SLOVENSKI STANDARD
oSIST prEN 302-4:2021

01-november-2021

Nadomešča:
SIST EN 302-4:2013

Lepila za nosilne lesene konstrukcije - Preskusne metode - 4. del: Ugotavljanje vpliva krčenja lesa na strižno trdnost

Adhesives for load-bearing timber structures - Test methods - Part 4: Determination of the effects of wood shrinkage on the shear strength

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 4: Bestimmung des Einflusses von Holzschwindung auf die Scherfestigkeit

Adhésifs pour structures portantes en bois - Méthodes d'essai - Partie 4: Détermination de l'influence du retrait du bois sur la résistance au cisaillement

Ta slovenski standard je istoveten z: **prEN 302-4**

ICS:

83.180	Lepila	Adhesives
91.080.20	Lesene konstrukcije	Timber structures

oSIST prEN 302-4:2021 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 302-4

September 2021

ICS 83.180

Will supersede EN 302-4:2013

English Version

Adhesives for load-bearing timber structures - Test methods - Part 4: Determination of the effects of wood shrinkage on the shear strength

Adhésifs pour structures portantes en bois - Méthodes d'essai - Partie 4: Détermination de l'influence du retrait du bois sur la résistance au cisaillement

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 4: Bestimmung des Einflusses von Holzschwindung auf die Scherfestigkeit

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.

This draft European Standard was established by CEN 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, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

This document (prEN 302-4:2021) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by UNE.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 302-4:2013.

In comparison with the previous edition, the following technical modifications have been made:

— list of standards in Introduction updated;

— two new standards, EN 17334 and EN 17418, have been included in the scope;

— two new clauses (Terms and definitions and Symbols) are introduced;

— preparation of samples with 0,3 mm and 2 mm glue line thickness has been added;

— the Bibliography has been deleted.

Introduction

This document is one of a series dealing with adhesives for use with timber structures, and is published in support of EN 1995, *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 polymerised 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 (all parts), 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 loaded perpendicular to the glue line (Glasshouse 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 polymerized 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 user of the standard take care to carry out an appropriate disposal of the wastes, according to local regulations.

1 Scope

This document specifies a method for determining the influence of shear strength in crosswise gluing by wood shrinkage under drying conditions.

It is suitable for the following applications:

a) for assessing the compliance of adhesives with EN 301, EN 15425, EN 16254, EN 17334 and EN 17418;

b) for assessing the suitability and quality of adhesives for load-bearing timber structures;

c) for determining if the adhesive is capable of withstanding stresses due to wood shrinkage without unacceptable loss of strength.

This test is intended primarily to obtain performance data for the classification of adhesives for load-bearing timber structures according to their suitability for use in defined climatic environments. This test is carried out on Norway spruce (*Picea abies* L.).

This method is not intended for use to provide numerical design data and does not necessarily represent the performance of the bonded member in service.

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 301, *Adhesives, phenolic and aminoplastic, for load-bearing timber structures - Classification and performance requirements*

EN 13183-1, *Moisture content of a piece of sawn timber - Part 1: Determination by oven dry method*

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

ISO 6344-2, *Coated abrasives - Grain size analysis - Part 2: Determination of grain size distribution of macrogrits P12 to P220*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological 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
glue line
adhesive layer between the wood members

3.2
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.

4 Symbols

A bonded test surface, in mm²

f_v shear strength, in N/mm²

$F_{c,max}$ maximum compression load at failure, in N

α angle of annual ring orientation to the surfaces 35° to 55°

U_m mean moisture content

U_1 moisture content of the first cover piece

U_2 moisture content of the second cover piece

U_3 moisture content of the core piece

5 Principle

A crosswise double joint with 0,3 mm, 0,5 mm or 2 mm thick glue line is submitted to a dry storage treatment and then strained to failure by a compressive shear force.

6 Apparatus

6.1 Testing machine, which shall be either:

a) capable of maintaining a constant rate of loading of (20 ± 5) kN/min; or

b) capable of maintaining a constant crosshead speed as described in ISO 5893.

6.2 Climatic cabinets, which shall be capable of maintaining the bonded assemblies under the following conditions:

a) (40 ± 2) °C and a relative humidity of (30 ± 2) % and an air speed of (0,7 ± 0,15) m/s measured in the centre of an empty cabinet;

b) (20 ± 2) °C and a relative humidity of (65 ± 5) %;

c) (20 ± 2) °C and a relative humidity of (75 to 80) %.

7 Method

7.1 General

7.1.1 Selection of timber

Use Norway spruce (*Picea abies* L.) having a density of (450 ± 25) kg/m³ measured at 12 % moisture content as determined by oven drying (according to EN 13183-1).

7.1.2 Preparation of cover pieces

From three boards with a length of at least 1 200 mm, prepare three pairs of solid Norway spruce cover pieces that are knot-free, straight grained with growth rings that are approximately tangential to the face and have a radius of 60 mm to 140 mm. The cover pieces shall be

a) 400 mm in length,

b) 140 mm in width, and

c) (20 ± 0,5) mm in thickness

after conditioning, measurement of moisture content (oven dry method according to EN 13183-1) and final preparation. Each matching pair of cover pieces is intended for the production of a specimen.

7.1.3 Preparation of core pieces

Prepare three laminated spruce core pieces that are knot-free, straight-grained and with annual rings at an angle of 35° to 55° relative to the surface (see Figure 1). The dimensions of the core pieces shall be

d) 400 mm in length,

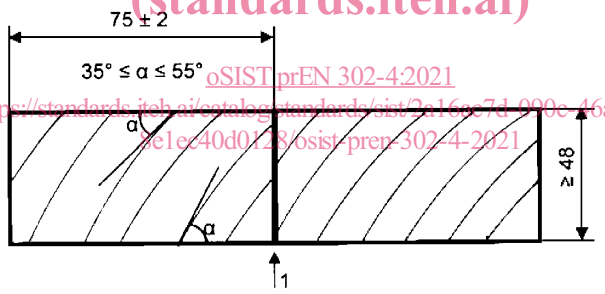
e) 140 mm in width, and

f) (40,0 ± 0,5) mm in thickness

after conditioning, measurement of moisture content (oven dry method according to EN 13183-1) and final preparation.

These laminated core pieces shall be produced of two boards with a width of (75 ± 2) mm, and a thickness of at least 48 mm. The two boards shall be bonded together longitudinally with a phenol-resorcinol-formaldehyde (PRF) adhesive which passed EN 301 (used according to the adhesive manufacturer's instructions), with an annual ring orientation as indicated in Figure 1.

Dimensions in millimetres



Key

1 PRF adhesive glue line

α angle of annual ring orientation to the surfaces

Figure 1 — Cross-section of the laminated Norway spruce core piece before planing and cutting to the required dimensions of 140 mm wide by (40,0 ± 0,5) mm thick

7.1.4 Conditioning

Condition the core and cover pieces such that the average moisture content of all three pieces used in an assembly is (17,5 ± 0,5) %. Individual core and cover pieces may have a moisture content of (17 ± 1) %, as determined by the oven-dry method, according to EN 13183-1.

NOTE Storage at (20 ± 2) °C and 75 % to 80 % relative humidity would be expected to give rise to a moisture content in the wood of between 16 % and 18 %.

Not more than 8 h before bonding, either lightly plane or lightly sand, using a grade P100 abrasive paper as defined in ISO 6344-2, each surface to be bonded. Remove any dust carefully.

Do not touch or soil the prepared surface.