing machine, which shall be either:

- a) capable of maintaining a constant rate of loading of $(2,0 \pm 0,5)$ kN/min; or
- b) capable of maintaining constant crosshead speed as specified in ISO 5893.

The jaws of the testing machine shall grip the test pieces firmly and prevent slippage during loading. The grip shall be fixed in hinged manner.

EN 302-6:2023 (E)**7 Procedure****7.1 General**

A sufficient number of planed beech panels with a moisture content of $(12 \pm 1) \%$ shall be prepared to enable manufacturing of a total of 12 bonded assemblies. Each bonded assembly is used for cutting of 10 test specimens as specified in EN 302-1. For adhesives according to EN 301, six bonded assemblies for close contact glue line and six bonded assemblies for 0,3 mm thick glue line (1,0 mm for gap filling adhesive) are required.

According to other requirement standards, other glue line thicknesses need to be tested.

For very fast setting adhesives and close contact glue line, individual single lap joint test pieces (according to EN 302-1) may be prepared for the bonding and the performance of the test.

7.2 Preparation of bonded assemblies

The panels shall be lightly planed or lightly sanded by hand to fresh up the surface using an abrasive paper of grain size P100 as specified in ISO 6344-2. The panels shall be divided into 3 equal groups, one for each of the 3 temperatures to be tested, and wrapped air-tightly to prevent further change in moisture content. Each group of the panels or a sufficient number of prepared individual test pieces shall be transferred to one of the test temperatures described in 6.1.

After at least 12 h conditioning in the test temperature, the panels or the individual test pieces shall be glued and pressed using glue spread of 325 g/m^2 (double sided application) and pour additional adhesive into the grooves of the grooved panel. The open and closed assembly time shall be as recommended by the adhesive manufacturer, but the total assembly time shall not exceed 10 min.

If the adhesive manufacturer wants to test at a lower spread rate, an additional test may be performed using a glue spread of 250 g/m^2 (single sided application), with maximum 5 min assembly time.

The test pieces shall not be removed from the test temperature during the pressing period. Unless otherwise stated by the manufacturer, the clamping pressure shall be $0,8 \text{ N/mm}^2$. For each of the 3 test temperatures, two pressing times shall be chosen. One pressing time shall give a tensile shear strength below 4 N/mm^2 and one above 4 N/mm^2 . If this is not achieved, conduct new tests with shorter or longer pressing times.

It is a common practice before bonding is started to store overnight the adhesive components and the timber at the specified temperature whereby the timber shall be packaged hermetically (air-tight) to prevent changes of moisture content.

NOTE Because wood temperature is difficult to measure, it is a common practice to remove the test pieces from the conditioning cabinet immediately before applying the adhesive to them.

7.3 Preparation of test specimens

Immediately after the pressing time has elapsed, the panels shall be unclamped, and 10 test specimens cut from each of the bonded panels according to EN 302-1.

7.4 Test procedure

The test specimens shall be tested according to EN 302-1 without delay. The time from unclamping to the start of testing shall not be longer than 10 min. If a curing time below 30 min will be tested, then use smaller beech panels than specified in 7.1 and prepare less than ten test pieces each time or use individual test pieces as specified in 7.1.