SLOVENSKI STANDARD
oSIST prEN 17618:2021

01-januar-2021

Lepila - Lepila za les za nekonstrukcijsko uporabo - Ugotavljanje strižne trdnosti s tlačno obremenitvijo

Adhesives - Wood-to-wood adhesive bonds for non-structural applications - Determination of shear strength by compressive loading

Klebstoffe - Holz auf Holz-Klebeverbindungen für nicht tragende Anwendungen - Bestimmung der Scherfestigkeit durch Druckbelastung

Adhésifs - Joints collés de bois à bois à usages non structuraux - Détermination de la résistance au cisaillement par effort de compression

Ta slovenski standard je istoveten z: **prEN 17618**

ICS:

83.180	Lepila	Adhesives

oSIST prEN 17618:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 17618

November 2020

ICS 83.180

English Version

Adhesives - Wood-to-wood adhesive bonds for non-structural applications - Determination of shear strength by compressive loading

Adhésifs - Joints collés de bois à bois à usages non structuraux - Détermination de la résistance au cisaillement par effort de compression

Klebstoffe - Holz auf Holz-Klebeverbindungen für nicht tragende Anwendungen - Bestimmung der Scherfestigkeit durch Druckbelastung

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 ... 3
Introduction ... 4
1 Scope ... 5
2 Normative references ... 5
3 Terms and definitions ... 5
4 Principle ... 6
5 Safety ... 6
6 Apparatus ... 6
6.1 Linear measuring device: Reading to 0,05 mm e.g. Vernier calliper or micrometer. ... 6
6.2 Testing machine ... 6
7 Procedure ... 6
7.1 Preparation of bonded assemblies ... 6
7.1.1 General ... 6
7.1.2 Test specimen ... 6
7.1.3 Preparation of test blocks ... 7
7.2 Conditioning of test blocks ... 8
7.3 Preparation of specimens ... 8
7.4 Procedure ... 8
8 Expression of results ... 10
8.1 Shear strength ... 10
8.2 Wood failure percentage ... 11
9 Test report ... 11
Annex A (normative) Information required prior to testing ... 12
A.1 Information required prior to testing ... 12
Annex B (normative) Timber species, surfaces, quality and moisture content ... 13
B.1 Timber species ... 13
B.2 Timber quality and surface ... 14
B.3 Timber moisture content ... 14
Bibliography ... 16

European foreword

This document (prEN 17618:2020) 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.

SAFETY STATEMENT — Persons using this document are familiar with the normal laboratory practice, if applicable. This document does not purport to 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 may have negative environmental impact. As technological advantages lead to acceptable 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 standard takes care to carry out an appropriate disposal of the wastes, according to local regulation.

Introduction

The test method described in this document can be used for the determination of shear strength, wood failure percentage of bonded assemblies with the aim of defining working properties of adhesives. It will allow considerable improvement in consumer protection in any future product liability system with regard to properties guaranteed by the adhesive manufacturer.

1 Scope

This document specifies a method for adhesives for wood and derived solid wood products for determining the shear strength and wood failure percentage of wood-to-wood adhesive bonds loaded in compression. These parameters allow to define different working properties of adhesives: (e.g. final bond strength, pressing time, closed assembly time).

Annex A gives information required prior to testing.

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923 and the following 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 http://www.electropedia.org/

3.1
thin bond line
close contact adhesive joint where the adhesive layer is nominally 0,1 mm thick

3.2
shear strength
force per surface units necessary to bring an adhesive joint to the point of failure by means of forces applied in a shear mode

[SOURCE: EN 923:2015, 2.7.17]

3.3
wood failure percentage
percentage of wood adherend failure

Note 1 to entry: Failure of a joint in the body of the adherend

3.4
final bond strength
maximum force per surface units provided by complete processing conditions, necessary to bring an adhesive joint to the point of failure occurring in, or near the plane of the bond-line

3.5
closed assembly time
interval between assembly of the adhesive joint and the initiation of the heat and/or pressure of the setting process in the assembled joint

[SOURCE: EN 923:2015, 2.6.63]

4 Principle

A non-symmetrical bonded assembly, between two symmetrical wooden adherends, is loaded to rupture a compressive force parallel to the grain.

5 Safety

People using this document shall be familiar with normal laboratory practice.

This document does not purport to address all the safety problems, if any, associated with this use.

It is the responsibility of the user to establish health and safety practices and to ensure compliance with any European or national regulatory conditions.

6 Apparatus

6.1 Linear measuring device: Reading to 0,05 mm e.g. Vernier calliper or micrometer.

6.2 Testing machine

The testing machine shall be a constant-rate-of-traverse machine as described in ISO 5893. The machine shall be capable of determining a maximum load. The machine shall permit the measurement and recording of the applied force with an accuracy of ± 1 %. The testing machine shall be fitted with a shearing tool containing a self-alignement seat to ensure uniform lateral distribution of the force. The testing machine shall be located in an atmosphere such that the moisture content of the specimens developed under the conditions prescribed in 7.2 is not noticeably altered during testing.

7 Procedure

7.1 Preparation of bonded assemblies

7.1.1 General

Use wood and derived solid wood blocks having the parameters defined in Annex B (to complete with Wood Handbook, 1999 and standard ASTM D2559; refer also to national wood institute to collect wood/TDS parameters).

The blocks shall not be treated or coated; it shall be freshly sanded or planed and shall be of straight-grain and free from all defects that may interfere with the bond strength determination such as: knots, birdseye, holes, cracks, bark, short grain, distorted grain, decay, any unusual discolorations within the shearing area, etc.

Any wood species, derived solid wood products may be used unless it is essential to minimize differences in the wood in order to conduct special comparative tests.

7.1.2 Test specimen

Individual test joints shall conform to the form and dimensions shown in Figure 1 + thickness 20mm (shear area 40 × 50 mm).

The specimens shall be cut from bonded blocks prepared as described in 7.1.3.

Test a minimum of five test joints from each of the bonded blocks.

Dimensons in millimetres

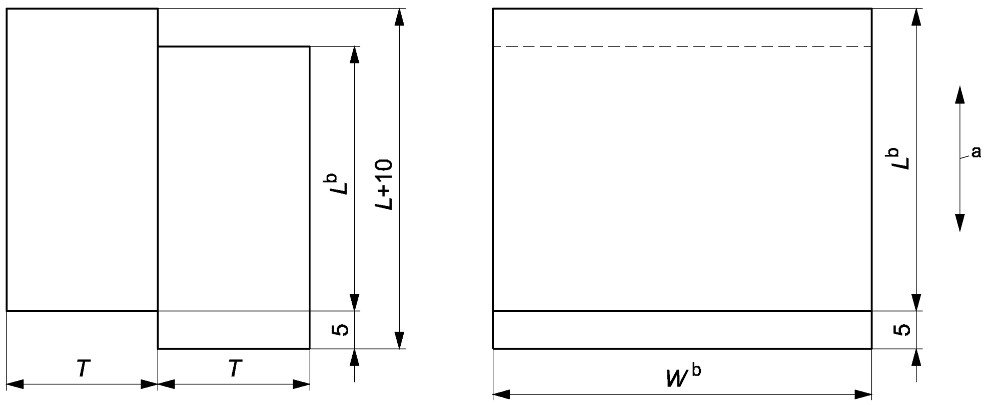

Figure 1 — Shape and dimensions of test specimens

7.1.3 Preparation of test blocks

The blocks shall be of suitable size preferably so that at least five test specimens may be cut from one test joint as shown in Figure 2. The grain direction shall be parallel to the longest dimension of the block. The blocks shall be at the equilibrium moisture content recommended by the manufacturer of the adhesive.

In the absence of such recommendation, the moisture content shall be from (10 ± 2) % based on oven-dry weight as determined on representative samples in accordance with EN 13183-1.

The blocks shall have surfaces substantially free from saw marks. The blocks shall be weighed and assembled in pairs so that blocks of approximately the same relative density are bonded together. The test blocks shall be knife-planed to ensure the bonding faces are flat, smooth and parallel to the surface where pressure will be applied. No more than 24 h before bonding, either lightly plane or lightly sand each surface to be bonded (using an abrasive paper of grain size P100 complying with ISO 6344-2:1998 is recommended). Remove any dust carefully. Do not touch or soil the prepared surfaces. They shall be free from dirt, dust or other contamination. Unless otherwise agreed between the interested parties, the thickness of each of the blocks shall not vary by more than 0,1 mm to ensure homogenous pressure during cure. Ensure that the angle between the growth rings and the surface to be bonded is between 30° and 70°.

Comply with the adhesive manufacturer's instructions regarding the processing conditions, including the preparation of the adhesive, the amount of adhesive to be applied, whether the adhesive is to be applied on one or both surfaces, the open and closed assembly time and the magnitude and duration of the assembly pressure and report them in the test report.

Where no manufacturer's instructions are available, the following processing conditions may be used:

— adhesive applied on both sides;

— adhesive spread: (150 ± 10) g/m^2;

— open assembly time: (120 ± 10) s;

— closed assembly time: (180 ± 10) s;

— pressing pressure: (depending on the wood, (0,6 to 1,0) N/mm^2);

— pressing time: 2 h.

Bond the panels with the pressure uniformly distributed over the bonded surface.

Dimensions in millimetres

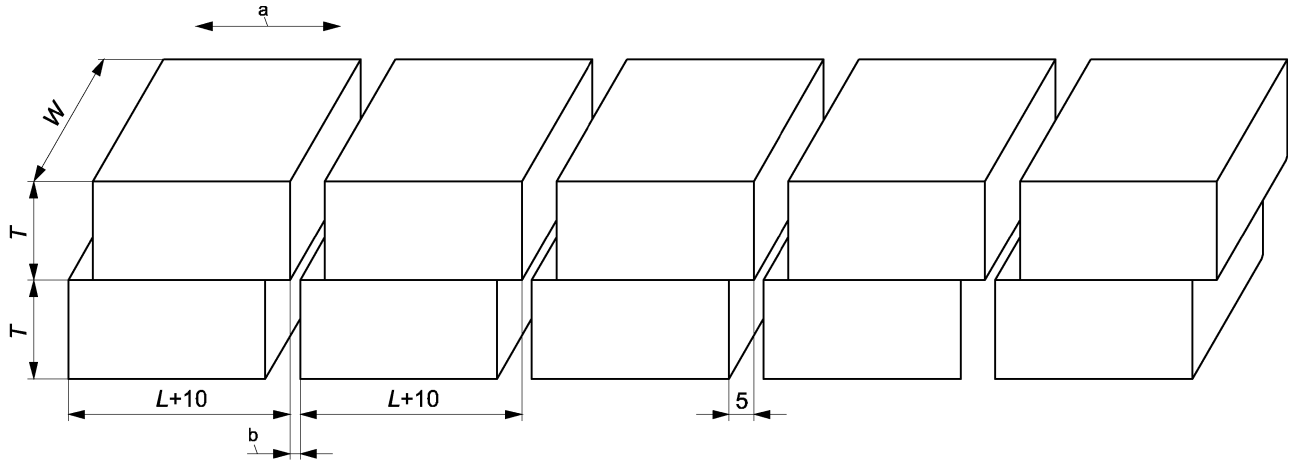

Figure 2 — Method of cutting test specimens from bonded blocks

7.2 Conditioning of test blocks

The bonded blocks, upon removal from pressure shall be conditioned either at a relative humidity of (50 ± 5) % and a temperature of (23 ± 2) °C or at a relative humidity of (65 ± 5) % and a temperature of (20 ± 2) °C, for a period depending on the working properties of the adhesives.

7.3 Preparation of specimens

a) Reduce the width of the test blocks to L ± 0,5 mm by planing or sawing (see Figure B.1 a) and b)) an approximately equal amount from each side. Before cutting off the test joints, cut approximately 10 mm from each end, then cut off the individual test joints as shown in Figure 3. When preparing the test specimens, make sure that the loaded surfaces are smooth and parallel to each other and perpendicular to the height. While reducing the lengths of the overlap to W ± 0,5 mm, ensure that the saw cuts extend to, but not beyond, the bond line. Also ensure that the saw cuts are perpendicular to the major axis.

b) Store the test joints in the conditioning atmosphere described in 7.2, until tested. The bonded blocks may be briefly removed for the cutting operations.

7.4 Procedure

a) Place the test joint in the shearing tool (Figure 3) so that the force may be applied.

b) Test the test pieces in a compression-testing machine.

c) Apply the loading with a continuous motion of the movable head at a rate of 2 mm/min to failure.

d) Record the applied maximum force Fmax in newtons (N).

e) Record the percentage of wood failure.

Determine the percentage of apparent cohesive wood failure of the individual specimen to the nearest 10 % of the tested area (see the examples in Figure 4). The determination consists of an area assessment