

## SLOVENSKI STANDARD SIST EN 15416-3:2008+A1:2010

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#### Lepila (razen fenolnih ali aminskih) za nosilne lesene konstrukcije - Preskusne metode - 3. del: Preskus deformacij lezenja v cikličnih klimatskih pogojih s preskušanci pod upogibno-strižno obremenitvijo

Adhesives for load bearing timber structures other than phenolic and aminoplastic - Test methods - Part 3: Creep deformation test at cyclic climate conditions with specimens loaded in bending shear

#### **iTeh STANDARD PREVIEW** Klebstoffe für tragende Holzbauteile ausgenommen Phenolharzklebstoffe und

Klebstoffe für tragende Holzbauteile ausgenommen Phenolharzklebstoffe und Aminoplaste - Prüfverfahren - Teil 3: Prüfung der Kriechverformung unter zyklischen Klimabedingungen an Prüfkörpern bei Biege-Scherbeanspruchung SIST EN 15416-3:2008+A1:2010

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Adhésifs pour structures portantes en bois, de type autre que phénolique et aminoplaste - Méthodes d'essai - Partie 3: Essai de déformation par fluage dans des conditions climatiques cycliques avec des éprouvettes chargées en cisaillement par flexion

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# EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

## EN 15416-3:2007+A1

February 2010

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English Version

## Adhesives for load bearing timber structures other than phenolic and aminoplastic - Test methods - Part 3: Creep deformation test at cyclic climate conditions with specimens loaded in bending shear

Adhésifs pour structures portantes en bois, de type autre que phénolique et aminoplaste - Méthodes d'essai - Partie 3: Essai de déformation par fluage dans des conditions climatiques cycliques avec des éprouvettes chargées en cisaillement par flexion Klebstoffe für tragende Holzbauteile ausgenommen Phenolharzklebstoffe und Aminoplaste - Prüfverfahren -Teil 3: Prüfung der Kriechverformung unter zyklischen Klimabedingungen an Prüfkörpern bei Biege-Scherbeanspruchung

This European Standard was approved by CEN on 23 September 2007 and includes Amendment 1 approved by CEN on 4 January 2010.

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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 Management Centre has the same status as the official versions.

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

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### Foreword

This document (EN 15416-3:2007+A1:2010) 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 August 2010, and conflicting national standards shall be withdrawn at the latest by August 2010.

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 includes Amendment 1, approved by CEN on 2010-01-04.

This document supersedes EN 15416-3:2007.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\square$   $\square$ .

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom dards.iteh.ai)

#### Safety statement

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Persons using this document should be familiar with the hormal aboratory 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 standard may have negative environmental impact. As technological advantages lead to acceptable alternatives for these materials, they will be eliminated from this standard to the extent possible.

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

#### 1 Scope

This European standard specifies a method for determining the creep deformation of bonded specimens loaded in bending shear. It is applicable to adhesives used in load-bearing timber structures.

It is suitable for the following applications:

- a) for assessing the compliance of adhesives to A EN 15425 (A Adhesives, One component polyurethane, for load bearing timber structures Classification and performance requirements;
- b) for assessing the suitability and quality of adhesives for load-bearing timber structures.

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 numerical design data and does not necessarily represent the performance of the bonded member in service. It is not applicable for assessing the suitability of adhesives for the manufacture of wood-based panels

#### 2 Normative references

The following referenced documents are indispensable for the application 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 **NDARD PREVIEW** 

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

EN 923:2005, Adhesives — Terms and definitions N 15416-3:2008+A1:2010

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A) EN 15425 (A), Adhesives — One component polyurethane (for load bearing timber structures — Classification and performance requirements

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923:2005 and the following apply.

#### 3.1

#### relative creep value, $k_{def}(t)$

time-dependent increase of the deformation of one specimen

NOTE By means of the deflection w(t) and the initial deflection w(0), the relative creep value is calculated using the following formula:

$$k_{def}(t) = \frac{w(t)}{w(0)} - 1$$
(1)

where

*w*(t) is the deflection at times t;

w(0) is the initial deflection immediately after initial loading, measured 1 min after the loading of the individual specimen;

 $k_{def}$  (t) is the relative creep value.

#### 3.2

#### ratio of relative creep, $R_{C_i}(t)$

ratio of the relative creep values  $k_{def}$  (t) of two matched specimens i, tested adhesive, and PRF, at time t

NOTE By means of  $k_{def}$  (t),tested adhesive,i and  $k_{def}$  (t),PRF,i within one pair of matched bending specimens (i), the ratio of relative creep is calculated using the following formula:

$$R_{Ci}(t) = \frac{k_{def}(t), tested \ adhesive, i}{k_{def}(t), PRF, i}$$
(2)

where

k <sub>def</sub> (t), tested adhesive,i	is the relative creep value of the respective tested adhesive sample i;
k <sub>def</sub> (t), PRF,i	is the relative creep value of the respective phenolic-resorcinol (PRF) - sample i;
R <sub>Ci</sub> (t)	is the ratio of relative creep of matched pair of bending specimens i.

#### 4 Principle

Bending specimens of a constant cross-section are subjected to constant load at cyclically varying climate conditions. Specimens bonded with the adhesive to be tested are compared with specimens bonded with a PRF- adhesive conforming to the requirement of adhesive type I as specified in EN 301.

#### **5** Apparatus

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#### 5.1 Test jig

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A test jig being capable of applying a load of 2 000 N in each loading point with a loading principle as shown in Figure 1.

Dimensions in millimetres



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A Measuring gauge for the measuring of the deflection of the specimen

#### Figure 1 — Loading principle for the bending test

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#### 5.2 Climate chamber

Key

A climate chamber capable of maintaining the two test climates  $(20 \pm 2)$  °C and  $(85 \pm 5)$  % RH and  $(45 \pm 2)$  °C and  $(40 \pm 5)$  % RH. The climate chamber shall be capable of alternating between the two test climates in 10 h.

#### 5.3 Measuring gauge

A measuring gauge enabling readings of the deflection of the specimens with an accuracy of 0,01 mm, see Figure 1.

#### 6 Preparation of test samples

Five boards of straight grained, defect-free spruce wood (*Picea abies* L.) of density ( $425 \pm 25$ ) kg/m<sup>3</sup> shall be used to manufacture a total of 5 pairs of matched bending specimens with bondline thickness ( $0,3 \pm 0,1$ ) mm.

Each board shall have a width of at least 150 mm, a length of at least 1 260 mm and a thickness of at least 33 mm, and shall be used to manufacture one pair of 2 matched bending specimens according to the scheme shown in Figure 2.

Each of the 2 matched bending specimens consists of 2 boards of spruce wood of equal sizes. Each board shall have a thickness in the bond line area of  $(25 \pm 0,1)$  mm (after final preparation), a width of at least 70 mm (before the bonding) and a length of at least 625 mm (before the bonding), with an angle of the growth rings between 30° and 60° (in relation to the surface to be bonded).

Not more than 24 h before the bonding, the boards are planed to their final thickness and one of the two boards of each specimen is prepared at the periphery in an appropriate manner to ensure a bondline thickness of  $(0,3 \pm 0,1)$  mm and to ensure that there is no loss of adhesive during the bonding of the test specimen.

NOTE The use of a 0,2 mm thick cardboard spacer frame with a width of maximum 10 mm (bonded on a planed board with the final thickness of  $(25 \pm 0,1)$  mm), or milling a 60 mm wide groove with a depth of  $(0,2 \pm 0,1)$  mm into a  $(25,2 \pm 0,1)$  mm thick, planed board, have shown to be suitable methods for the production of samples with a bondline thickness of  $(0,3 \pm 0,1)$  mm.

Each specimen is glued from the two boards with an orientation of the growth rings as shown in Figure 2. One specimen of the pair shall be glued with the adhesive tested for assessment and the other specimen of the pair shall be glued with an adhesive of thermosetting phenolic-resorcinol type conforming to the requirements for an adhesive of type I as specified in EN 301. The adhesives shall be used in accordance with the recommendations of the adhesive manufacturer.

After pressing and curing for at least seven days in standard climate  $(20 \pm 2)$  °C and  $(65 \pm 5)$  % RH, the specimens are planed to final width of  $(50 \pm 0,1)$  mm and cut to final length of  $(600 \pm 1,0)$  mm, ensuring that the prepared periphery of the samples is cut off completely from the test specimen, so that the specimen has a constant bondline thickness of  $(0,3 \pm 0,1)$  mm. The thickness of the samples shall not be changed after bonding in order to provide samples with a thickness of  $(50,3 \pm 0,1)$  mm.

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