SLOVENSKI STANDARD
oSIST prEN 13880-3:2022

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Tesnilne mase za stike, ki se vgrajujejo po vročem postopku - 3. del: Preskusna metoda za ugotavljanje penetracije in sposobnosti vrnitve v prvotno stanje

Hot applied joint sealants - Part 3: Test method for the determination of penetration and recovery (resilience)

Heiß verarbeitbare Fugenmassen - Teil 3: Prüfverfahren zur Bestimmung der Kugel-Penetration und des elastischen Rückstellvermögens

Produits de scellement de joints appliqués à chaud - Partie 3 : Méthode d'essais pour la détermination de la pénétrabilité et du retour élastique

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Hot applied joint sealants - Part 3: Test method for the determination of penetration and recovery (resilience)

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 227.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 13880-3:2022) has been prepared by Technical Committee CEN/TC 207 “Road materials”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13880-3:2003.

This document is one part of the EN 13880 series of standards, *Hot applied joint sealants*, which consists of the following parts:

— *Part 1: Test method for the determination of density at 25 °C*

— *Part 2: Test method for the determination of cone penetration at 25 °C*

— *Part 3: Test method for the determination of penetration and recovery (resilience)*

— *Part 4: Test method for the determination of heat resistance - Change in penetration value*

— *Part 5: Test method for the determination of flow resistance*

— *Part 6: Method for the preparation of samples for testing*

— *Part 7: Function testing of joint sealants*

— *Part 8: Test method for the determination of the change in weight of fuel resistance joint sealants after fuel immersion*

— *Part 9: Test method for the determination of compatibility with asphalt pavements*

— *Part 10: Test method for the determination of adhesion and cohesion following continuous extension and compression*

— *Part 11: Test method for the preparation of asphalt test blocks used in the function test and for the determination of compatibility with asphalt pavements*

— *Part 12: Test method for the manufacture of concrete test blocks for bond testing (recipe methods)*

— *Part 13: Test method for the determination of the discontinuous extension (adherence test)*

1 Scope

This document describes a test method as an indicator both for the penetration resistance (hardness) and elastic recovery after de-loading (resilience) of hot applied joint sealants according to EN 14188-1 at 25 °C using a standard penetrometer fitted with a ball penetration tool.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1426, *Bitumen and bituminous binders - Determination of needle penetration*

EN 13880-6, *Hot applied joint sealants - Part 6: Method for the preparation of samples for testing*

EN 58, *Bitumen and bituminous binders - Sampling bituminous binders*

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

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
resilience value
R
product's elastomeric properties under standard test conditions, determined as relative value [%] (percentage of recovery) related to an initial penetration value plus additional 10 mm penetration depth recorded under a controlled time-dependent loading and de-loading test regime

3.2
penetration
P
product's penetration resistance as a measure of its hardness under standard test conditions, measured as initial absolute ball penetration depth in [mm] under a controlled time-dependent load

4 Principle

A representative portion of the sealant (test sample according to EN 58) is poured into two metal containers (see 5.4) to provide two test specimens; these are cooled in air and then lidded prior to immersion respectively. directly water contact in a constant temperature water bath. After the period of conditioning, the specimens are taken from the water bath, the lids are removed and both test specimen shall be tested. The test shall be performed immediately.

The test principle consists in the measurement of the elastic resilience of a sealant sample after penetration with a ball penetration tool.

It delivers both characteristics for the penetration resistance as well as the elastic recovery of sealants according to EN 14188-1.

The test shall not be carried out underwater.

5 Apparatus

5.1 Penetrometer

Penetrometer test devices, conforming to EN 1426, which allows the ball penetration tool holder to move vertically without measurable friction and allows the penetration to be measured to the nearest 0,1 mm. The ball penetration tool holder shall be readily detachable from the apparatus and shall weigh (47,50 ± 0,05) g.

5.2 Ball penetration tool

Ball penetration tool, conforming to Figure 1. The penetration ball shall be made of steel and weigh (27,5 ± 0,1) g. The total mass of the ball penetration tool and standard penetrometer holder shall be (75,0 ± 0,1) g.

Dimensions in millimetres

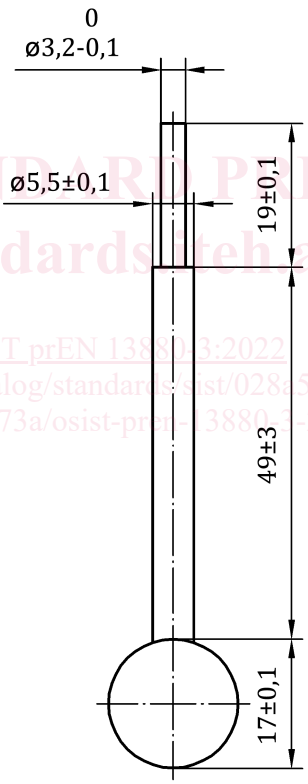

Figure 1 — Ball penetration tool

5.3 Water bath

Water bath having a capacity of at least 10 l of water with a perforated shelf not less than 50 mm from the bottom of the bath and capable of maintaining the samples at the required test temperature of (25,0 ± 0,3) °C. Distilled or de-ionized water should be used in the bath.

Direct contact to the surface of the filled tins shall be avoided.

5.4 Sample Tins

Two metal containers, 45 mm deep, with flat bottoms and measuring 70 mm in diameter.

5.5 Time recording equipment

Measuring instruments to record the time-controlled loading and unloading course during test procedure.

The time recording should have an accuracy of 0,1 s.

6 Preparation and conditioning of the test specimens

6.1 Precautions shall be taken to ensure the test sample according to EN 58 is representative for the sealant. During the preparation of the test specimens, any local overheating and/or contamination by oil or other substances shall be avoided by following the instructions in EN 13880-6.

6.2 Fill the two sample tins with the sealant specimens so that it is flush with the rim of the container.

6.3 Immediately after filling, loosely cover each test specimen container and its contents with a lipped beaker of suitable size as a protection against dust and to assist in the elimination of air bubbles. Allow the specimens to cool in air at a temperature of (23 ± 2) °C at least 2 but less than 24 h. During this conditioning time a direct air contact shall be avoided by covering.

6.4 Place the test specimens in the water bath (see 5.3) and allow them to remain immersed for a further period of 2 to 4 h. During this conditioning time a direct air contact shall be avoided by covering. Ensure that the specimens are lidded prior to immersion in the water bath.

7 Test conditions

The test conditions shall be:

— temperature: (25,0 ± 0,3) °C;

— applied load: (75,0 ± 0,1) g;

— duration of loading: (5,0 ± 0,5) s.

8 Procedure

8.1 After conditioning the specimens in accordance with 6.2 and 6.3 remove the lid and perform the test immediately. The test shall not be conducted underwater. Lightly coat the surface of the specimen with talcum powder, removing any excess carefully (e.g. in a fume cupboard). The test procedure shall begin in a time frame not more than 24 h after preparation of test specimens (tins).

8.2 Position a light so that at the initial contact of the ball on the penetration tool the surface of the specimens is not warmed up.

8.3 Place the ball in contact with the surface of the specimen and set the penetrometer indicating dial to zero.

8.4 Release the ball for a period of (5,0 ± 0,5) s, thus allowing the ball to penetrate the specimen. Record the reading in millimetres to 0,1 mm as the initial ball penetration value P.

It is recommended to record the time-penetration curve and the final penetration value P.

8.5 Without returning the dial pointer to zero, press the ball penetration tool down an additional 10,0 ± 0,1 mm (i.e. to a reading of P +10 mm) at a uniform rate in 10,0 ± 0,5 s.

It is recommended to record the additional penetration curve over the time.

8.6 Hold the ball in this position for 5 ± 0,5 s and during this time set the measuring scale to zero.

NOTE It is important that the ball stays in this position during the rest period.

8.7 Release the clamping of the ball penetration tool and with the ball still supported by the specimen allow the specimen to recover for 20 ± 0,5 s and. measure and record the final penetration F in millimetres to ± 0,1 mm.

It is recommended to record the ball position over the release period.

8.8 Carry out this procedure for every test specimen at three points equally spaced and not less than 10 mm from each other and from the tin rim.

8.9 Test results: Calculate the recovery *R* for each of the 6 measurements from the equation:

$$R = (P + 10 - F) \times \frac{100}{10} \quad (1)$$

R in [%] = $[(P + 10 - F) / (P + 10)] \times 100$

where

R is the recovery, in percent (%);

P is the initial ball penetration, in millimetres (mm);

F is the final penetration, in millimetres (mm).

The test result with regards to the elastic recovery is the average of the six determinations and is expressed to the nearest 1 % ± standard deviation.

The test results with regards to the penetration are the initial ball penetration *P* and the final penetration *F* These results are expressed as the average value of the six determinations to the nearest 0,1 mm ± standard deviation.

9 Precision

Estimates of the repeatability and reproducibility of this test method and of the variability due to sampling are not available as yet, but they will be included by amendment when known.

NOTE To define variability, it is necessary for accredited laboratories to discuss their measurement uncertainty for the test method.

10 Test report

The test report shall confirm that the test was carried out in accordance with this document and shall include the following information:

a) name of product; sealant type according to EN 14188-1; manufacturer, sample No.;

b) batch number, and, when appropriate, date of manufacture and expiry date;

c) conditioning time of the sample;

d) the date of testing and test results obtained:

1) time-deformation-course with P, P+10, F, R for every measurement;

2) test results for R, P, F;

3) table with single values of R, P, F.