SLOVENSKI STANDARD
SIST EN 13880-10:2018

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Nadomešča:
SIST EN 13880-10:2004

Tesnilne mase za stike, ki se vgrajujejo po vročem postopku - 10. del: Preskusna metoda za ugotavljanje adhezije in kohezije po dolgotrajnem raztezanju in stiskanju

Hot applied joint sealants - Part 10: Test method for the determination of adhesion and cohesion following continuous extension and compression

Heiß verarbeitbare Fugenmassen - Teil 10: Prüfverfahren zur Bestimmung des Dehn- und Haftvermögens bei kontinuierlicher Dehnung und Stauchung

Produits de scellement de joints appliqués à chaud - Partie 10: Méthode d'essai pour la détermination de l'adhésion et de la cohésion après traction et compression répétée

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ICS:

91.100.50	Veziva. Tesnilni materiali	Binders. Sealing materials
93.080.20	Materiali za gradnjo cest	Road construction materials

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EUROPEAN STANDARD

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EN 13880-10

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ICS 93.080.20

Supersedes EN 13880-10:2003

English Version

Hot applied joint sealants - Part 10: Test method for the determination of adhesion and cohesion following continuous extension and compression

Produits de scellement de joints appliqués à chaud - Partie 10: Méthode d'essai pour la détermination de l'adhésion et de la cohésion après traction et compression répétée

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This European Standard was approved by CEN on 16 March 2018.

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

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European foreword

This document (EN 13880-10:2018) 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 November 2018, and conflicting national standards shall be withdrawn at the latest by November 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13880-10:2003.

A list of all parts in the EN 13880 series, published under the general title "Hot applied joint sealants", can be found on the CEN website.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document specifies a method for determination of adhesion and cohesion characteristics of hot applied joint sealant specimens following cyclic extensions.

NOTE The test simulates yearly joint movements due to temperature variations.

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

EN 13880-12, *Hot applied joint sealants — Part 12: Test method for the manufacture of concrete test blocks for bond testing (recipe methods)*

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 terms and definitions given in EN 14188-1 and the following apply.

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
adhesion failures
surface area of the concrete test blocks from which the sealant is completely separated are to be evaluated for adhesive failure, calculated to the nearest 10 mm^2

3.2
cohesion failures
sum of the superficial areas of any ruptures on the faces of the material to the nearest 5 mm^2 and any cavity exceeding 3 mm in depth, measured normal to the face of the test specimen

4 Principle

The cohesive properties of a sealant are examined to verify its ability to adhere to concrete (primed if the manufacturer of the sealant so recommends) when subjected to cycles of repeated extensions at the appropriate test temperature defined in EN 14188-1.

5 Apparatus

5.1 Jig for pouring and handling of test specimen

Suitable jig to place two concrete test blocks exactly opposite each other for a joint width of (24,0 ± 0,5) mm and joint length and height of (50,0 ± 0,5) mm and handling the test specimen until testing without disturbing the test specimens before, during and after the removal of the jig.

5.2 Tensile rig

Bond testing tensile rig, which allows the specimens to be inserted:

- motor driven through positive drives without slip or significant backlash, so the cycles of extension are carried out steadily and automatically;
- capable of moving blocks smoothly and linearly, so that their alignment is maintained at all times and the test specimens are not subjected to torsion, bending, shocks or significant vibration;
- capable of exerting on each test specimen a tensile force of up to 2 500 N and subject to such a force being sufficient, extending each test specimen uniformly under all conditions by (18,00 ± 0,25) mm at a rate of (6,00 ± 0,25) mm/h;
- capable of exerting on each extended test specimen a compressive force of 2 500 N in order to compress each test specimen uniformly under all conditions to its original length.

The accuracy of the test rig shall be class 2A according to ISO 5893.

If the apparatus is capable of testing a number of test specimens simultaneously, it shall not be significantly affected by the premature failure of one or more test specimens.

5.3 Cooling chamber

Cooling chamber capable of reducing the temperature of a full set of test specimens to the appropriate test temperature in not more than 4 h and holding the test specimens at this temperature for at least 36 h. The test temperature is according to EN 14188-1.

The chamber shall be fitted with a calibrated temperature indicator accurate to ± 1,0 °C with its bulb or sensor at the point where the temperature fluctuation is known to be greatest. Alternatively, the temperature indicator may be placed in the centre of the horizontal plane above the top of the specimens.

5.4 Measurement of forces

One or more devices for measurement of forces, fitted at the outside of the cooling chamber, measuring the tensile forces applied to each test specimen.

5.5 Ruler

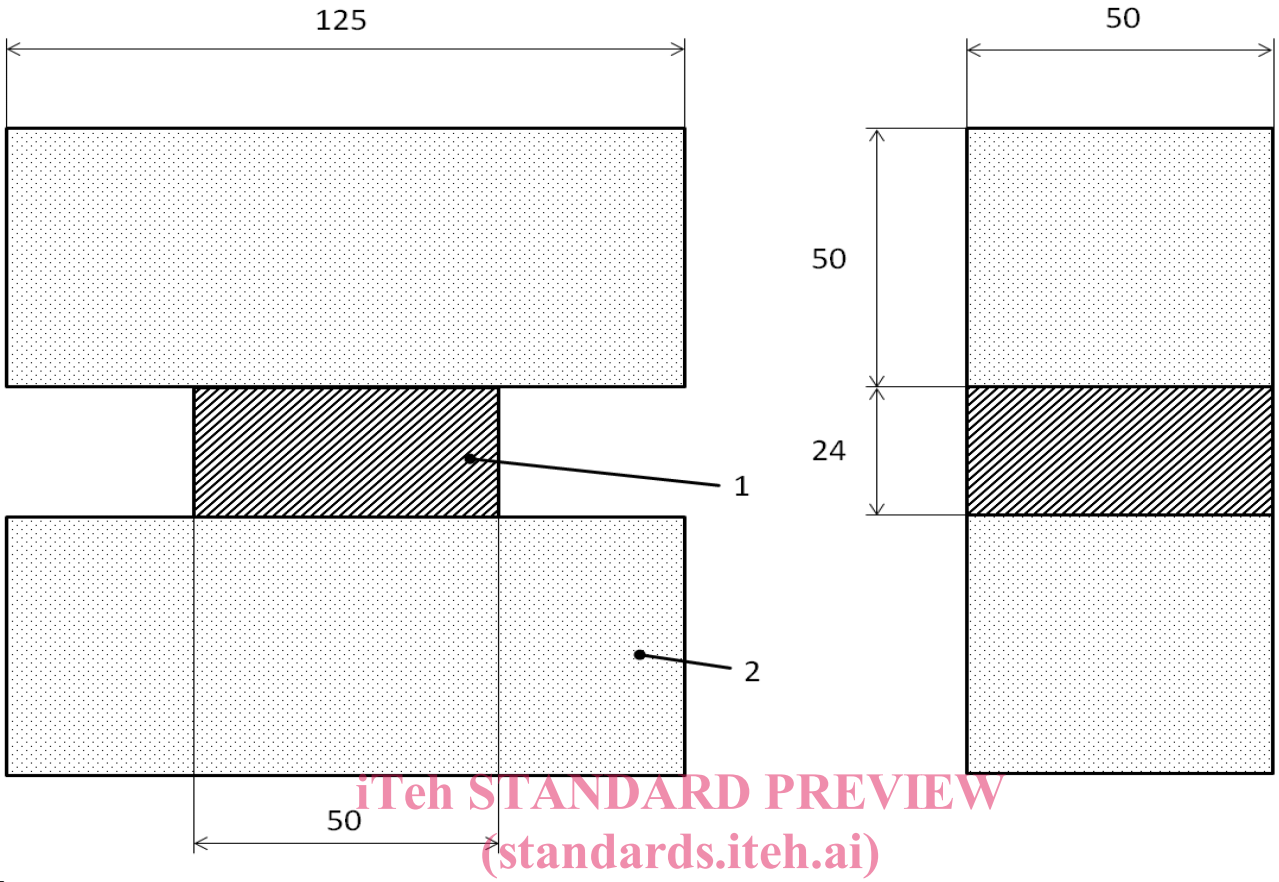
Ruler or other suitable device to measure depth and width of defects to the nearest 1mm.

6 Preparation and conditioning of test specimens

6.1 Prepare the test sample according to EN 13880-6.

6.2 Concrete test blocks in accordance with EN 13880-12 shall be used. The concrete test blocks shall be (125 ± 50) mm in length, (50,0 ± 0,5) mm in width and (50,0 ± 0,5) mm in height and shall have a moisture content of (5,0 ± 0,5) %. The surfaces shall be clean and free of dust.

6.3 Use a suitable jig to place two test blocks exactly opposite each other for a joint width of (24,0 ± 0,5) mm and a joint length and height of (50,0 ± 0,5) mm. See Figure 1.



Key

1 joint sealant

2 concrete block

Figure 1 — Test Sample (dimensions in mm)

6.4 If a primer is used, apply it to the sawn test faces of the concrete test blocks in accordance with the manufacturer's instructions.

6.5 Place a top-mask on the jig so that the joint can be overfilled when the hot applied joint sealant in poured into it.

6.6 Any adhering of the poured hot applied joint sealant to the borders of the joint shall be avoided.

6.7 Allow the test specimens to cool at laboratory temperature for 2 h after which remove the excess hot applied joint sealant using a heated knife so that the test specimens are flush with the surface of the concrete test blocks.

6.8 Three test specimens shall be prepared for each test.

7 Procedure

7.1 Carefully transfer the test specimens to the tensile rig. Make sure they are tightly fixed to the driving mechanism both in tensile and compression.

7.2 Reduce the temperature of the atmosphere surrounding the test specimen and maintain that temperature for a period of at least 6 h and during the test.

NOTE The relevant testing temperatures for hot applied joint sealants are in accordance with EN 14188-1.

7.3 The test specimens are subjected to two and a half cycles of extension and compression as follows:

Extend the joint to the maximum defined extension at a uniform rate of (6,00 ± 0,25) mm/h and immediately compress the test specimen at the same uniform rate and at the same temperature to its original dimension without removal from the test rig.

7.4 The temperature of the air around the specimens, the forces and the extension shall be recorded during the entire test procedure. The extension can be measured outside the chamber as long as the accuracy requirement is fulfilled for the sealant specimens. The forces shall be measured outside the chamber.

7.5 Record the maximum force reached for each test specimen.

7.6 Examine all three test specimens at the end of the procedure for adhesion and cohesion failures. Measure the depth and width of defects to the nearest 1 mm. Calculate the sum of the defect areas in mm^2.

8 Calculation and expression of results

8.1 General

The maximum tension σ shall be calculated by the following formula:

$$\max\sigma = \frac{\max F}{A} \quad (1)$$

where

$\max\sigma$ is the maximum tension, in newton per square millimetres (N/mm^2);

$\max F$ is the maximum force, in newton (N);

A is the joint area [(50,0 ± 0,5) mm × (50,00 ± 0,5) mm], in square millimetres (mm^2).

Report the maximum tension as the average of the three test specimens, rounded to the nearest 0,1 N/mm^2.

8.2 Failures

For each sample:

Report adhesive failures, calculated to the nearest 10 mm^2, and any cavity exceeding 3 mm in depth.

Report cohesive failures, calculated to the nearest 5 mm^2, and any cavity exceeding 3 mm in depth.

In case of total failure of one specimen redo the whole test once. If more than one test specimen fails, or if one specimen fails in the repeated test, the test should be reported as failure.

9 Precision

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