
Polnilne in tesnilne mase za stike – 2. del: Specifikacije za tesnilne mase, ki se vgrajujejo po hladnem postopku

Joint fillers and sealants - Part 2: Specifications for cold applied sealants

Fugeneinlagen und Fugenmassen - Teil 2: Anforderungen an kalt verarbeitbare Fugenmassen

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Produits d'obturation et de scellement de joints - Partie 2 : Spécifications pour produits de scellement appliqués a froid

SIST EN 14188-2:2005

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Joint fillers and sealants - Part 2: Specifications for cold applied sealants

Produits d'obturation et de scellement de joints - Partie 2 :
Spécifications pour produits de scellement appliqués à froid

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an kalt verarbeitbare Fugenmassen

This European Standard was approved by CEN on 4 November 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 14188-2:2004) has been prepared by Technical Committee CEN/TC 227 "Road materials", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

This document is one of a series of standards as listed below.

EN 14188-1, *Joint fillers and sealants — Part 1: Specifications for hot applied sealants.*

EN 14188-2, *Joint fillers and sealants — Part 2: Specifications for cold applied sealants.*

prEN 14188-3, *Joint fillers and sealants — Part 3: Specifications for preformed joint seals.*

This document includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EN 14188-2:2004 (E)**1 Scope**

This document specifies the requirements for cold applied normal and fuel resistant joint sealants for concrete pavements to be used in roads, parking decks, bridge decks, airfields and other trafficked areas.

This document does not cover the use in gasoline stations, jet fuel stations on airfields and the chemical industry.

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.

EN 14187-1, *Cold applied joint sealants — Part 1: Test method for the determination of rate of cure.*

EN 14187-2, *Cold applied joint sealants — Part 2: Test method for the determination of tack free time.*

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

EN 14187-4, *Cold applied joint sealants — Part 4: Test method for the determination of the change in mass and volume after immersion in test fuels.*

EN 14187-5, *Cold applied joint sealants — Part 5: Test method for the determination of the resistance to hydrolysis.*

EN 14187-6, *Cold applied joint sealants — Part 6: Test method for the determination of the adhesion/cohesion properties after immersion in chemicals liquids.*

EN 14187-7, *Cold applied joint sealants — Part 7: Test method for the determination of the resistance to flame.*

EN 14187-8, *Cold applied joint sealants — Part 8: Test method for the determination of the artificial weathering by UV-irradiation.*

prEN 14187-9, *Cold applied joint sealants — Test methods — Part 9: Function testing of joint sealants.*

EN 26927:1990, *Building construction - Jointing products - Sealants - Vocabulary (ISO 6927:1981).*

EN 28340:1990, *Building construction - Jointing products - Sealants - Determination of tensile properties at maintained extension (ISO 8340:1984).*

EN 28394, *Building construction - Jointing products - Determination of extrudability of one-component sealants (ISO 8394:1988).*

EN 29048, *Building construction — Jointing products — Determination of extrudability of sealants using standardized apparatus (ISO 9048:1987).*

EN ISO 7389, *Building construction - Jointing products - Determination of elastic recovery of sealants (ISO 7389:2002).*

EN ISO 7390:2003, *Building construction - Jointing products - Determination of resistance to flow of sealants (ISO 7390:2003).*

EN ISO 9001, *Quality management systems — Requirements (ISO 9001:2000).*

EN ISO 9047, *Building construction — Jointing products — Determination of adhesion/cohesion properties of sealants at variable temperatures (ISO 9047:2001)*.

EN ISO 10563, *Building construction — Sealants for joints — Determination of change in mass and volume (ISO 10563:1991)*.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 26927:1990 and the following apply.

3.1

manufacturer's limiting value MLV

manufacturer's stated minimum or maximum value to be met during testing according to the requirements of this document

3.2

manufacturer's declared value MDV

value declared by the manufacturer accompanied by a declared tolerance

3.3

cold climate area

areas in which the temperature can go below $-25\text{ }^{\circ}\text{C}$ and the opening of the joint can exceed 35 %

4 Classification and specification

4.1 Cold applied sealant

According to the field of their application, cold applied joint sealants for joints in concrete pavements have to fulfil different requirements.

Depending on their chemical base and their compositions sealants are available as single or multi-component systems. To make identification easy they shall be designated by the following symbols:

Table 1 — Systems of cold applied joint sealants

Material	System
Single component system	S
Multi components system	M

Table 2 — Types of cold applied joint sealants

Material	Type
Self levelling type	sl
Non sag type	ns

Table 3 — Classes of cold applied joint sealants

Material	Class
No requirements of chemical resistance	A
Used in contact with jet fuel and de-icing chemicals	B
Used in contact with gasoline, diesel and de-icing chemicals	C
Liquid chemicals as required	D

4.2 Primer

Where a primer is recommended by the manufacturer of the joint sealant, the manufacturer's directions for its use shall be followed. Where a primer is part of the system recommended by the manufacturer, then specimens prepared for the appropriate performance tests shall include a primer.

The manufacturer shall always specify whether a primer is required or not.

5 Requirements

5.1 General

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For testing a cold applied sealant, the uniform method of conditioning (EN 28340:1990, Method B) shall be applied for test procedures where this conditioning method is stipulated by choice.

A test specimen shall fail if, after the test extension, the sum of adhesive and cohesive failures exceeds 5 %. Test specimens, which pass the first extension, shall fail in subsequent extensions if the sum of additional adhesive or cohesive failures exceeds 10 %.

If one of the three test specimens fails, the test shall be repeated once. If more than one test specimens fail, the sample shall be reported as failing the test.

The manufacturer shall provide installation recommendations. Advice is provided in Annex C.

5.2 Extrudability

5.2.1 Single component sealants

The extrudability of single component sealants, Type ns, shall be determined in accordance with EN 28394 and the result shall conform to the relevant value given in Table 4, line 1.1.

The quantity of extruded material shall be determined using an orifice of $(5,0 \pm 0,3)$ mm.

5.2.2 Multicomponent sealants

The extrudability of multicomponent sealants, Type ns, shall be determined at (23 ± 2) °C in accordance with EN 29048 and the result shall conform to the relevant value given in Table 4, line 1.2.

5.3 Rate of cure

The rate of cure shall be determined in accordance with EN 14187-1 to measure the time to reach 80 % of rate of cure. The manufacturer shall declare the rate of cure and the result shall conform to the relevant value given in Table 4, line 2.

5.4 Tack free time

The tack free time shall be determined in accordance with EN 14187-2. The manufacturer shall declare the tack free time and the result shall conform to the relevant value given in Table 4, line 3.

5.5 Self levelling properties

The self levelling properties of cold applied sealants, Type sl, shall be determined in accordance with EN 14187-3. The manufacturer shall declare the self levelling properties and the result shall conform to the relevant value given in Table 4, line 4.

5.6 Resistance to flow

The resistance to flow of cold applied sealants, Type ns, shall be determined in accordance with EN ISO 7390 and the result shall conform to the relevant value given in Table 4, line 5.

The following test conditions shall be applied:

- U-profile with a nominal width of 20 mm and a nominal depth of 10 mm;
- test temperatures of (50 ± 2) °C and (5 ± 2) °C.

5.7 Loss of volume

The loss of volume shall be determined in accordance with EN ISO 10563 and the result shall conform to the relevant value given in Table 4, line 6.

The following test conditions shall be applied:

- Test procedure C: $(24,0 \pm 0,5)$ h at (23 ± 2) °C and (50 ± 5) % relative humidity, followed by procedure B: 7 days at (70 ± 2) °C.

5.8 Change in mass and volume after immersion in liquid chemicals

The change in mass and volume after immersion in liquid chemicals shall be determined in accordance with EN 14187-4 and the result shall conform to the relevant value given in Table 4, line 7, after a storage time in liquid chemicals of $(72 \pm 0,5)$ h at (23 ± 2) °C using the following test fuels:

- class A: no test;
- class B: test fuel I and de-icing chemicals;
- class C: test fuel II and de-icing chemicals;
- class D: liquid chemical as required.

5.9 Resistance to hydrolysis

The resistance to hydrolysis shall be determined in accordance with EN 14187-5 and the result shall conform to the relevant value given in Table 4, line 8.

The following test conditions shall be applied:

- 14 days at (70 ± 2) °C and (95 ± 5) % relative humidity.

EN 14188-2:2004 (E)**5.10 Cohesion**

The cohesion properties at maintained extension shall be determined in accordance with EN ISO 9047 and the result shall conform to the relevant value given in Table 4, line 10.1.

The following test conditions shall be applied:

- The total test procedure includes 10 cycles of extension at (-20 ± 1) °C and compression at (50 ± 1) °C.
- After completion of the test the test specimens are extended at (-20 ± 1) °C for (100 ± 2) % of the original width and kept for $(24,0 \pm 0,5)$ h at this extension using the spacers.
- Any failures in adhesion or cohesion are recorded.

For cold climate areas:

- The cohesion properties shall be determined in accordance with prEN 14187-9 and the results shall conform to the relevant values in Table 4, line 10.2.

5.11 Bonding strength

The bonding strength shall be determined in accordance with EN 28340 and the results shall conform to the relevant values given in Table 4, line 11. The applied extension shall be (100 ± 2) %.

5.12 Adhesion/cohesion properties at maintained extension after immersion in liquid chemicals

The adhesion/cohesion properties at maintained extension after immersion in liquid chemicals shall be determined in accordance with EN 14187-6 and the results shall conform to the relevant values in Table 4, line 14.

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The following test conditions shall be applied:

Storage time of $(72,0 \pm 0,5)$ h at (23 ± 2) °C using the following test liquids:

- class A: no test;
- class B: test fuel I and de-icing chemicals;
- class C: test fuel II and de-icing chemicals;
- class D: liquid chemical as required.

5.13 Resistance to UV-ageing

The resistance to UV-ageing shall be determined in accordance with EN 14187-8 and the result shall conform to the relevant value given in Table 4, line 13.

5.14 Elastic recovery

The elastic recovery shall be determined in accordance with EN ISO 7389 and the result shall conform to the relevant value given in Table 4, line 12. The applied extension shall be (100 ± 2) %.

5.15 Resistance to flame

The resistance to flame shall be determined in accordance with EN 14187-7 and the result shall conform to the relevant value given in Table 4, line 9.

5.16 Dangerous substances

The manufacturer shall ensure that there are no emissions of any substances hazardous to health or the environment in excess of the legally permitted level in the member state of destination.

Table 4 — Requirements and test methods for cold applied joint sealants

Column	1	2	3
Line	Properties	Test method	Requirements
Application properties			
1	Extrudability		
1.1	1-component sealants	EN 28394	≥70 ml/min
1.2	2-component sealants	EN 29048	≥70 ml/min
2	Rate of cure	EN 14187-1	declared value
3	Tack free time	EN 14187-2	declared value
4	Self levelling properties, Type sl	EN 14187-3	declared value
5	Resistance to flow, Type ns	EN ISO 7390	vertical slope ≤2 mm horizontal slope ≤2 mm
Material properties			
6	Loss of volume	EN ISO 10563	≤5 % by volume
7	Change in mass and volume after immersion in liquid chemicals	EN 14187-4 class B, class C, class D	≤ - 25 % by mass, no increase ≤ ± 30 % by volume
8	Resistance to hydrolysis	EN 14187-5	change of hardness Shore A ≤ ± 50 %
9	Resistance to flame	EN 14187-7	no flow, cracking, flaking, hardening, ignition
Functional properties			
10.1	Cohesion	EN ISO 9047	no failure at - 20 °C ≤0,6 MPa
10.2	Cohesion (for cold climate areas)	prEN 14187-9	no failure at - 30 °C ≤1,0 MPa
11	Bonding strength	EN 28340	tensile modulus at 100 % extension at 23 °C ≥0,15 MPa at - 20 °C ≤0,6 MPa
12	Elastic recovery	EN ISO 7389	≥ 70 %
13	Artificial weathering by UV irradiation	EN 14187-8	change of tensile modulus at 100 % extension ≤ ± 20 %
14	Adhesion/cohesion properties after immersion in liquid chemicals	EN 14187-6 class B, class C, class D	no failure

NOTE Sealants of all classes, which fulfil the requirements of Table 4, would have a total movement capability of, at least 25 %.