



BSI Standards Publication

# 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

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

**National foreword**

This British Standard is the UK implementation of EN 302-3:2013. It supersedes BS EN 302-3:2004, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/52, Adhesives.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013.  
Published by BSI Standards Limited 2013.

ISBN 978 0 580 75257 5

ICS 83.180

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2013.

**Amendments issued since publication**

Date	Text affected
------	---------------

---

EUROPEAN STANDARD

**EN 302-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2013

ICS 83.180

Supersedes EN 302-3:2004

English Version

**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**

Adhésifs pour structures portantes en bois - Méthodes  
d'essai - Partie 3: Détermination de l'influence de l'attaque  
d'acide des fibres de bois, résultant de traitements  
cycliques en température et humidité sur la résistance à la  
traction transversale

Klebstoffe für tragende Holzbauteile - Prüfverfahren - Teil 3:  
Bestimmung des Einflusses von Säureschädigung der  
Holzfasern durch Temperatur- und Feuchtezyklen auf die  
Querzugfestigkeit

This European Standard was approved by CEN on 5 February 2013.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

**Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

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 assemblies.....	7
5.3 Preparation of the test pieces .....	9
5.4 Number of test pieces .....	9
5.5 Climatic and cyclic storage conditions .....	9
5.6 Test procedure .....	9
6 Expression of results .....	10
7 Test report .....	10
7.1 The adhesive .....	10
7.2 Preparation of test pieces and testing procedures.....	10
7.3 Test results .....	11
Bibliography.....	12

## Foreword

This document (EN 302-3:2013) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by AENOR.

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 September 2013 and conflicting national standards shall be withdrawn at the latest by September 2013.

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 302-3:2004.

The following modification has been made:

— The amendment in A1 has been included in the standard.

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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, 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 (prEN 16254), and all together eleven test methods (EN 302 Parts 1 to 7 and EN 15416 Parts 2 to 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 for load bearing — Classification and performance requirements*

prEN 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*

EN 15416, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods*

— *Part 2: Static load test of multiple bondline specimens in compression shear*

— *Part 3: Creep deformation test at cyclic climate conditions with specimens loaded in bending shear*

— *Part 4: Determination of open assembly time for one component polyurethane adhesives*

— *Part 5: Determination of conventional pressing time*

## 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 effect on bond strength of damage to wood fibres caused by the action of acids from the adhesive or primer used in the gluing process during climatic cycling.

It is suitable for the following applications:

- a) for assessing the compliance of adhesives with EN 301, EN 15425 and prEN 16254;
- b) for assessing the suitability and quality of adhesives for load-bearing timber structures;
- c) for determining if the adhesive after bonding has a damaging influence on the strength of the wood due to chemical action.

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, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1245, *Adhesives — Determination of pH*

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

## 3 Principle

A joint between wooden adherends is submitted to defined temperature and humidity cycles and then strained to failure by a transverse tensile load.

## 4 Apparatus

**4.1 Testing machine**, which shall be either:

- a) a constant rate of loading machine, capable of maintaining a rate of loading of  $(5 \pm 1)$  kN/min; or
- b) a constant rate of traverse machine as described in ISO 5893.

Special mounts are required (see Figure 1). One or both mounts shall be attached to the straining heads by a coupling, which permits self-alignment of the mounts whilst the test pieces are being pulled.

**4.2 Climatic cabinets**, which are enclosures with air circulation capable of maintaining the test pieces under the following conditions:

- a)  $(10 \pm 2)$  °C at approximately  $(87,5 \pm 2,5)$  % relative humidity;