



# SLOVENSKI STANDARD

## SIST EN 13179-1:2013

01-oktober-2013

Nadomešča:  
SIST EN 13179-1:2002

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### Preskus kamene moke za bitumenske zmesi - 1. del: Delta preskus prstan-kroglica

Tests for filler aggregate used in bituminous mixtures - Part 1: Delta ring and ball test

Prüfverfahren für mineralische Füller in bitumenhaltigen Mischungen - Teil 1: Delta-Ring- und Kugel-Verfahren

Essais sur les fillers utilisés dans les mélanges bitumineux - Partie 1: Essai bille-anneau

Ta slovenski standard je istoveten z: **EN 13179-1:2013**

#### ICS:

75.140	Voski, bitumni in drugi naftni proizvodi	Waxes, bituminous materials and other petroleum products
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**SIST EN 13179-1:2013**

**en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13179-1**

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ICS 75.140

Supersedes EN 13179-1:2000

English Version

## Tests for filler aggregate used in bituminous mixtures - Part 1: Delta ring and ball test

Essais sur les fillers utilisés dans les mélanges bitumineux  
- Partie 1: Essai bille-anneau

Prüfverfahren für mineralische Füller in bitumenhaltigen  
Mischungen - Teil 1: Delta-Ring- und Kugel-Verfahren

This European Standard was approved by CEN on 30 May 2013.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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## Foreword

This document (EN 13179-1:2013) has been prepared by Technical Committee CEN/TC 154 "Aggregates", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.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 13179-1:2000.

EN 13179-1:2013 includes the following significant technical change with respect to EN 13179-1:2000:

Clause 7 has been completed by the following sentence: "For some types of filler, the stiffening effect may make the mixture of filler and bitumen so stiff that a homogeneous mixture cannot be obtained by stirring for the specified time. If a homogenous mixture cannot be obtained, the test shall be stopped. The result shall be recorded (9.1 (b)) as "greater than 25 °C".

The other part of EN 13179 are:

Part 2: Bitumen number.

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This standard forms part of series of tests for bituminous bound filler aggregates.

Test methods for other properties of aggregates will be covered by parts of the following European Standards:

EN 932, *Tests for general properties of aggregates*

EN 933, *Tests for geometrical properties of aggregates*

EN 1097, *Tests for mechanical and physical properties of aggregates*

EN 1367, *Tests for thermal and weathering properties of aggregates*

EN 1744, *Tests for chemical properties of aggregates*

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.

**EN 13179-1:2013 (E)****1 Scope**

This European Standard specifies the procedure used to determine the stiffening effect of filler aggregate when mixed with bitumen.

**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 932-2, *Tests for general properties of aggregates — Part 2: Methods for reducing laboratory samples*

EN 932-5, *Tests for general properties of aggregates — Part 5: Common equipment and calibration*

EN 1097-7, *Tests for mechanical and physical properties of aggregates — Part 7: Determination of the particle density of filler — Pyknometer method*

EN 1427, *Bitumen and bituminous binders — Determination of the softening point — Ring and Ball method*

EN 12591, *Bitumen and bituminous binders — Specifications for paving grade bitumens*

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**3 Terms and definitions**

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

**3.1****delta ring and ball**

increase of the softening point of a bitumen/filler aggregate mixture in a composition of 37,5 volume parts of filler aggregate and 62,5 volume parts of bitumen, related to the softening point of the bitumen used in that mixture

**3.2****constant mass**

mass determined by successive weighings performed at least 1 h apart and not differing by more than 0,1 %

Note 1 to entry: In many cases constant mass can be achieved after a test portion has been dried for a pre-determined period in a specified oven at  $(110 \pm 5)$  °C. Test laboratories can determine the time required to achieve constant mass for specific types and sizes of sample dependent upon the drying capacity of the oven used.

**3.3****laboratory sample**

reduced sample derived from a bulk sample for laboratory testing

**3.4****test portion**

sample used as a whole in a single test

**3.5****softening point**

temperature at which the material under standardized test conditions attains a certain consistency between solid and liquid behaviour

**4 Principle**

The test is carried out using filler aggregate particles smaller than 0,125 mm and bitumen. Duplicate disks of bitumen and a bitumen/filler aggregate mixture are cast in brass rings. The rings are heated at a controlled rate in a water bath while supporting a steel ball and the temperature at which the disks soften enough to allow the steel ball to fall a distance of  $(25,0 \pm 0,4)$  mm is determined. The mean values of temperature for the rings containing the bitumen and the rings containing the bitumen/filler aggregate mixture are calculated. The difference between the two mean temperatures is reported as  $\Delta_{R \& B}$ .

**5 Apparatus**

All apparatus, unless otherwise stated, shall conform to the general requirements of EN 932-5.

**5.1 Balance**, accurate to 0,1 g.

**5.2 Drying oven**, capable of being set to maintain temperatures of  $(110 \pm 5)$  °C and  $(150 \pm 5)$  °C.

**5.3 Stirrer**, heat resistant.

**5.4 Paving bitumen**, 70/100 grade as specified in EN 12591.

**5.5 Beakers**, capable of being heated (2 required).

**5.6 Evaporation dish**, heat resistant, with round bottom of approximate capacity 140 ml.

**5.7 Brass rings**, square shouldered, as specified in EN 1427 (4 required).

**5.8 Flask heater**, suitable for use with the evaporation dish (see 5.6).

**5.9 Desiccator**, with desiccant.

**5.10 Glass or metal plate**, approximately 150 mm by 150 mm, coated with a release agent.

NOTE The release agents specified in EN 1427 are suitable.

**5.11 Cork ring**, for weighing the evaporation dish.

**5.12 Test sieve**, 0,125 mm size.

**6 Preparation of test portion**

Prepare a test portion for the determination of particle density as specified in EN 1097-7.

Dry sieve the remainder of the laboratory sample on the 0,125 mm sieve and discard any particles retained on the sieve.

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Reduce the sieved laboratory sample in accordance with EN 932-2 to give a test portion with a mass of at least 60 g.

NOTE A mechanical sample divider can be used.

Dry the test portion at  $(110 \pm 5) ^\circ\text{C}$  to constant mass and leave to cool in the desiccator to room temperature.

Check the sample for the presence of lumps and, if present, pulverise them carefully with a spatula. Mix the pulverised lumps with the rest of the sample.

**7 Procedure**

Determine the particle density of the filler aggregate in accordance with EN 1097-7, using the first test portion.

Place a beaker with at least 60 g of the paving bitumen grade 70/100, a beaker with the test portion of filler aggregate, an evaporation dish and four brass rings, in the drying oven and bring them to a temperature of  $(150 \pm 5) ^\circ\text{C}$  in  $(4,0 \pm 0,5)$  h.

After heating, place two of the brass rings on the glass plate coated with release agent and slightly overfill them with bitumen. Record the actual mass of bitumen ( $m_b$ ) to the nearest 0,1 g.

Place the evaporation dish on the balance, using a cork ring to insulate the balance from the heat of the dish. Fill the dish with  $(20,0 \pm 2,0)$  g bitumen.

Put the dish with the bitumen in the flask heater and adjust the flask heater so that the temperature of the bitumen is held at  $(150 \pm 10) ^\circ\text{C}$ .

For some types of filler (e.g. mixed filler with high calcium hydroxide content), the stiffening effect may make the mixture of filler and bitumen so stiff that a homogeneous mixture cannot be obtained by stirring for the specified time. If a homogenous mixture cannot be obtained, the test shall be stopped. The result shall be recorded (9.1 (b)) as "greater than  $25 ^\circ\text{C}$ ".

Return the dish with the bitumen to the balance, again insulating the balance from the heat of the dish by a cork ring, and add  $m_f$  g filler aggregate to the bitumen, calculated in accordance with the following formula:

$$m_f = 0,6 m_b \times \rho_f / \rho_b$$

where:

$m_b$  is the mass of bitumen, in grams;

$m_f$  is the mass of added filler aggregate, in grams;

$\rho_f$  is the particle density of the filler aggregate, in megagrams per cubic metre;

$\rho_b$  is the density of the paving bitumen at  $25 ^\circ\text{C}$ , in megagrams per cubic metre.

NOTE 1 This gives a mixture by volume of 37,5 % filler aggregate and 62,5 % bitumen.

NOTE 2 If  $\rho_b$  is not known,  $1,025 \text{ Mg/m}^3$  can be used in the calculation.

Put the dish back into the flask heater and stir the filler aggregate into the bitumen over a period of  $(150 \pm 5)$  s. Continue to stir for a further  $(150 \pm 5)$  s with the temperature held at  $(150 \pm 5) ^\circ\text{C}$ , so that a homogenous mixture is obtained.