BS EN 15651-3:2017

BSI Standards Publication

Sealants for non-structural use in joints in buildings and pedestrian walkways

Part 3: Sealants for sanitary joints

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National foreword

This British Standard is the UK implementation of EN 15651-3:2017. It supersedes BS EN 15651-3:2012 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/547, Sealants for building and construction.

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.

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Mastics pour joints pour des usages non structuraux dans les constructions immobilières et pour chemins piétonniers - Partie 3 : Mastics sanitaires

Fugendichtstoffe für nicht tragende Anwendungen in Gebäuden und Fußgängerwegen - Teil 3: Dichtstoffe für Fugen im Sanitärbereich

This European Standard was approved by CEN on 25 December 2016.

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European foreword

This document (EN 15651-3:2017) has been prepared by Technical Committee CEN/TC 349 “Sealants for joints in building constuction”, the secretariat of which is held by AFNOR.

This document supersedes EN 15651-3:2012.

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of an identical text or by endorsement, at the latest by August 2017, and conflicting national standards shall be withdrawn at the latest by November 2018.

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This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports basic work requirements of EU Regulation.

For relationship with EU Regulation, see informative Annex ZA, which is an integral part of this document.

This document is one of the product European Standards within the framework series of EN 15651 on *Sealants for non-structural use in joints in buildings and pedestrian walkways,* as follows:

— *Part 1: Sealants for facade elements*,

— *Part 2: Sealants for glazing*,

— *Part 3: Sealants for sanitary joints* (this document),

— *Part 4: Sealants for pedestrian walkways*,

— *Part 5: Assessment and verification of constancy of performance, marking and labelling*.

The following significant technical changes have been implemented in this new edition:

— Clause 4.1.3 and Clause 5 have been improved;

— Clause 4.5 has been modified;

— Clause 7 and Annex ZA have been changed in accordance with the regulation (EU) No.305/2011.

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

1 Scope

This European Standard specifies definitions and requirements for sealants used for sealing of joints applied in sanitary areas in the interior of buildings exposed to non-pressurized water.

It covers joints in:

— bathrooms;

— toilets;

— showers;

— domestic kitchens;

— prefabricated elements in sanitary areas (e.g. shower cubicles).

Industrial, drinking water, underwater (swimming pools, sewage systems, etc.), food contact applications and sealing of glass-ceramic cooktop panels (stove tops, ceramic hobs) are excluded from the scope.

This European Standard does not provide criteria or recommendations for the design of joints and installation of sealants in sanitary applications.

NOTE Provisions on assessment and verification of constancy of performance - AVCP (i.e. Product type determination and Factory Production Control) and marking of these products are given in EN 15651–5.

This European Standard does not apply to non-structural sealants in any of non-paste form, to those used in sanitary joints and to oil-based mastics.

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 13238, *Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 15651-5:2017, *Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 5: Evaluation of conformity and marking*

EN ISO 846:1997, *Plastics - Evaluation of the action of microorganisms (ISO 846:1997)*

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

EN ISO 2811-1:2016, *Paints and varnishes - Determination of density - Part 1: Pycnometer method (ISO 2811-1:2016)*

EN ISO 6927, *Buildings and civil engineering works - Sealants - Vocabulary (ISO 6927)*

EN ISO 7390, *Building construction - Jointing products - Determination of resistance to flow of sealants (ISO 7390)*

EN ISO 8340, *Building construction - Sealants - Determination of tensile properties at maintained extension (ISO 8340)*

EN ISO 9047, *Building construction - Jointing products - Determination of adhesion/cohesion properties of sealants at variable temperatures (ISO 9047)*

EN ISO 10563, *Building construction - Sealants - Determination of change in mass and volume (ISO 10563)*

EN ISO 10590, *Building construction - Sealants - Determination of tensile properties of sealants at maintained extension after immersion in water (ISO 10590)*

EN ISO 10591, *Building construction - Sealants - Determination of adhesion/cohesion properties of sealants after immersion in water (ISO 10591)*

EN ISO 11358 (all parts), *Plastics — Thermogravimetry (TG) of polymers — General principles (ISO 11358)*

EN ISO 11600:2003, *Building construction - Jointing products - Classification and requirements for sealants (ISO 11600:2002)*

EN ISO 11925-2, *Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2)*

ISO 13640, *Building construction — Jointing products — Specifications for test substrates*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 6927 and the following apply.

3.1
non-reactive sealant
mainly physical drying mechanism, without significant change in the molecular weight of the main polymer

3.2
reactive sealant
mainly curing by chemical reaction, with significant increase of the molecular weight of the main polymer

3.3
cure
irreversible transformation of a sealant from a liquid or paste-like state into a hardened or rubber-like solid state

3.4
uncured / wet
state of a sealant prior to the above transformation

4 Requirements

4.1 Identification requirements and test methods

4.1.1 Short description of the sealant

The short description of the non-structural sealant for sanitary joints includes: brand name, type (general chemical family), opaque or translucent, waterborne or solvent based or solvent free, reactive or non-reactive, and one or multi-component (e.g. waterborne acrylic opaque and one component, etc.).

The primer shall be stated for the substrate concerned, if relevant (name, chemical type, etc.).

4.1.2 Thermogravimetric test

The test shall be carried out in accordance with EN ISO 11358 on the uncured or wet sealant, between 35 °C and 900 °C, temperature slope 10 °C/min, non-oxidative condition (e.g. nitrogen). A single sample shall be used for this test. A single specimen may be tested and there shall be no significant difference between the reference curve and derivative (profile).

In the case of a multi-component sealant, each component shall be evaluated (if relevant).

4.1.3 Density

4.1.3.1 Principal

A pyknometer is filled with the product under test. The density is calculated from the mass of the product in the pyknometer and the known volume of the pyknometer.

4.1.3.2 Method

A test temperature of (23,0 ± 0,5) °C shall be used and the test sample and pyknometer shall be conditioned to this temperature, and it shall be ensured that the temperature variation does not exceed 0,5 °C during testing.

The determination of the density shall be in accordance with EN ISO 2811-1:2016 using a suitable 50 cm^3 calibrated pyknometer as described in EN ISO 2811-1:2016, 6.1.1. An alternative is the 50 cm^3 Hubbard pyknometer as described in ISO 3507.

Measurements should be carried out on the uncured or wet sealant and in the case of a multi-component sealant, each component shall be evaluated. At least three samples shall be tested. The specific pyknometer used and the mean value, recorded to two decimal places, shall be declared. The tolerance of the declared values shall be within ± 5 %.

4.1.4 Indentation hardness (Shore hardness)

The determination of the indentation hardness shall be in accordance with EN ISO 868. The test shall be performed on the cured or dried sealant.

The exact conditions of the test shall be defined by the manufacturer, i.e. thickness, cure/drying times and temperature and relative humidity, specific Shore type (A, D…), test time, temperature, etc.

At least three samples shall be tested and five measurements taken per sample. The mean value and tolerances of all measurements, recorded to the nearest unit, shall be declared.

4.2 Conditioning, test procedure and substrates

When determining the classification of a sanitary sealant according to the requirements of this standard, the same conditioning procedure shall be used in all the relevant test methods (Method A or Method B conditioning shall be used for all relevant tests).

For each test method, three test specimens for each substrate shall be tested. The same batch of sealant (and primer, if used) shall be used in all tests. The same substrates (material and surface finish) shall be used in all tests.

Substrates to be used in all mechanical tests concerned shall be glass and/or anodised aluminium according to ISO 13640 and/or any substrate used in the sanitary area.

The specific test conditions shall be in accordance with Table 1.

Table 1 — Specific test conditions

	Test method	**Class XS**
Elongation [a]	EN ISO 8340 (Test temperature: (23 ± 2) °C) EN ISO 10590	60 % 60 %
Amplitude	EN ISO 9047 (Test temperature: (70 ± 2) °C and optionally (- 20 ± 2) °C or (0 ± 2) °C)	±20 %
[a] The value of elongation is given as a percentage of the original width: elongation % = [(final width – original width) / (original width)] x 100 %.		

4.3 Performance requirements and test methods for non-structural sealants for sanitary joints

4.3.1 General

Classes of non-structural sealants to be used for sanitary elements are referred to as type “S”. A summary of the characteristics and classes, together with corresponding test methods for these characteristics shall be as given in Table 2.

Table 2 — Summary of classes for non-structural sealants for sanitary joints

Properties	Class of sealants for sanitary joints						Method of test
	XS 1	XS 2	XS 3	S 1	S 2	S 3	
Tensile properties at maintained extension	NF	NF	NF	–	–	–	EN ISO 8340
Adhesion/cohesion properties at variable temperatures	NF	NF	NF	–	–	–	EN ISO 9047
Adhesion/cohesion properties at maintained extension after water immersion	NF	NF	NF	–	–	–	EN ISO 10590
Tensile properties after water immersion Elongation at break (%)	–	–	–	≥ 25	≥ 25	≥ 25	EN ISO 10591
Loss of volume (%)	≤ 20 ≤ 30 [a] ≤ 40 [b]	≤ 20 ≤ 30 [a] ≤ 40 [b]	≤ 20 ≤ 30 [a] ≤ 40 [b]	≤ 55	≤ 55	≤ 55	EN ISO 10563
Resistance to flow (mm)	≤ 3	≤ 3	≤ 3	≤ 5	≤ 5	≤ 5	See 4.3.2.
Microorganisms: Intensity of growth	0 or 1	2	3 to 5	0 or 1	2	3 to 5	See 4.3.3.

[a] For water-based dispersion filled sealants

[b] For clear water-based dispersion sealants

NF = No failure according to EN ISO 11600:2003

4.3.2 Resistance to flow

The resistance to flow shall be measured according to EN ISO 7390, with the precise test method modified according to the following details.

A vertical, anodised aluminium U-profile shall be used with dimensions 20 mm × 10 mm. Testing shall be carried out under two test temperature conditions:

a) temperature of (50 ± 2) °C and relative humidity of (50 ± 10) %;

b) temperature of (5 ± 2) °C.

If the flow exceeds the required value, then the test may be repeated once.

4.3.3 Evaluation of the action of microorganisms

The evaluation of microbiological growth shall be performed according to EN ISO 846:1997, procedure B. A (2 ± 0,5) mm thick foil from the sealant shall be prepared and let cured for four weeks at (23 ± 2) °C and (50 ± 5) % relative humidity. Afterwards specimens with the dimensions (4 ± 0,1) cm x (4 ± 0,1) cm shall be cut from the foil and exposed to one of the following conditions:

— immediate test according to EN ISO 846:1997, procedure B; or

— four weeks storage in deionised water at (23 ± 2) °C.

The volume of water shall be 100 × the volume of the specimens.

The water shall be exchanged once per week.

After storage in water, the specimens shall be conditioned 1 week at (23 ± 2) °C and then tested according to EN ISO 846:1997, 8.2.2.

The results shall be expressed as an average of results of individual specimens rounded to the nearest unit.

4.4 Release of dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE: An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through:

http://ec.europa.eu/enterprise/construction/cpd-ds/

4.5 Reaction to fire

4.5.1 General

Products shall be classified in accordance with EN 13501-1. The appropriate reaction to fire class shall be declared.

4.5.2 Mounting and fixing conditions for test samples

Mounting and fixing conditions for the test samples of the reaction to fire performance shall be as follows for the following reaction to fire classes:

a) Class A2, B, C or D

   Design of specimen:

   1) substrate: calcium silicate panel

b) Class E

   Design of specimen:

   1) substrate: beech wood, mean bulk density about 720 kg/m^3, or calcium silicate panel according to EN 13238

   2) joint dimension: 20 mm x 10 mm x 250 mm (width x depth x length), see Figure 1

   3) conditioning: 28 days at 23 ± 2 °C and 50 ± 5 % relative humidity (according to EN 13238)

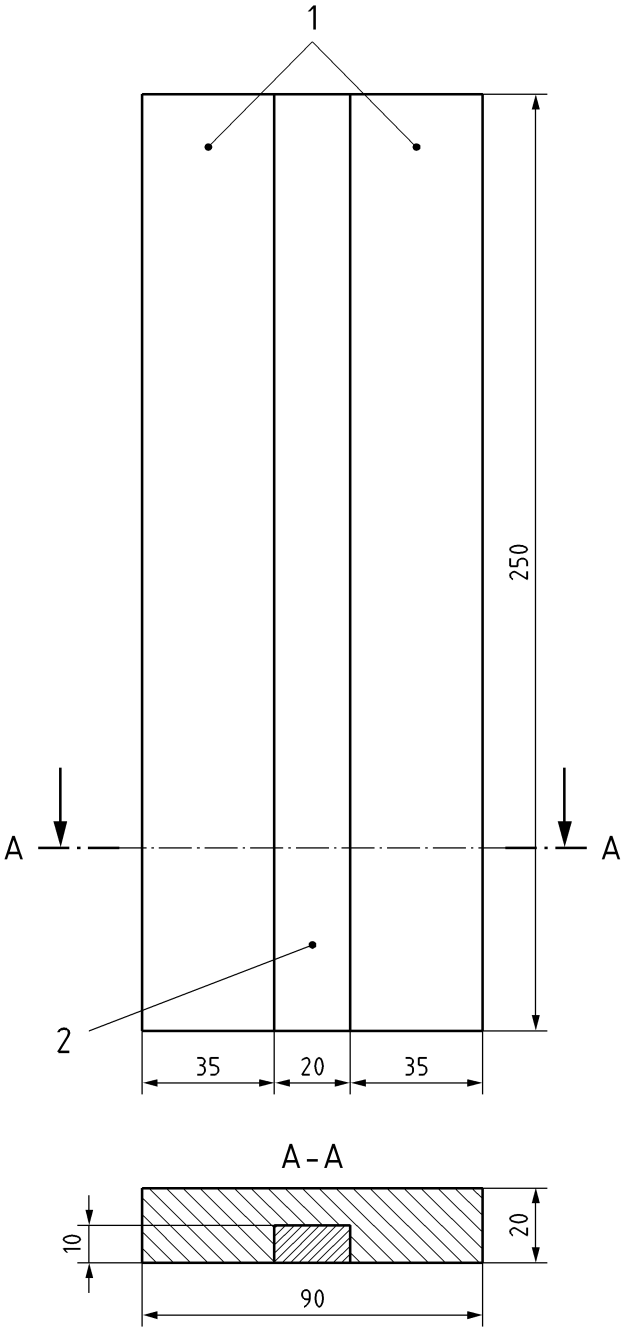
   4) number of specimens: 6 (according to EN ISO 11925-2)

   5) fire test: impingement of flame in centre to the bottom edge (according to EN ISO 11925-2)

The substrates are not standard-substrates according to EN 13238. They serve only to prepare a standardized sample according to EN ISO 11925-2.

Furthermore, the defined joint dimension is not a classification parameter with respect to the dimension of the tested product. If the product meets the test requirements, it should be classified independently from its dimensions.

Dimensions in millimetres



Key

1 substrate

2 sealant

Figure 1 — Test specimen

5 Durability

The durability of a sealed joint is only as good as both the adhesion of the sealant (and primer) to the surfaces forming the joint and also the cohesive stability of the sealant itself. It is important that the sealant has sufficient adhesion and cohesion to survive the mechanical and environmental stresses to which the sealed joint is likely to be exposed.

In service experience indicates that sealants meeting the requirements given in the technical classifications in Table 2 demonstrate the necessary durability if correctly installed using a suitable joint design. Long-term durability of joints based on such sealants is seen when they are selected and applied according to the sealant data sheets, taking into account the expected service conditions on site.

Durability shall be evaluated by selecting the appropriate test depending on the class of sealants given in Table 2:

- Classes “XS”:EN ISO 10590 (Report Failure or No Failure according to test method)

- Classes “S”: EN ISO 10591 (Report elongation at break according to test method)

6 Sampling

General requirements for sampling of the sealant shall be as set out in EN 15651-5.

7 Assessment and verification of constancy of performance

7.1 General

The assessment and verification of constancy of performance (AVCP) needs to be defined by each sealant manufacturer in order to show compliance to the level of performance indicated in the Product type determination.

7.2 Product type determination

General requirements for the product type determination of the sealant shall be as set out in EN 15651-5.

7.3 Factory production control

Requirements for the factory production control shall be in accordance with EN 15651-5.

An example of suitable frequency of identification and performance tests for FPC is given in Annex A. Frequencies may be increased during initial production or following an incident of non-conformity.

Any deviation from this guidance should be justified by documented evidence that demonstrates equivalence.

8 Marking and labelling

Requirements for marking and labelling shall be as set out in EN 15651-5.

Annex A
(informative)

Example on the frequency of tests for factory production control

An example of a suitable frequency of identification and performance tests for factory production control of sealants for sanitary joints is given in Table A.1.

Table A.1 — Example of the frequency of tests for factory production control

One test on the appearance such as colour, homogeneity, etc. One test on the uncured product such as viscosity, density, skin over time, stringiness, extrusion rate, etc. For reactive sealants: one test on the cured sealant such as indentation hardness, adhesion peeling test, tensile properties, etc.	F_A F_A F_B
The following tests mentioned in the Annex ZA: – resistance to flow (4.3.2), – loss of volume (EN ISO 10563), – adhesion/cohesion properties at maintained extension after immersion in water (EN ISO 10590), or – tensile properties after immersion in water (EN ISO 10591).	F_C F_C F_C F_C
F_A - every batch (definition of batch is given in EN 15651–5) F_B - every week F_C - once per year	
All tests shall be carried out on the same batch.	

Annex ZA
(informative)

Relationship of this European Standard with Regulation (EU) No.305/2011

(When applying this standard as a harmonized standard under Regulation (EU) No. 305/2011, manufacturers and Member States are obliged by this regulation to use this Annex)

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under standardization request M/474 "Sealants for non-structural use in joints in buildings and pedestrian walkways" given to CEN and CENELEC by the European Commission (EC) and the European Free Trade Association (EFTA).

When this European standard is cited in the Official Journal of the European Union (OJEU), under Regulation (EU) No 305/2011, it shall be possible to use it as a basis for the establishment of the Declaration of Performance (DoP) and the CE marking, from the date of the beginning of the co-existence period as specified in the OJEU.

Regulation (EU) No 305/2011, as amended, contains provisions for the DoP and the CE marking.

Table ZA.1 — Relevant clauses for non-structural sealants for sanitary joints

Product:	Sealants for joints		
Intended use:	For non-structural use in sanitary areas		
Essential characteristics	**Clauses of this European Standard related to essential characteristics**	**Classes and/or threshold levels**	**Notes**
Reaction to fire	4.5	Class A1 to F	Classified acc. to EN 13501–1 after being tested acc. to relevant test standards given therein
Release of chemicals dangerous to the environment and health	4.4	-	Evaluation
WATER TIGHTNESS and **AIR TIGHTNESS**			
a) Resistance to flow	4.3.1	≤ 5 mm [a] or ≤ 3 mm	Tested acc. to modified EN ISO 7390 and expressed as a declared flow (in mm)
b) Loss of volume	4.3.1	≤ 20 %, ≤ 30 %, ≤ 40 % [a], ≤ 55 % [a]	Tested acc. to EN ISO 10563 and expressed as a declared loss (in %)
c) Tensile properties (i.e. elongation):	4.3.1		
- after immersion in water at (23 °C),	4.3.1	≥ 25 %	Tested acc. to EN ISO 10591 and expressed as a threshold value (in

(Class S) or			%)
- at maintained extension after water immersion (Class XS)	4.3.1	NF	Tested acc. to EN ISO 10590 pass/fail criteria
d) Microbiological growth	4.3.1	0,1, 2, 3, 4 or 5	Tested acc. to EN ISO 846:1997, procedure B and expressed as a declared intensity of growth
Durability	5	-	Declared test results
[a] **These values are introduced to enable CE marking without excluding existing products that are fit for purpose and currently placed on the European market.**			
NOTE Depending on the performance requirements of the joint design, these minimum requirements may not be sufficient. Then, a sealant of higher performance shall be used (see classes in 4.3, Table 2).			

ZA.2 System of Assessment and Verification of Constancy of Performance (AVCP)

The AVPC systems for the non-structural sealants for sanitary joints indicated in Table ZA.1 can be found in the EC legal act adopted by the EC: Decision 2011/19/EU (OJL page L11/49 of 15.1.2011).

Micro-enterprises are allowed to treat products under AVCP system 3 covered by this standard in accordance with AVCP system 4, applying this simplified procedure with its conditions, as foreseen in Article 37 of Regulation (EU) No.305/2011.

ZA.3 Assignment of AVCP tasks

The AVCP of the non-structural sealants for sanitary joints as provided in Table ZA.1 are defined in Tables ZA.3.1 to ZA.3.3 resulting from application of the clauses of this or other European Standards indicated therein. The content of the tasks assigned to the notified body shall be limited to those essential characteristics, if any, as provided for in Annex III of the relevant standardization request and those that the manufacturer intends to declare.

Taking into account the AVCP systems defined for the products and the intended uses the following tasks are to be undertaken by the manufacturer and the notified body respectively for the assessment and verification of the constancy of performance of the product.

Table ZA.3.1 — Assignment of AVCP tasks for the sealants in sanitary joints under system 3 and of Euroclasses A1*, A2*, B*, C* subject to fire regulations under system 1

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	7.3 with link to 5.3 of EN 15651-5:2017
	Further testing of samples taken at the manufacturing plant by the manufacturer in accordance with the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use which are declared	7.3 with link to 5.3 of EN 15651-5:2017
Tasks for a notified laboratory	The notified laboratory shall assess the performance on the basis of testing (based on sampling carried out by the manufacturer), calculation, tabulated values or descriptive documentation of the construction product	Essential characteristics of Table ZA.1 relevant for the intended use except reaction to fire	7.2 with link to 5.2 of EN 15651-5:2017
Tasks for the notified product certification body	An assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product	Reaction to fire	7.2 with link to 5.2 of EN 15651-5:2017
	Initial inspection of manufacturing plant and of FPC	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared, namely reaction to fire Documentation of the FPC.	7.3 with link to 5.3 of EN 15651-5:2017
	Continuing surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared, namely reaction to fire. Documentation of FPC	7.3 with link to 5.3 of EN 15651-5:2017

Table ZA.3.2 — Assignment of AVCP tasks for the sealants in sanitary joints under system 3 and of Euroclasses A1, A2**, B**, C**, D, E subject to fire regulations under system 3**

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	7.3 with link to 5.3 of EN 15651-5:2017
Tasks for a notified laboratory	The notified laboratory shall assess the performance on the basis of testing (based on sampling carried out by the manufacturer), calculation, tabulated values or descriptive documentation of the construction product	Essential characteristics of Table ZA.1 relevant for the intended use which are declared, and as indicated in Annex III of the standardization request	7.2 with link to 5.2 of EN 15651-5:2017

Table ZA.3.3 — Assignment of AVCP tasks for the sealants in sanitary joints under system 3 and of Euroclasses (A1 to E)*, F subject to fire regulations under system 4**

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use	7.3 with link to 5.3 of EN 15651-5:2017
	An assessment of the performance of the construction product on the basis of testing, calculation, tabulated values or descriptive documentation of that product	Reaction to fire	7.2 with link to 5.2 of EN 15651-5:2017
Tasks for a notified laboratory	The notified laboratory shall assess the performance on the basis of testing (based on sampling carried out by the manufacturer), calculation, tabulated values or descriptive documentation of the construction product	Essential characteristics of Table ZA.1 relevant for the intended use which are declared except reaction to fire, and as indicated in Anne III of the standardization request	7.2 with link to 5.2 of EN 15651-5:2017

Bibliography

[1] EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

[2] ISO 3507, *Laboratory glassware — Pyknometers*

[3] EN ISO 8339, *Building construction - Sealants - Determination of tensile properties (Extension to break) (ISO 8339)*

[4] EN ISO 9046, *Building construction - Jointing products - Determination of adhesion/cohesion properties of sealants at constant temperature (ISO 9046)*

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