SLOVENSKI STANDARD
SIST EN 17224:2019

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Ugotavljanje tlačne strižne trdnosti lesnih lepil pri povišanih temperaturah

Determination of compressive shear strength of wood adhesives at elevated temperatures

Bestimmung der Druck-Scherfestigkeit von Holzklebstoffen bei erhöhten Temperaturen

Détermination de la résistance des adhésifs de bois au cisaillement par compression à températures elevées

Ta slovenski standard je istoveten z: EN 17224:2019

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83.180	Lepila	Adhesives

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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 17224:2019) 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of an identical text or by endorsement, at the latest by January 2020, and conflicting national standards shall be withdrawn at the latest by January 2020.

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.

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Introduction

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

At the end of the test, the user of the document should take care to carry out an appropriate disposal of the wastes, according to local regulation.

1 Scope

This document specifies a test method for determining the comparative compression shear strength of adhesive bonds and solid wood at both ambient temperature and elevated temperature. The maximum load of the test pieces at ambient temperature and after exposure to a specific elevated temperature for a specified duration of time is evaluated. It is applicable to adhesives used in load bearing timber structures and to other wood adhesives.

This method is intended primarily to obtain performance data for the influence of elevated temperatures on the behaviour of adhesive bonds.

This method is not intended to provide data for structural design, and does not necessarily represent the performance of the bonded element 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 923, *Adhesives — Terms and definitions*

EN 14080:2013, *Timber structures — Glued laminated timber and glued solid timber — Requirements*

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 923 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Principle

Solid wood test pieces and adhesively bonded test pieces are prepared. Both types of test pieces are tested in a compression shear test according to EN 14080:2013, Annex D at ambient temperature and after exposure to an elevated temperature. The compression shear strength of the solid wood test pieces and the adhesively bonded test pieces at ambient temperature and elevated temperature is compared in order to evaluate the shear strength of the adhesive at elevated temperature.

5 Apparatus

5.1 Test jig

The test equipment described in EN 14080:2013, Annex D is suitable for the performance of the shear test.

5.2 Climate chamber or oven

A climate chamber or oven capable of maintaining the targeted temperature to within ±2 °C and with sufficient air circulation to provide constant temperature conditions within the oven interior for the heating of the test pieces.

5.3 Thermocouples

Thermocouples capable of measuring the temperature in the test pieces to within ±2 °C.

5.4 Testing machine

A testing machine capable of performing the block shear test specified in EN 14080:2013, Annex D with an accuracy of ±1 % of the maximum load is required for the performance of the shear tests.

6 Test specimens

6.1 Selection of wood

In general, Norway spruce (*Picea abies L.*) with a density of (450 ± 25) kg/m^3 at 12 % moisture content is used. The test with Norway spruce also covers Silver fir (Abies alba) and Scots pine (Pinus sylvestris). The use of other wood species is possible.

NOTE When using other wood species, the test results are considered to be representative of the density range used in the test. It is assumed that the results apply to lower densities as well.

The material shall be straight-grained and free from knots, reaction wood, machining defects (such as chipped grain, dubbed ends, feed roll polish, coarse knife marks and feed roll compression) and any drying defects such as case hardening, collapse, splits or checks. The raw material for the preparation of the test pieces shall have dimensions of at least 150 mm (width) × 50 mm (height) and a length of at least 300 mm.

The angle of the annual rings to the surface, as measured from the wide face, shall be between 45° and 90°.

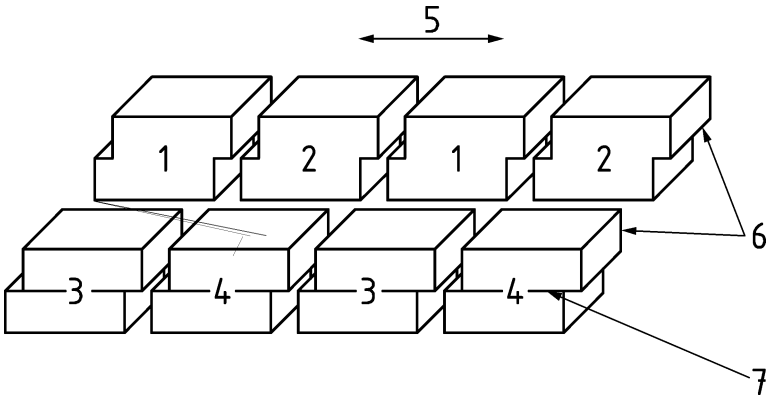
When testing adhesives used in load-bearing timber structures, the wood shall be conditioned at (20 ± 2) °C and a relative humidity of (65 ± 5) % until a moisture content of (12 ± 1) % has been obtained.

When testing wood adhesives for non-load-bearing applications, the wood may alternatively be conditioned at (23 ± 2) °C and a relative humidity of (50 ± 5) % until equilibrium moisture content is obtained.

Plane each lamination not more than 8 h before the bonding of the test pieces.

6.2 Preparation of test pieces

Solid wood block shear test pieces and adhesively bonded block shear test pieces shall be produced. To ensure that all test pieces have a comparable wood quality, the solid wood test pieces and the adhesively bonded test pieces shall be produced using the same raw material following the principle as shown in Figure 1. At least four test pieces, two solid wood test pieces for testing at ambient temperature and elevated temperature and two adhesively bonded test pieces for testing at ambient temperature and elevated temperature, shall be produced from one board.



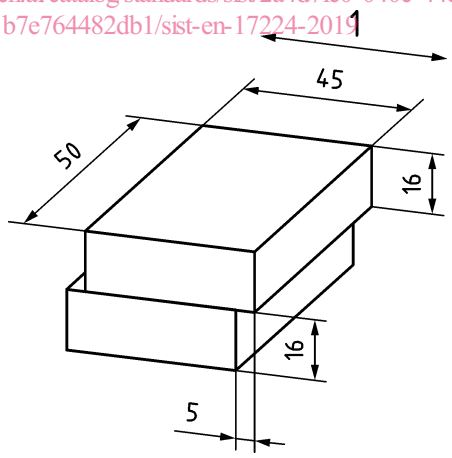
Key

1	solid, ambient temperature	5	grain direction
2	solid, elevated temperature	6	side-matched specimens
3	bonded, ambient temperature	7	bondline
4	bonded, elevated temperature		

Figure 1 — Principle for production of side-matched test pieces

20 bonded test pieces shall be prepared in accordance with Figure 2. In addition, 20 solid wood control test pieces shall be produced with the same dimensions as the bonded test pieces. The bonded test pieces and the matched solid wood test pieces shall be produced as 20 pairs. Care shall be taken to ensure the same annual ring orientation when bonding the laminations together into a bonded assembly.

Dimensions in millimetres



Key

1 grain direction

Figure 2 — Form and dimensions of the final block shear test pieces

The bonded test pieces shall be prepared from laminations (16,0 ± 0,1) mm thick (after planing) by (60,0 ± 0,1) mm wide. The adhesive preparation and the bonding procedure shall follow the adhesive manufacturer's recommendation.