



SLOVENSKI STANDARD

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Tesnilne mase za nekonstrukcijske stike v stavbah in na sprehajalnih površinah - 4. del: Tesnilne mase za sprehajalne površine

Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 4:
Sealants for pedestrian walkways

Fugendichtstoffe für nicht tragende Anwendungen in Gebäuden und Fußgängerwegen -
Teil 4: Fugendichtstoffe für Fußgängerwege

Mastics pour joints pour des usages non structuraux dans les constructions immobilières
et pour chemins piétonniers - Partie 4: Mastics pour chemins piétonniers

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English Version

Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 4: Sealants for pedestrian walkways

Mastics pour joints pour des usages non structuraux dans les constructions immobilières et pour chemins piétonniers
- Partie 4: Mastics pour chemins piétonniers

Fugendichtstoffe für nicht tragende Anwendungen in Gebäuden und Fußgängerwegen - Teil 4: Fugendichtstoffe für Fußgängerwege

This European Standard was approved by CEN on 10 August 2012.

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EN 15651-4:2012 (E)**Foreword**

This document (EN 15651-4:2012) has been prepared by Technical Committee CEN/TC 349 “Sealants for joints in building construction”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by March 2013, and conflicting national standards shall be withdrawn at the latest by June 2014.

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 supersedes EN 15651-4:2010.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Construction Products Directive (89/106/EC).

For relationship with EU Directive(s), 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,*
- *Part 4: Sealants for pedestrian walkways* (this document),
- *Part 5: Evaluation of conformity and marking.*

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

- an Annex ZA has been added;
- the clause on reaction to fire was improved.

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

1 Scope

This European Standard specifies definitions and requirements for cold applied non-structural elastic sealants used for movement joints in floors in building construction for interior and exterior use.

Areas of application are: floor joints designed for pedestrian walkways, public areas, movement joints between concrete slabs, areas with pedestrian load, areas used with trolleys, walkable floors, balconies, terraces, warehouses.

NOTE Provisions on evaluation of conformity (i.e. Initial Type Testing and Factory Production Control) and marking of these products are given in EN 15651-5.

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

This European Standard does not apply to non-structural sealants in any of non-paste form, to those used in pedestrian walkways.

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 13501-1:2007+A1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 14187-3, *Cold applied joint sealants — Part 3: Test method for the determination of self-levelling properties*

EN 15651-5:2012, *Sealants for non-structural use in joints in buildings and pedestrian walkways — Part 5: Evaluation of conformity and marking*

EN ISO 291, *Plastics — Standard atmospheres for conditioning and testing (ISO 291)*

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

EN ISO 1183-1:2004, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1:2004)*

EN ISO 6927:2012, *Buildings and civil engineering works — Sealants — Vocabulary (ISO 6927:2012)*

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

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

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

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

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

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

EN ISO 11431, *Building construction — Jointing products — Determination of adhesion/cohesion properties of sealants after exposure to heat, water and artificial light through glass (ISO 11431)*

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

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For the purposes of this document, the terms and definitions given in EN ISO 6927:2012 and the following apply.

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

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

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

4 Requirements**4.1 Identification requirements****4.1.1 Short description of the sealant**

The short description of the non-structural sealant for pedestrian walkways shall include brand name, type (general, chemical, family, one or multi-component e.g. one component Polyurethane sealant in different colours, 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 Specific Gravity

The determination of the specific gravity shall be in accordance with EN ISO 1183-1:2004, on the uncured or wet sealant, using Method A or Method B, depending on the type of sealant under test. The testing temperature shall be (23 ± 2) °C. At least three samples shall be tested. The method used and the mean value, recorded to two decimal places, shall be declared. The tolerance of the declared values shall be within ± 5 %.

In the case of a multi-component sealant, each component shall be evaluated.

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 sealant.

The exact conditions of 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

4.2.1 General

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

4.2.2 Classification

4.2.2.1 General

Classes for cold applied elastic sealants for movement joints in floors in building construction are referred to as type:

- PW (= pedestrian walkways);
- EXT (= exterior application) and INT (= interior application);
- CC (= cold climate).

4.2.2.2 Classification according to the movement capability

According to their movement capability, sealants are subdivided into different classes as given in Table 1.

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Table 1 — Sealant classes

Class	Elongation %	Test amplitude %	Movement capability % ^a
25	100	± 25	25,0
20	100	± 20	20,0
12,5	60	± 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.

4.2.2.3 Classification according to the secant tensile modulus

Sealants of class 25 and class 20 are additionally sub-classified according to their secant tensile modulus (see EN ISO 6927 and EN ISO 11600):

- low modulus: code LM;
- high modulus: code HM.

If the evaluated secant tensile modulus value exceeds the values specified below for either or both temperatures, the sealant shall be classified as high modulus. Specified values (see Tables 2 and 3, second column) are as follows:

- 0,4 N/mm² at + 23 °C;
- 0,6 N/mm² at - 20 °C.

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

Substrates to be used in all mechanical tests concerned are; mortar M1 or M2 according to ISO 13640 and/or other substrates.

4.3 Performance requirements and test methods for non-structural sealants for pedestrian walkways

4.3.1 General

The requirements and test methods are specified in Table 2.

Table 2 — Summary of characteristics required and classes for sealants in pedestrian walkways

Properties	Class					Test method
	25 LM	25 HM	20 LM	20 HM	12,5 E	
Elastic recovery (%)	≥ 70	≥ 70	≥ 60	≥ 60	≥ 40	EN ISO 7389
Tensile properties secant modulus at (23 ± 2) °C (MPa) at (- 20 ± 2) °C (Mpa)	≤ 0,4 and ≤ 0,6	> 0,4 or > 0,6	≤ 0,4 and ≤ 0,6	> 0,4 or > 0,6		EN ISO 8339
Tensile properties at maintained extension	NF	NF	NF	NF	NF	EN ISO 8340
Adhesion/cohesion properties at variable temperatures	NF	NF	NF	NF	NF	EN ISO 9047
Adhesion/cohesion properties at maintained extension after water immersion	NF	NF	NF	NF	NF	EN ISO 10590
Loss of volume non sagging sealant (%)	≤ 10 %	≤ 10 %	≤ 10 %	≤ 10 %	≤ 15 %	EN ISO 10563
Loss of volume self levelling sealants (%)	≤ 10 %	≤ 10 %	≤ 10 %	≤ 10 %	≤ 15 %	Adapted EN ISO 10563 See Annex B
Resistance to flow for non sagging sealants (mm)	≤ 3	≤ 3	≤ 3	≤ 3	≤ 5	EN ISO 7390
Sealants with self- levelling properties	declared value	declared value	declared value	declared value	declared value	EN 14187-3
Tear resistance	NF	NF	NF	NF	NF	EN ISO 8340 Modified, see 4.3.5

NF = No Failure

NOTE Use the U-profile made from anodised aluminium with a nominal width of and a nominal depth of 20 mm and nominal depth of 10 mm. Apply test temperatures of (50 ± 2) and (5 ± 2) °C. Test to procedure A and procedure B. If the flow exceeds the required value, the test may be repeated once.

4.3.2 Sealants in pedestrian walkways used in cold climates

4.3.2.1 General

This test has been developed to demonstrate that elastic sealants for exterior use perform well at lower temperatures than those currently tested at in EN ISO 11600 (e.g. common winter temperatures in Northern Europe). The specific intention is to ensure that the sealant continues to perform at - 30 °C, which is a common winter temperature in cold climate areas.

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In addition to the requirements given in Table 2, elastic non-structural for sealants in pedestrian walkways required to maintain performance in cold climates ($-30\text{ }^{\circ}\text{C}$) shall fulfil the requirements given in Table 3.

The classification of the sealant given in Table 2 shall be determined prior to this optional additional test and the corresponding test amplitude shall be applied to this additional test.

The designation CC (cold climate) shall be declared for any sealant meeting the requirements of Table 2. For example, Type PW Class 25LM CC.

Anodised aluminium and/or mortar M1 or M2 substrates, according to ISO 13640, shall be used.

4.3.2.2 Tensile properties - Secant modulus to EN ISO 8339 - test procedure at $(-30 \pm 2)\text{ }^{\circ}\text{C}$

The test specimens shall be stored at $(-30 \pm 2)\text{ }^{\circ}\text{C}$ for at least 4 h before the start of the test. The spacers for the preparation of the test specimens shall be removed and the test specimen placed in the tensile test machine and extended at $(-30 \pm 2)\text{ }^{\circ}\text{C}$ at a rate of $(5,5 \pm 0,7)\text{ mm/min}$ until rupture occurs. The force/extension diagram shall be recorded.

4.3.2.3 Tensile properties at maintained extension to EN ISO 8340 - test procedure at $(-30 \pm 2)\text{ }^{\circ}\text{C}$

The test specimens shall be stored at $(-30 \pm 2)\text{ }^{\circ}\text{C}$ for at least 4 h before the start of the test. The spacers for the preparation of the test specimens shall be removed and the test specimens placed in the tensile test machine at $(-30 \pm 2)\text{ }^{\circ}\text{C}$ and extended at a rate of $(5,5 \pm 0,7)\text{ mm/min}$ by 60 % or 100 % of the original width (to 19,2 mm and 24 mm respectively). The separators shall be used to maintain the elongation at $(-30 \pm 2)\text{ }^{\circ}\text{C}$ for 24 h. The test specimens shall be brought to $(23 \pm 2)\text{ }^{\circ}\text{C}$. The depth of any loss of adhesion or cohesion shall be measured using a suitable measuring device capable of reading to 0,5 mm.

4.3.2.4

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Table 3 — Requirements to be suitable for use in cold climate areas

Characteristics		Classes of sealants in pedestrian walkways used in cold climates					Test method
		25LM	25HM	20LM	20HM	12,5E	
Tensile properties: - Secant modulus	MPa	$\leq 0,9$	NR ^a	$\leq 0,9$	NR ^a	NR ^a	4.3.2.2
Tensile properties at maintained extension	-	NF ^b	NF ^b	NF ^b	NF ^b	NF ^b	4.3.2.3
^a NR = Not required. ^b NF = No failure according to EN ISO 11600.							

4.3.2.5 Resistance to flow for non-sagging sealants

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:

- temperature of $(50 \pm 2)\text{ }^{\circ}\text{C}$ and relative humidity of $(50 \pm 10)\text{ }%$;
- temperature of $(5 \pm 2)\text{ }^{\circ}\text{C}$.

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