

Adhesives for load-bearing timber structures - Test  
methods - Part 2: Determination of resistance to  
delamination

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 302-2:2017 sisaldab Euroopa standardi EN 302-2:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 302-2:2017 consists of the English text of the European standard EN 302-2:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 06.09.2017.	Date of Availability of the European standard is 06.09.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 83.180

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

## Adhesives for load-bearing timber structures - Test methods - Part 2: Determination of resistance to delamination

Adhésifs pour structures portantes en bois - Méthodes d'essais - Partie 2 : Détermination de la résistance à la délamination

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 2: Bestimmung der Delaminierungsbeständigkeit

This European Standard was approved by CEN on 9 July 2017.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

## Contents

Page

European foreword.....	3
Introduction .....	4
1 Scope.....	6
2 Normative references.....	6
3 Principle .....	6
4 Apparatus.....	6
5 Method .....	7
5.1 Selection of timber.....	7
5.2 Preparation of the bonded members.....	7
5.2.1 Bonded members with thin glue lines.....	7
5.2.2 Bonded members with 2 mm glue lines.....	8
5.3 Preparation of test pieces .....	9
5.3.1 Bonded members with thin glue lines.....	9
5.3.2 Bonded members with 2 mm glue lines.....	9
5.4 Test procedures .....	9
5.4.1 General.....	9
5.4.2 High temperature procedure (for type I adhesives) .....	9
5.4.3 Low temperature procedure (for type II adhesives).....	10
5.5 Measurement and evaluation of delamination .....	11
6 Expression of results.....	12
7 Test report.....	12
7.1 The adhesives.....	12
7.2 Preparation of test pieces and testing procedure .....	13
7.3 Test results.....	13
Bibliography.....	14

## European foreword

This document (EN 302-2:2017) 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 March 2018, and conflicting national standards shall be withdrawn at the latest by March 2018.

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

This document supersedes EN 302-2:2013.

Compared to EN 302-2:2013 the following modifications have been made:

- a) EN 15416-2 is replaced by EN 302-8, Adhesives for load-bearing timber structures — Test methods — Part 8: Static load test of multiple bond line specimens in compression shear;
- b) preparation of bonded members with 2 mm glue line thickness added as 5.2.2;
- c) preparation of test pieces with 2 mm glue line thickness added as 5.3.2;
- d) drying conditions for hardwood species included in 5.4.3.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 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 three classification and performance requirements for adhesives for load-bearing timber structures, phenolic and aminoplastic adhesives (EN 301), one component polyurethane adhesives (EN 15425) and emulsion polymerised isocyanate adhesives (EN 16254), 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 and 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 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 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.*

**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 European Standard specifies a method for determining the resistance to delamination in glue lines. It is suitable for the following applications:

- a) for assessing the compliance of adhesives with EN 301, EN 15425 and EN 16254;
- b) for assessing the suitability and quality of adhesives for load-bearing timber structures;
- c) for comparing the effects on the bond strength resulting from the choice of bonding conditions, from different climatic conditioning and from the treatment of the test pieces before and after bonding.

This test is not applicable for modified and stabilized wood with strongly reduced swelling and shrinkage properties, such as acetylated wood, heat-treated wood and polymer impregnated wood.

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

## 2 Normative references

Not applicable.

## 3 Principle

Bonded, laminated specimens are subjected to an impregnation-drying procedure. The specimens are impregnated with water by immersing them and applying alternating high and low (vacuum) pressure. They are then dried rapidly in a specified air stream at low humidity (see 4.4). The extent of open glue lines, delamination, as a result of these treatments is measured and compared with the total length of glue lines on both end-grain faces of the specimen.

## 4 Apparatus

**4.1 Autoclave or similar pressure vessel**, designed to safely withstand a pressure of at least 625 kPa absolute (525 kPa above nominal atmospheric pressure).

**4.2 Vacuum pump or similar device**, capable of reducing the pressure in the vessel (4.1) to below 20 kPa absolute (80 kPa below nominal atmospheric pressure).

**4.3 Pump or similar device**, for obtaining a pressure of at least 600 kPa absolute (500 kPa above nominal atmospheric pressure).

**4.4 Air-circulating oven(s) or chamber(s)**, capable of drying the test pieces (see 5.4) in the following climate condition:

- a) for low temperature procedure (type II adhesive) a temperature of  $(27,5 \pm 2,5) ^\circ\text{C}$ , circulating the air within the chamber, maintaining a constant relative humidity of  $(30 \pm 5) \%$  and
- b) for high temperature procedure (type I adhesive) a temperature of  $(65 \pm 3) ^\circ\text{C}$ , circulating the air within the chamber, maintaining a relative humidity of  $(12,5 \pm 2,5) \%$ .