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**Polnilne in tesnilne mase za stike – 3. del: Specifikacije za elastomerne tesnilne profile**

Joint fillers and sealants - Part 3: Specifications for preformed joint seals

Fugeneinlagen und Fugenmassen - Teil 3: Anforderungen an elastomere Fugenprofile

Produits de scellement de joints - Partie 3 : Spécifications pour les joints d'étanchéité moulés

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EUROPEAN STANDARD  
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**EN 14188-3**

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## Joint fillers and sealants - Part 3: Specifications for preformed joint seals

Produits de scellement de joints - Partie 3 : Spécifications pour les joints d'étanchéité moulés

Fugeneinlagen und Fugenmassen - Teil 3: Anforderungen an elastomere Fugenprofile

This European Standard was approved by CEN on 12 October 2005.

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.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## EN 14188-3:2006 (E)

## Foreword

This European Standard (EN 14188-3:2006) 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 July 2006, and conflicting national standards shall be withdrawn at the latest by September 2007.

This European Standard 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 Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this European Standard.

This European Standard 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 joint sealants.*

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

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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## 1 Scope

This European Standard specifies requirements for preformed joint seals made of vulcanised rubber for concrete pavements.

General requirements for finished joint seals are also given. This European Standard is applicable to joint seals for joints in new concrete pavements and maintenance work in concrete highways.

## 2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14840, *Joint fillers and sealants — Test methods for preformed joint seals*

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

ISO 48, *Rubber, vulcanised or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 3302-1, *Rubber — Tolerances for products — Part 1: Dimensional tolerances*

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## 3 Terms and definitions (standards.iteh.ai)

For the purposes of this European Standard, the following terms and definitions apply.

### 3.1 joint

vertical discontinuity between the adjacent faces of slabs in the concrete layer of a pavement, formed for the purpose of providing some movement capability

### 3.2 joint chamber

cut into the upper part of the joint to offer a seating for the preformed joint seals. The width of the chamber depends on the movement capability of the preformed joint seals. The bottom of the chamber supports the preformed joint seals to withstand vertical forces by traffic

### 3.3 preformed joint seals

extruded (preformed) and vulcanised elastic rubber profile that, when inserted by special machines into the joint chamber, seals the joint by compression reaction to appropriate surfaces within the joint chamber to fill the joint and to prevent ingress of water

NOTE The behaviour of a preformed joint seals is mainly influenced by the elastomer. In this application mainly the following elastomers are used:

- EPDM rubber: Ethylen-Propylen-Dien-Monomer rubber,
- CR rubber: Chloroprene Rubber.

**EN 14188-3:2006 (E)****3.4****rubber hardness degree**

reaction forces of compressed preformed joint seals depend on geometry and rubber hardness of preformed joint seals. Hardness is measured in IRHD. IRHD is the international rubber hardness degree in accordance with ISO 48

NOTE The higher the hardness degree, the higher is the reaction force. The softer the hardness degree is, the better is the ability for the lips of the rubber profile to lean tight to surface roughness of the cut joint chamber.

**3.5****manufacturer's limiting value MLV**

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

**3.6****manufacturer's declared value MDV**

value declared by the manufacturer accompanied by a declared tolerance

**3.7****cold climate area**

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

**4 Classification**

Table 1 specifies five hardness classes of materials for preformed joint seals.

Table 1 — Hardness classification

Hardness class	40	50	60	70	80
Range of hardness IRHD	36 to 45	46 to 55	56 to 65	66 to 75	76 to 85

**5 Requirements****5.1 General**

The materials shall not contain any ingredients that can have a detrimental effect on the concrete pavement.

NOTE An incorporated fibre reinforcement in the preformed joint seal as additional protection against over-extension is recommended.

**5.2 Dimensional tolerances**

The dimensions shall be determined in accordance with ISO 3302-1 and the result shall conform to classes E1 or E2 defined in ISO 3302-1.

**5.3 Imperfections and defects**

The imperfections and defects shall be determined by visual inspection. The surface of preformed seals shall be free of surface defects or irregularities, which can affect their function.



## 5.4 Hardness

### 5.4.1 Hardness

The hardness shall be determined in accordance with ISO 48 (method micro-test). The result shall conform to the relevant value given in Table 2, line 1.1.

### 5.4.2 Hardness tolerance

The hardness shall be determined in accordance with ISO 48 (method micro-test). Over a 5 m length of the preformed joint seal, 5 measurements randomly taken, the difference between the minimum and maximum hardness shall not be more than 5 IRHD. Each value shall be within the specified range for the relevant hardness class.

## 5.5 Tensile strength and elongation at break

The tensile strength and elongation at break shall be determined in accordance with EN 14840. The tensile strength and the elongation at break shall conform to the relevant values given in Table 2, line 2 and line 3.

## 5.6 Compression set in air

### 5.6.1 General

The test piece is taken from a preformed seal, then the measurement shall be carried out in the direction of compression of the seal in service.

### 5.6.2 Compression set at 70 °C

The compression set at 70 °C shall be determined in accordance with EN 14840. The compression set at 70 °C shall conform to the relevant values given in Table 2, line 4.

### 5.6.3 Compression set at low temperature (–25 °C)

The compression set at low temperature (–25 °C) shall be determined in accordance with EN 14840. The compression set at low temperature (–25 °C) shall conform to the relevant values given in Table 2, line 4.

## 5.7 Accelerated ageing in air

The accelerated ageing in air shall be determined in accordance with EN 14840. The changes in hardness, tensile strength and elongation at break shall conform to the relevant values given in Table 2, line 5.

## 5.8 Stress relaxation in compression

The stress relaxation in compression shall be determined in accordance with EN 14840. The stress relaxation after 100 days at 50 °C shall conform to the relevant values given in Table 2, line 6.

## 5.9 Recovery at low and high temperatures (–25 °C, +70 °C)

The recovery at low and high temperatures shall be determined in accordance with EN 14840. The recovery at low and high temperatures shall conform to the relevant values given in Table 2, line 7.

## 5.10 Ozone resistance

The ozone resistance shall be determined in accordance with EN 14840. The ozone resistance shall conform to the relevant values given in Table 2, line 8. This test is not required for EPDM-preformed joint seals.

**EN 14188-3:2006 (E)****5.11 Protection against over-extension**

The protection against over-extension shall be determined in accordance with EN 14840. The elongation at first effect of the fibre shall conform to the relevant values given in Table 2, line 9. The elongation at 300 N tensile force shall conform to the relevant values given in Table 2, line 9. The tensile force at first break of fibre shall conform to the relevant values given in Table 2, line 9.

**5.12 Function testing for cold climate areas**

When the seal is intended to be used in cold climate areas, the minimum compression force during function testing for cold climate area shall be determined in accordance with EN 14840. The compression force shall conform to the relevant values given in Table 2, line 10.

NOTE As the width of joints is changing with temperature, the profile should be flexible enough to compensate for dimensional changes within a broad temperature range, sometimes down to  $-30\text{ }^{\circ}\text{C}$ . In this context, particular attention should be paid to the cyclic mechanical stresses and to the compression set of the material.

**5.13 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.

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Table 2 — Requirements for preformed joint seals (test methods are compiled in EN 14840)

No	Property	Unit	Clause	Requirements for hardness classes					
				40	50	60	70	80	
1.1	Hardness	IRHD	5.4.1	36 to 45	46 to 55	56 to 65	66 to 75	76 to 85	
1.2	Hardness tolerance	IRHD	5.4.2	≤ 5					
2	Tensile strength	MPa	5.5	≥ 9					
3	Elongation at break	%	5.5	≥ 400	≥ 375	≥ 300	≥ 200	≥ 125	
4	Compression set	%	5.6	≤ 20					
	– at +70 °C		5.6.2						
	– at –25°		5.6.3						≤ 60
5	Accelerated ageing in air	IRHD	5.7	–5 ... +8					
	– Change in hardness		%						–20 ... +40
	– Change in tensile strength		%						–30 ... +10
6	Stress relaxation in compression	%	5.8	50			55		
7	Recovery at low and high temperatures	%	5.9	≥ 65					
	– at –25 °C								≥ 80
8	Ozone resistance		5.10	no crack					
9	Protection against over-extension	%	5.11	≤ 2					
	– Elongation at first effect of fibre								≤ 5
	– Elongation at 300 N tensile force								≥ 300
10	Function testing for cold climate areas; minimum compression force	kN/m	5.12	≥ 0,03					

## 6 Evaluation of conformity

### 6.1 General

The compliance of the product with the requirements of this document shall be demonstrated by:

- Initial Type Testing;
- Factory Production Control by the manufacturer, including product assessment.

The characteristics indicated in Clause 5 shall be determined within 3 months of the date of delivery from the manufacturer.