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Buildings and Civil Engineering Works — Sealants — Classification and requirements for pedestrian walkway sealants

Construction immobilière — - Mastics — Classification et exigences pour les mastics des voies pédestres

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 8, *Sealants*.

Buildings and Civil Engineering Works — Sealants — Classification and requirements for pedestrian walkway sealants

1 Scope

This International Standard applies to sealants used for pedestrian walkways, public areas, movement joints between concrete slabs, areas with pedestrian load, areas which are used with trolleys, parking garages, walkable floors, balconies, terraces, and warehouses.

This International Standard specifies the types and classes of elastic sealants used in building construction pedestrian walkways according to their performance characteristics. Sealant may be either non-sag or self-leveling as declared by the manufacturer. Areas of application are floor joints which have been designed.

Chemical containment, cold applied joint sealants for concrete pavements to be used in roads, airfields, and sewage treatment plants are excluded.

Local regulations may be required in addition to this International Standard based on local laws and codes.

2 Normative reference

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.

ISO 6927, *Buildings and civil engineering works — Sealants — Vocabulary*

ISO 7389, *Building construction — Jointing products — Determination of elastic recovery of sealants*

ISO 8339, *Building construction — Sealants — Determination of tensile properties (Extension to break)*

ISO 8340, *Building construction — Sealants — Determination of tensile properties at maintained extension*

ISO 9047, *Building construction — Jointing products — Determination of adhesion/cohesion properties of sealants at variable temperatures*

ISO 10563, *Building construction — Sealants — Determination of change in mass and volume*

ISO 10590, *Building construction — Sealants — Determination of tensile properties of sealants at maintained extension after immersion in water*

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

ISO 19861, *Buildings and civil engineering works — Sealants — Determination of Curing rate behavior*

ISO 19862, *Buildings and civil engineering works — Sealants — Durability to extension compression cycling under accelerated weathering*

ISO 19863, *Buildings and civil engineering works — Sealants — Determination of tear resistance*

3 Terms and definitions

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

4 Classification

4.1 Classes

Sealants are classified according to their ability to fulfill sealing functions in joints with movement parameters as given in Table 1.

Table 1 — Sealant classes[a]

Class	Test amplitude %
25	±25
20	±20
12,5	±12,5

[a] For the correct interpretation and application of movement capability to the design of joints, relevant national standards and advisory documents should be considered.

4.2 Subclasses

4.2.1 Sealants of class 25 and 20 are additionally sub-classified according to their secant tensile modulus.

Low modulus: code LM.

High modulus: code HM.

If the measured secant tensile modulus value at 100% strain exceeds the values specified below for either or both temperatures, the sealant shall be classified as high modulus. Specified values (see Table 2 and Table 3) are as follows:

0,4 N/mm^2 at + 23 °C (1)

0,6 N/mm^2 at – 20 °C (2)

The secant modulus shall be the mean value of the three measured values. Round the mean value to one decimal place.

EXAMPLE Measured values: 0,43 N/mm^2, 0,40 N/mm^2, and 0,46 N/mm^2. Mean value: 0,43 N/mm^2. Reported value: 0,4 N/mm^2.

4.2.2 Sealants are additionally sub-classified according to the applicability for use in exterior or interior applications.

Exterior applications: code EXT XX (XX represents the number of movement cycles exhibiting no failure in a mechanical cycling during weathering).

Interior applications: code INT.

INT classified sealants are suitable for interior use only. EXT classified sealants are suitable for use in both interior and exterior applications.

Interior class sealants are intended to be in conditioned spaces without direct UV exposure.

4.2.3 Sealants of class 12.5 are classified according to their elastic recovery: elastic recovery equal to or more than 40% Code E (elastic); elastic recovery less than 40%: the sealant is not recognized by this standard.

5 Requirements and test methods for interior and exterior sealants

The requirements and test methods are as specified in Table 2 and Table 3 for type interior and type exterior sealants. If a sealant is classified as an exterior sealant, it is also classified as an interior sealant.

Table 2 — Requirements for interior sealants for pedestrian walkways

Properties	Class					Test method
	25LM	25HM	20LM	20HM	12,5E	
Elastic recovery (%)	≥70	≥70	≥60	≥60	≥40	ISO 7389
Tensile properties, secant tensile modulus at +23 °C (N/mm^2)	≤0,4	>0,4	≤0,4	>0,4	report	ISO 8339
Tensile properties at maintained extension at 23 °C	nf[a]	nf	nf	nf	nf	ISO 8340
Adhesion cohesion properties at constant temperature	nf	nf	nf	nf	nf	ISO 9047[b]
Tear resistance at 23 °C	Less than 6 mm	Less than 6 mm	Less than 6 mm	Less than 6 mm	Less than 6 mm	ISO 19863
Loss of volume (%)	≤10	≤10	≤10	≤10	≤10	ISO 10563
Cure rate behaviour	Record	Record	Record	Record	Record	ISO 19861

[a] nf = no failure as defined in Clause 7.

[b] Tested at 23 °C.

Table 3 — Requirements for exterior sealants for pedestrian walkways

Properties	Class					Test method
	25LM	25HM	20LM	20HM	12,5E	
Elastic recovery (%)	≥70	≥70	≥60	≥60	≥40	ISO 7389
Tensile properties, secant tensile modulus at + 23 °C (N/mm^2) and -20 °C (N/mm^2)	≤0,4 and ≤0,6	>0,4 or >0,6	≤0,4 and ≤0,6	>0,4 or >0,6	report	ISO 8339
Tensile properties at maintained extension at 23 °C and -20 °C	nf[a]	nf	nf	nf	nf	ISO 8340
Tear Resistance at 23 °C	Less than 6 mm	Less than 6 mm	Less than 6 mm	Less than 6 mm	Less than 6 mm	ISO 19863
Loss of volume (%)	≤10	≤10	≤10	≤10	≤10	ISO 10563
Cure rate behaviour	record	Record	Record	Record	Record	ISO 19861
Adhesion and cohesion properties at variable temperatures	nf	nf	nf	nf	nf	ISO 9047
Durability to extension compression cycling under accelerated weathering	Class based on nf	Class based on nf	Class based on nf	Class based on nf	Class based on nf	ISO 19862
Adhesion/cohesion properties at maintained extension after water immersion for 28 days.	nf	nf	nf	nf	nf	ISO 10590[b]

[a] nf = no failure as defined in Clause 7.

[b] See ISO 10590, Annex A. Water immersion can be replaced by salt water immersion (10%).

Table 4 — Specific test conditions for interior and exterior sealants

Properties	Class					Test method
	25HM	25LM	20HM	20LM	12,5	
Elongation[a]	100%	100%	60%	60%	60%	ISO 7839 ISO 8339 ISO 8340 ISO 10590
Amplitude	±25%	±25%	±20%	±20%	±12,5%	ISO 9047
Tear resistance	50%	50%	40%	40%	25%	ISO 19863
[a] The value of elongation is given as a percentage of the original width.						

6 Conditioning, test procedure and substrates

When determining the classification of a sealant according to the requirements of this International Standard, the same conditioning procedure (cure) shall be used in all the relevant test methods (use only method A or method B) for which details are given in the test methods and also noted in 6.1 and 6.2.

For each test method, three test specimens for each substrate shall be tested (see also Clause 7). The same batch of sealant (and primer, if used) shall be used in all tests. The same mortar substrates, M1 or M2, shall be used in all tests and as defined in ISO 13640.

It should be noted that project specific testing for plazas and walkways that intend to use this criteria to determine the suitability for elastic sealants on natural stone substrates shall also include ISO 16938-1 and ISO 16938-2 to determine if a staining potential exists.

Testing is carried out on mortar, M1 or M2, according to ISO 13640 and primers are allowed and reported if used.

NOTE Other substrates can be used if agreed amongst the parties involved.

6.1 Method A

The test specimens shall be conditioned for 28 days at (23 ± 2) °C and (50 ± 10) % relative humidity.

6.2 Method B

The test specimens shall be conditioned according to method A and shall then be subjected three times to the following storage cycle:

a) three days in the oven at (70 ± 2) °C;

b) one day in distilled water at (23 ± 2) °C;

c) two days in the oven at (70 ± 2) °C;

d) one day in distilled water at (23 ± 2) °C.

Alternatively, this cycle may be carried out in the order c), d), a), and b).

After conditioning according to method B, the test specimens shall be stored for 24 h at (23 ± 2) °C and (50 ± 10) % relative humidity before testing.

NOTE Method B is a normal conditioning procedure using the influence of heat and water. It is not suitable for giving information on the durability of the sealant.

7 Definition of failure

7.1 General

After preparation, the sealant test specimens shall be examined for defects. Any test specimens deemed unsuitable for testing shall be rejected. After testing, the sealant test specimens shall be examined for evidence of loss of adhesion or cohesion. Wherever it is observed, the depth of adhesion loss and/or cohesion loss shall be measured using a suitable measuring device capable of reading to 0.5mm. The highest observed value of the depth of either shall be recorded and used to determine a pass or failure.

Due to the excessive stress experienced by the sealant near the ends of the test specimens during both the preparation and testing, loss of adhesion or cohesion observed within the excluded volume at either or both ends of the sealant shall not be reported as a failure (see ISO 11600, Figure 2).

Each test shall be carried out in triplicate. In any test method, if two or more of the test specimens fail, then the sealant shall be reported as failing the test. If only one of the test specimens fails, then the complete test shall be repeated. If one of the three repeat test specimens fails, then the sealant has failed the test.

7.2 Additional note on failure

Reference test methods are as given in ISO 8340, ISO 9047, and ISO 10590. If loss of adhesion or cohesion in the depth of the sealant exceeds 2 mm anywhere on the sealant surface, then the sealant test specimen has failed (see ISO 11600, Figure 2).

7.3 Durability specimens

Specimens shall be considered failed in the durability test when visible light is able to be observed through the sealant specimen assembly when the specimen is in its extended state.

8 Designation

In the case of conformity with this International Standard, the sealants shall be designated by the symbols for the type, class, and the subclass in accordance with the following format:

ISO 11618 - TYPE - CLASS – SUBCLASS

The packages shall be marked with the appropriate designation of the sealant tested for which the holder of the test report takes responsibility. The substrates used in the tests and the primers used shall be shown on the package using the following abbreviations: mortar [M1 or M2 (A) and primed (p) or unprimed (up)]. A full description of the test substrates may optionally be given on the package, but shall be given in the technical data sheet.

EXAMPLE 1 A sealant having a movement capability of 25 %, a modulus greater than 0,4 MPa at 100% strain, (HM) tested on primed mortar type, M1, and passed six cycles of durability for exterior applications can be described as follows:

ISO 11618 - 25HM –EXT 6 - M1p –

EXAMPLE 2 A sealant having a movement capability of 20 % and a modulus less than 0,4 MPa at 100% strain, (LM) tested on unprimed mortar, M2, and intended for interior applications can be described as follows:

ISO 11618 - 20LM - INT – M2up

EXAMPLE 3 A sealant having a movement capability of 25 % and a modulus less than 0,4 MPa at 100% strain (LM) tested on unprimed mortar, M1, and passed 10 cycles of durability for exterior applications can be described as follows:

ISO 11618 - 25LM – EXT 10 – M1up