

Hot applied joint sealants —

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

The European Standard EN 13880-3:2003 has the status of a
British Standard

ICS 93.080.20

National foreword

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

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

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

This European Standard was approved by CEN on 25 March 2003.

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Foreword

This document (EN 13880-3:2003) 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of an identical text or by endorsement, at the latest by December 2003, and conflicting national standards shall be withdrawn at the latest by March 2005.

This European Standard is one of a series of standards as listed below:

prEN 13880-1	Hot applied joint sealants — Part 1: Test method for the determination of density at 25 °C
prEN 13880-2	Hot applied joint sealants — Part 2: Test method for the determination of cone penetration at 25 °C
EN 13880-3	Hot applied joint sealants — Part 3: Test method for the determination of penetration and recovery (resilience)
EN 13880-4	Hot applied joint sealants — Part 4: Test method for the determination of heat resistance — Change in penetration value
prEN 13880-5	Hot applied joint sealants — Part 5: Test method for the determination of flow resistance
prEN 13880-6	Hot applied joint sealants — Part 6: Test method for the preparation of samples for testing
prEN 13880-7	Hot applied joint sealants — Part 7: Function testing of joint sealants
prEN 13880-8	Hot applied joint sealants — Part 8: Test method for the determination of the change in weight of fuel resistance joint sealants after fuel immersion
EN 13880-9	Hot applied joint sealants — Part 9: Test method for the determination of compatibility with asphalt pavements
prEN 13880-10	Hot applied joint sealants — Part 10: Test method for the determination of adhesion and cohesion following continuous extension and compression
EN 13880-11	Hot applied joint sealants — 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
prEN 13880-12	Hot applied joint sealants — Part 12: Test method for the manufacture of concrete test blocks for bond testing (recipe methods)
prEN 13880-13	Hot applied joint sealants — Part 13: Test method for the determination of the discontinuous extension (adherence test)

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

1 Scope

This European Standard describes a method for determining of the penetration and recovery (resilience) of hot applied joint sealants using a standard penetrometer fitted with a ball penetration tool.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1426, *Bitumen and bituminous binders — Determination of needle penetration.*

prEN 13880-6, *Hot applied joint sealants — Part 6: Test method for the preparation of samples for testing.*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests.*

3 Term and definition

For the purposes of this European Standard the following term and definition applies.

3.1

resilience value

percentage of recovery recorded under standard test conditions resulting from a measurement of the product's elastomeric properties

4 Principle

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

It is not allowed to carry out the test under water.

5 Apparatus

5.1 Penetrometer

Penetrometer, 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.

All dimensions in millimetres

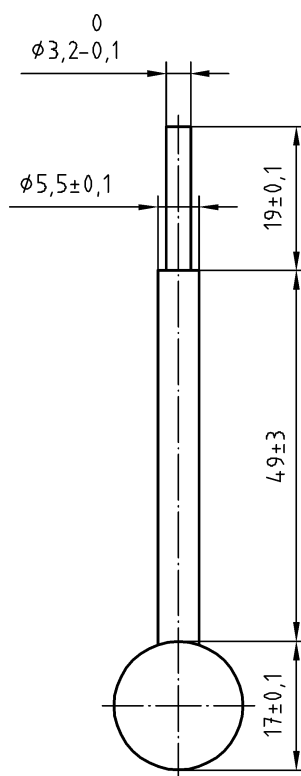


Figure 1 — Ball penetration tool

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 $(25,0 \pm 0,3) ^\circ\text{C}$. Distilled or de-ionised water should be used in the bath.

5.4 Sample Tins

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

6 Preparation and conditioning of the test specimens

6.1 Precautions shall be taken during the preparation of the test specimens to ensure that the test sample of sealant to be examined is representative of the laboratory sample from which it is taken. Any local overheating of the sample and contamination by oil or other substances during the preparation of the test specimens, shall be avoided (see prEN 13880-6).

6.2 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 $(23 \pm 2) ^\circ\text{C}$ for a period of $(1,75 \pm 0,25)$ h.

6.3 Place the test specimens in the water bath (see 5.3) and allow them to remain immersed for a further period of $(1,75 \pm 0,25)$ h.

7 Test conditions

The test conditions shall be:

- ¾ temperature: (25,0 0,3) °C;
- ¾ applied load: (75,0 0,1) g;
- ¾ duration of loading: (5,0 0,1) s.

8 Procedure

- 8.1** Fill the two sample containers with the sealant specimens so that it is flush with the rim of the container.
- 8.2** Condition the specimens in accordance with 6.2 and 6.3 but ensure that the specimens are lidded prior to immersion in the water bath.
- 8.3** Remove the specimen from the water, remove the lid and perform the test immediately. The test shall not be conducted under water. Lightly coat the surface of the specimen with talcum powder, removing any excess by blowing.
- 8.4** 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.
- 8.5** Place the ball in contact with the surface of the specimen and set the penetrometer indicating dial to zero.
- 8.6** Release the clutch for a period of (5,0 0,1) 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.
- 8.7** Without returning the dial pointer to zero, release the clutch and press the ball penetration tool down an additional 10 mm (i.e. to a reading of P +10 mm) at a uniform rate of 10 s.
- 8.8** Re-engage the clutch, thereby holding the ball in this position for a further 5 s and during this time, push up the upper shaft of the penetrometer until the dial reads zero.
- 8.9** Release the clutch and with the ball still supported by the specimen, allow the specimen to recover for 20 s and then re-engage the clutch.
- 8.10** Push down the upper shaft of the penetrometer until it is in contact with the plunger and measure and record the final penetration F in millimetres to 0,1 mm.
- 8.11** Carry out this procedure once at each specimen of three and not less than 10 mm from the container rim.

9 Expression of results

Calculate the recovery R from the equation:

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

where

R is the recovery, in percent (%);

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

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

Record the recovery as the average of the three determinations and express it to the nearest 1 %.

Record the initial ball penetration P and the final penetration F to the nearest 0,1 mm.

10 Oven aged specimens

10.1 Further condition the specimen in a forced ventilated oven conforming to ISO 188 maintained at a temperature of $(70 \pm 1)^\circ\text{C}$ for (24 ± 1) h. Cool the specimens in air at standard conditions followed by conditioning in a water bath maintained at $(25 \pm 1)^\circ\text{C}$ for 1 h prior to testing.

10.2 Carry out the test in accordance with 8.3 to 8.11.

11 Precision

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

12 Test report

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

- a) name of sample and related primers if used;
- b) source of sample and relevant primer (if applicable);
- c) batch number and date of manufacture where appropriate or expiry date;
- d) the date of testing and test results obtained;
- e) the name of the analyst and test laboratory.

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