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BSI Standards Publication

Adhesives — One component polyurethane (PUR) for load-bearing timber structures — Classification and performance requirements

bsi.

National foreword

This British Standard is the UK implementation of EN 15425:2017. It supersedes BS EN 15425:2008 which is withdrawn.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.

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Adhesives - One component polyurethane (PUR) for load-bearing timber structures - Classification and performance requirements

Adhésifs - Adhésifs polyuréthane monocomposants (PUR) pour structures portantes en bois - Classification et exigences de performance

Klebstoffe - Einkomponenten-Klebstoffe auf Polyurethanbasis (PUR) für tragende Holzbauteile - Klassifizierung und Leistungsanforderungen

This European Standard was approved by CEN on 14 November 2016.

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European foreword

This document (EN 15425:2017) 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of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by July 2017.

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.

This document supersedes EN 15425:2008.

Compared to EN 15425:2008, the following main changes have been made:

a) terms and definitions have been written in details in Clause 3, not only referring to EN 923:2015;

b) a new classification system has been introduced. 90 °C test temperature and 1 mm glue line thickness are included in the test program in Clause 4. Adhesives tested for working properties according to Clause 7 will be marked with a “w” in the end of their designation code;

c) general requirements for the different tests have been listed in 5.1;

d) test treatment A8 (tensile/shear test at 90 °) has been introduced in 5.2, 6.2 and Annex A;

e) a new test method is given in 5.8: Long-term sustained load test at cyclic climate conditions with specimens loaded perpendicular to the glue line (Glass house test – EN 15416-1:2017);

f) the test method EN ISO 2555 has been included in 7.2;

g) the necessary duration times for the test given in 5.7 have been reduced for glue line thickness 0,3 mm (General purpose adhesives). Identical duration times have been introduced for the new class “Special purpose adhesives” with 0,5 mm glue line thickness in test;

h) EN 15416-2:2007, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 2: Static load test of multiple bond line specimens in compression shear* has been introduced to the EN 302 series as EN 302-8:2017;

i) in 5.6 - Static load test of multiple glue line specimens in compression shear - a definition is given for a failure mode which leads to a not counted sample;

j) a new Clause 8 – Marking and labelling – has been introduced;

k) a test program for adhesives with identical chemical composition except for a different amount of catalyst, has been introduced in Clause 4;

l) in 5.6, a more precise description of failure modes and their influence is given.

This document is one of a series dealing with one component polyurethane adhesives for use with timber structures, and is published in support of EN 1995-1-1, Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings.

The series consists of:

— one standard for classification and performance requirements (EN 15425:2017),

— seven test methods (EN 302-1, EN 302-2, EN 302-3, EN 302-4, EN 302-8:2017, EN 15416-1:2017 ("Glass house test") and EN 15416-3:2017) used to assess the performance of adhesives after specified heat and humidity treatments, and

— three test methods (EN ISO 2555 (reference in EN 302-7), EN 15416-4:2017, and EN 15416-5:2017) to characterize the working properties of the adhesives.

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

Safety statement

Persons using this European Standard should be familiar with the normal laboratory practice, if applicable. This European Standard 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 European Standard may have negative environmental impact. As technological advantages lead to better alternatives for these materials, they will be eliminated from this European Standard to the extent possible.

At the end of the test, it is recommended that the user of this European Standard take care to carry out an appropriate disposal of the wastes, according to local regulation.

1 Scope

This European Standard establishes a classification for one component polyurethane (PUR) adhesives according to their suitability for use in load-bearing timber structures in defined climatic exposure conditions; it specifies performance requirements for such adhesives for the factory manufacture or factory like manufacturing of load-bearing timber structures only.

It also classifies "adhesive lines" where all the products within the line have almost identical physical/chemical properties and gluing performance, but different reactivity.

This European Standard only specifies the performance of adhesives for use in an environment corresponding to the defined conditions.

The performance requirements of this European Standard apply to the adhesives only, not to the timber structure. This European Standard does not cover the performance of adhesives for on-site gluing (except for factory-like conditions) nor the production of wood-based panels, except solid wood panels, or modified and stabilized wood with considerably reduced swelling and shrinkage properties, e.g. such as acetylated wood, heat treated wood and polymer impregnated wood.

This European Standard is primarily intended for the use of adhesive manufacturers and for the use in timber structures bonded with adhesives, to assess or control the quality of adhesives. The requirements apply to the type testing of the adhesives. Production control activities are outside the scope of this European Standard.

Adhesives meeting the requirements of this European Standard are adequate for use in load-bearing timber structure, provided that the bonding process has been carried out according to an appropriate product standard.

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 302-1, *Adhesives for load-bearing timber structures - Test methods - Part 1: Determination of longitudinal tensile shear strength*

EN 302-2, *Adhesives for load-bearing timber structures - Test methods - Part 2: Determination of resistance to delamination*

EN 302-3, *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*

EN 302-4, *Adhesives for load-bearing timber structures - Test methods - Part 4: Determination of the effects of wood shrinkage on the shear strength*

EN 302-7, *Adhesives for load-bearing timber structures - Test methods - Part 7: Determination of the working life under referenced conditions*

EN 302-8:2017, *Adhesives for load-bearing timber structures — Test methods — Part 8: Static load test of multiple bond line specimens in compression shear*

EN 923:2015, *Adhesives - Terms and definitions*

EN 15416-1:2017, *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 perpendicular to the glue line (Glass house test)*

EN 15416-3:2017, *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*

EN 15416-4:2017, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 4: Determination of open assembly time under referenced conditions*

EN 15416-5:2017, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 5: Determination of minimum pressing time under referenced conditions*

EN ISO 2555:1999, *Plastics - Resins in the liquid state or as emulsions or dispersions - Determination of apparent viscosity by the Brookfield Test method (ISO 2555:1989)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923:2015 and the following apply.

3.1
one component polyurethane (PUR) adhesive
isocyanate containing urethane polymers, which are cross-linked by reaction with water

3.2
service class 1
climatic conditions characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 65 % for a few weeks per year

Note 1 to entry: In service class 1, which comprises typical indoor conditions, the average moisture content in most soft woods will not exceed 12 %.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3, modified – Indoor conditions added in Note 1 to entry]

3.3
service class 2
climatic conditions characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 85 % for a few weeks per year

Note 1 to entry: In service class 2, to which most covered exterior conditions belong, the average moisture content in most soft woods will not exceed 20 %.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3, modified – Covered exterior conditions added in Note 1 to entry]

3.4
service class 3
climatic conditions leading to higher moisture contents than in service class 2

Note 1 to entry: Exterior conditions typically belong to service class 3.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3, modified – Note 1 to entry has been added]

3.5
glue line
adhesive layer between the wood members

3.6
bond line
glue line including the two intermediate zones between adhesive and wood

3.7
close contact glue line
cc
glue line of thickness maximum 0,1 mm in the test

Note 1 to entry: Close contact glue line is achieved by gluing together two plane wood members with a clamping pressure of (0,8 ± 0,1) N/mm^2 without groves, spacers or similar device.

3.8
thick glue line
glue line of nominal thickness in the range of 0,3 mm to 1,0 mm in the test

Note 1 to entry: Thick glue lines are achieved by using spacers, grooves or similar device with a thickness of 0,3 mm to 1,0 mm when two plain members are glued together.

3.9
adhesive product line
series of products, all with the same chemical composition except for a different amount of catalyst

Note 1 to entry: Only for this reason the products have different reactivity.

4 Classification

Adhesives for structural purpose shall produce joints of such strength and durability that the integrity of the bond is maintained in the assigned service class throughout the expected life of the structure.

PUR-adhesives according to EN 15425 are classified by Type (climate condition in use), Maximum test temperature and Maximum glue line thickness in use. These three subclasses are subdivided as follows.

Type I: To be used in service classes 1, 2 and 3

Type II: To be used in service class 1 only

Maximum test temperature: 50 °C, 70 °C or 90 °C

Maximum glue line thickness in use: 0,1 mm, 0,3 mm and 0,5 mm

Depending on the maximum glue line thickness in use, the adhesives are assigned to different application areas as described below and shown in Table 1.

— **Special purpose adhesives (SP)**: to be used for glue lines between laminations (maximum glue line thickness 0,5 mm) and for finger joints in laminations.

— **General purpose adhesives (GP)**: to be used for glue lines between laminations (maximum glue line thickness 0,3 mm) and for finger joints in laminations.

— **Finger jointing adhesives (FJ)**: to be used for finger jointing of laminations and structural timber only (maximum glue line thickness 0,1 mm).

Definition of Special purpose, General purpose and Type can be different in other European Standards.

Table 1 — Adhesive classes

Adhesive type designation	**Application area**	**Max. test temperature** [a]	**Max. glue line thickness**		**Service classes** [b]
			Test	Use	
		°C	mm	mm	
	Normal use				
EN 15425 l 70 GP 0,3	General purpose	70	0,5	0,3	1,2,3
	Special use				
EN 15425 l 90 SP 0,5	Special purpose	90	1,0	0,5	1,2,3
EN 15425 l 90 GP 0,3	General purpose	90	0,5	0,3	1,2,3
EN 15425 l 90 FJ 0,1	Finger jointing	90	0,3	0,1	1,2,3
EN 15425 l 70 FJ 0,1	Finger jointing	70	0,3	0,1	1,2,3
EN 15425 ll 50 GP 0,3	General purpose	50	0,5	0,3	1
EN 15425 ll 50 FJ 0,1	Finger jointing	50	0,3	0,1	1

[a] Tested according to EN 302–8:2017 and Annex A designation A6, A7 or A8

[b] The application of the adhesive types in the different service classes can be restricted by national regulations applicable at the end use site of the bonded timber structures.

A classification to a certain “maximum test temperature” will automatically be valid for lower temperatures.

Table 2 specifies the tests that shall be performed for each application area. References are given to the actual suclause in this European Standard and to which European Standard the tests are based on.

Table 2 — Necessary tests for adhesives used in different application areas

Application area	Glue line thickness in test mm	EN 302–1 (based on 6.2) [a]	EN 302–2 (based on 6.3)	EN 302–3 (based on 6.4)[b]	EN 302–4 (based on 6.5)	EN 302–8:2017 (based on 6.6) [c]	EN 15416–3:2017 (based on 6.7)	EN 15416–1:2017 (based on 6.8)
Special Purpose	0,1[d]	X	X			X		X
	0,5	X		X	X		X	X
	1,0	X						
General purpose	0,1[d]	X	X			X		X
	0,3						X	
	0,5	X		X	X			X
Finger jointing	0,1[d]	X	X	X		X	X	X
	0,3	X						

[a] Climate treatment A1 to A5 and A6 or A7 or A8, depending on maximum test temperature (see Table 1 and Annex A).

[b] Only for wood surface treated with a primer with pH-value less than 3.

[c] Maximum test temperature according to Table 1.

[d] As defined in 3.6, close contact.

When testing an adhesive product line within one of the three application areas given in Table 2, the test program shall be as follows:

— full scale testing of the slowest product and the fastest product in the adhesive product line according to the test methods listed in Table 2. For determination of the working properties, testing according to paragraph 7 shall be performed.

— partly testing of the product closest to the mean reactivity will be performed according to EN 302-1 based on 6.2, EN 302-2 based on 6.3 and EN 302-8 based on 6.6. For determination of the working properties, testing according to 7.3 and 7.4 shall be performed.

Adhesives tested for working properties according to clause 7 are specified by the letter “w” at the end of the designation code (example: EN 15425 l 70 GP 0,3 w).

5 Requirements

5.1 General

Adhesives complying with this European Standard shall meet the performance requirements specified in 5.2 to 5.8 when tested in accordance with Table 2 and the following test methods:

a) The tensile shear test (see 5.2 and 6.2) using bonded test pieces made from beech (*Fagus sylvatica L.*). Is the wood surface treated with a primer, additional tests according to EN 302-1, storage treatment A1, A4 and A5 shall be performed.

b) The delamination test (see 5.3 and 6.3) on bonded test pieces made from Norway spruce (*Picea abies L.*). The test with Norway spruce also covers silver fir (*Abies alba*) and Scots pine (*Pinus sylvestris*). If the adhesive is to be used on wood from other conifers species, from hardwood species and/or preservative treated wood and/or wood surface-treated with a primer, also prepare four laminated members using representative samples from those species or wood treated that way. In case of an adhesive of application area finger jointing shall be used for the bonding of wood species other than Norway spruce, silver fir and scots pine, the additional delamination, test according to EN 302-2 may be replaced by the delamination test described in EN 301:2013, Annex A (delamination test for finger joints in laminations).

c) In case of wood being surface-treated with a primer with pH-value lower than 3,0, the acid damage test (EN 302-3, see 5.4 and 6.4) on bonded test pieces made from surface treated Norway spruce (*Picea abies* L.) shall be performed.

d) The shrinkage stress test (EN 302-4, see 5.5 and 6.5) on bonded test pieces made from Norway spruce (*Picea abies* L.).

e) Static load test (EN 302-8, see 5.6 and 6.6) on bonded test pieces made from beech (*Fagus sylvatica* L.).

f) Creep deformation under bending shear (EN 15416-3, see 5.7 and 6.7) on test pieces made from Norway spruce (*Picea abies* L.).

g) Long-term sustained load test ("Glass house test" EN 15416-1, see 5.8 and 6.8) under cyclic climate conditions perpendicular to the glue line on test pieces made from beech (*Fagus sylvatica* L.).

The adhesives shall be applied according to the manufacturer's instructions.

5.2 Bond strength in longitudinal tensile shear test

When tested in accordance with 6.2, the tensile shear strength values of close contact glue lines, 0,3 mm 0,5 mm and 1,0 mm thick glue lines shall meet the requirements given in Table 3.

Table 3 — Minimum mean tensile shear strength (N/mm²) for close contact, 0,3 mm, 0,5 mm and 1,0 mm thick glue lines after treatments according to Annex A

Treatment (see Annex A)	Close contact		0,3 mm		0,5 mm		1,0 mm	
	Type I	Type II	Type I	Type ll	Type I	Type ll	Type I	Type II
A1	10,0	10,0	9,5	9,5	9,0	9,0	8,0	8,0
A2	6,0	6,0	5,5	5,5	5,0	5,0	4,0	4,0
A3	8,0	8,0	7,6	7,6	7,2	7,2	6,4	6,4
A4	6,0	[a]	5,5	[a]	5,0	[a]	4,0	[a]
A5	8,0	[a]	7,6	[a]	7,2	[a]	6,4	[a]
A6	[a]	9,5	[a]	8,3	[a]	7,2	[a]	6,4
A7	8,0	[a]	7,2	[a]	6,5	[a]	5,5	[a]
A8	8,0	[a]	7,2	[a]	6,5	[a]	5,5	[a]

[a] Treatment not required.

5.3 Resistance to delamination

When tested in accordance with 6.3 the limits on delamination shall be those specified in Table 4.

Table 4 — Resistance to delamination after treatment according to EN 302–2

Treatment	Maximum delamination of any test sample	
	% of total glue line length	
	Type I	Type I
Low temperature	[a]	10,0
High temperature	5,0	[a]

[a] Treatment not required.

In the case of specific hardwood species [1)], the following provisions apply:

— The test may be performed with the lamination and glulam cross-section and sawing patterns of the laminations conforming to the maximum sizes and the laminations sawing patterns used in the respective product.

— The maximum delamination of any test sample shall be less than or equal to 8 % for adhesive type I and less than or equal to 12 % for adhesive type II.

1) Oak (*Quercus robur, Quercus petrea, Quercus alba*) with a mean density of less than 830 kg/m³. Other wood species can be added when sufficient experience is available.

5.4 Tensile strength perpendicular to the glue line after climatic treatment (acid damage test)

When tested in accordance with 6.4 due to primer treatment of the wood surface, the average tensile strength of the untreated control samples shall not be lower than 2,0 N/mm^2. The average tensile strength after cyclic treatment shall not be lower than 80 % of the average tensile strength of the untreated control samples.

5.5 Effect of wood shrinkage on the shear strength

When tested in accordance with 6.5, the average shear strength after climatic treatment shall not be lower than 1,5 N/mm^2.

5.6 Static load test of multiple glue line specimens in compression shear

When tested in accordance with 6.6, not more than one of the six samples is allowed to fail during the test period. In each of the remaining test pieces, the mean creep deformation of all bond lines shall not exceed 0,05 mm after the test.

If a failure within a test piece occurs as a solid wood failure without any interference with the bond line, the test piece shall not be counted. In case more than two test pieces in a test series collapse due to solid wood failure (low wood quality), the whole test shall be repeated.

5.7 Creep deformation test at cyclic climate conditions with specimens loaded in bending shear

Adhesive type "Finger jointing" – maximum 0,1 mm glue line thickness in test (cc)
When tested in accordance with 6.7, the average ratio of the relative creep values of all five matched bending specimen pairs evaluated after a given time *t* shall match the requirements in Table 5.

If the test fails to reach the given value after 26 weeks, the test may be continued for a second period of 26 weeks and a second assessment shall be performed after a total of 52 weeks under load. The load shall not be removed from the samples between the two test periods.

Adhesive type "General purpose" – 0,3 mm glue line thickness in test
When tested in accordance with 6.7, the average ratio of the relative creep values of all five matched bending specimen pairs evaluated after a given time *t* shall match the requirement in Table 5.

If the test fails to reach the given value after 13 weeks, the test may be continued for a second period of 13 weeks and a second assessment shall be performed after a total of 26 weeks under load.

If the adhesive also fail after 26 weeks, the test may continue and be assessed for the third time after a total period of 52 weeks. The load shall not be removed from the samples between the test periods.

Adhesive type "Special purpose" – 0,5 mm glue line thickness in test
The adhesive shall be tested in the same way and with the same duration times as for adhesive type "General purpose". The average ratio of the relative creep values of all five matched bending specimen pairs evaluated after a given time *t* shall match the requirement in Table 5.

Table 5 — Maximum average ratio of relative creep, $Rc_{\mathrm{mean}}(t)$

Category	Glue line thickness	Rc_{mean} 13 weeks	Rc_{mean} 26 weeks	Rc_{mean} 52 weeks
Finger jointing	Close contact	No option	1,12	1,15
General purpose	0,3 mm	1,12	1,12	1,15
Special purpose	0,5 mm	1,15	1,16	1,16

5.8 Long-term sustained load test at cyclic climate conditions with specimens loaded perpendicular to the glue line ("Glass house test")

When tested according to 6.8, not more than one of the 10 loaded samples for each climatic period (3 months, 6 months and 12 months) is allowed to fail during the test. The mean tensile strength perpendicular to the glue line in each group of test pieces (control batch, 3 months, 6 months and 12 months) shall not be less than 5,0 N/mm^2.

6 Test methods

6.1 General

The following test methods shall be used for establishing the requirements given in Clause 5.

6.2 Determination of longitudinal tensile shear strength

The test shall be made in accordance with EN 302-1 with a glue line thickness of close contact, 0,5 mm and 1,0 mm for application area Special purpose, close contact and 0,5 mm for application area General purpose and close contact and 0,3 mm for application area Finger jointing. Climatic treatments, as given in Table 3, shall be performed according to Annex A.

Test samples subjected to climatic treatment A6, A7 or A8 shall be wrapped before treatment to reduce moisture loss as much as possible. The samples shall be tested immediately after removal from the climate chamber in a testing machine supplied with a temperature-controlled chamber.

6.3 Determination of resistance to delamination

The test shall be made in accordance with EN 302-2.

6.4 Determination of tensile strength perpendicular to the glue line after climatic treatment (acid damaged test)

The test shall be made in accordance with EN 302-3 with primer- treated Norway spruce (*Picea abies* L.), and is mandatory if the pH value of the primer is lower than 3,0. The glue line thickness shall be 0,5 mm for application area Special purpose and General purpose, and close contact (cc) for Finger jointing.

6.5 Determination of the effect of wood shrinkage on the shear strength

The test shall be made in accordance with EN 302-4 with adhesives designed for the application areas Special purpose and General purpose.

6.6 Static load test of multiple glue line specimens in compression shear

The test shall be made in accordance with EN 302-8:2017. The test temperature for climate 1 for the respective adhesives type is given in Table 6.

Table 6 — Test temperatures

Adhesive type	**Temperature for climate 1 in** EN 302–8 °C
EN 15425 ll 50 GP 0,3 EN 15425 ll 50 FJ 0,1	50
EN 15425 l 70 GP 0,3 EN 15425 l 70 FJ 0,1	70
EN 15425 l 90 SP 0,5 EN 15425 l 90 GP 0,3 EN 15425 l 90 FJ 0,1	90

6.7 Creep deformation test with specimens loaded in bending shear

The test shall be made in accordance with EN 15416-3:2017. The glue line thickness shall be 0,5 mm for application area Special purpose, 0,3 mm for application area General purpose and close contact for application area Finger jointing.

6.8 Long-term sustained load test at cyclic climate conditions with specimens loaded perpendicular to the glue line ("Glass house test")

The test shall be made in accordance with EN 15416-1:2017. The glue line thickness shall be close contact and 0,5 mm for application area Special purpose and General purpose, and close contact for Finger joints.

7 Working properties of the adhesive

7.1 General

The working properties to be determined are given in the relevant product standards.

7.2 Determination of initial viscosity under reference conditions

In some Member States, it may be required to determine the initial viscosity. In this case, the initial viscosity shall be determined according to EN ISO 2555:1999 (reference in EN 302-7) at 20 °C. Only one measurement shall be performed.

7.3 Determination of open assembly time under reference conditions

In some member states, it may be required to determine the open assembly time. In this case, the open assembly time shall be determined according to EN 15416-4:2017.

7.4 Determination of pressing time under reference conditions

In some member states, it may be required to determine the pressing time. In this case, the pressing time shall be determined according to EN 15416-5:2017.

8 Marking and labelling

Each adhesive trade unit shall be labelled. The labelling shall at least include the trade name of the product, the batch number, the shelf life and the adhesive type according to EN 15425.

Annex A
(normative)

Climatic treatment prior to shear test

Assemblies are glued and thereafter conditioned for 7 days to 14 days in a standard climate of (20 ± 2) °C and (65 ± 5) % relative air humidity (hereafter climate [20/65]). A longer conditioning time may be used if recommended by the adhesive manufacturer. Test samples are prepared and treated according to Table A.1.

Table A.1 — Climatic treatment prior to shear test

Designation	Treatment
A1	Test immediately after the obligatory conditioning time in climate [20/65]
A2	4 days soaking in water at (20 ± 5) °C Samples tested in the wet state
A3	4 days soaking in water at (20 ± 5) °C Recondition in climate [20/65] to original mass[a] Samples tested in the dry state
A4	6 h in boiling water 2 h soaking in water at (20 ± 5) °C Samples tested in the wet state
A5	6 h in boiling water 2 h soaking in water at (20 ± 5) °C Recondition in climate [20/65] to original mass[a] Samples tested in the dry state
A6	24 h in 50 °C wrapped into a suitable water vapour tight material during the heating period. Samples tested hot in temperature controlled test cabinet at (50 ± 2) °C
A7	24 h in 70 °C wrapped into a suitable water vapour tight material during the heating period. Samples tested hot in temperature controlled test cabinet at (70 ± 2) °C
A8	24 h in 90 °C wrapped into a suitable water vapour tight material during the heating period. Samples tested hot in temperature controlled test cabinet at (90 ± 2) °C
When tested against A8, A7 may be skipped.	
[a] Tolerance of the original mass within + 2 % and − 1 %.	

Bibliography

[1] EN 1995-1-1:2004, *Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings*

[2] EN 14080:2013, *Timber structures - Glued laminated timber and glued solid timber - Requirements*

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