SLOVENSKI STANDARD
SIST EN 13589:2008

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Nadomešča:
SIST EN 13589:2004

Bitumen in bitumenska veziva - Določevanje nateznih lastnosti modificiranih bitumnov - Metoda določanja sile pri merjenju duktilnosti

Bitumen and bituminous binders - Determination of the tensile properties of modified bitumen by the force ductility method

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Streckeigenschaften von modifiziertem Bitumen mit dem Kraft-Duktilitäts-Verfahren

Bitumes et liants bitumineux - Détermination des caractéristiques de traction des bitumes modifiés par la méthode de force-ductilité

Ta slovenski standard je istoveten z: **EN 13589:2008**

ICS:

75.140	Voski, bitumni in drugi naftni proizvodi	Waxes, bituminous materials and other petroleum products
91.100.50	Veziva. Tesnilni materiali	Binders. Sealing materials

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EUROPEAN STANDARD

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English Version

Bitumen and bituminous binders - Determination of the tensile properties of modified bitumen by the force ductility method

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Foreword

This document (EN 13589:2008) has been prepared by Technical Committee CEN/TC 336 “Bituminous binders”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

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 13589:2003.

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1 Scope

This European Standard specifies a method for determining the tensile properties of a bituminous binder, in particular those of polymer-modified bitumens by means of a force ductility test.

The work done during the force ductility test is a criterion for assessing the quality of these materials.

WARNING — The use of this European Standard may involve hazardous materials, operations and equipment. This European Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this European Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2 Normative references

The following referenced documents are indispensable for the application 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 58, *Bitumen and bituminous binders – Sampling bituminous binders*

EN 1431, *Bitumen and bituminous binders – Determination of recovered binder and oil distillate from bitumen emulsions by distillation*

EN 12594, *Bitumen and bituminous binders – Preparation of test samples*

EN 13074, *Bitumen and bituminous binders – Recovery of binder from bitumen emulsions by evaporation*

EN 13398, *Bitumen and bituminous binders – Determination of the elastic recovery of modified bitumen*

EN 13703, *Bitumen and bituminous binders – Determination of deformation energy*

EN 14895, *Bitumen and bituminous binders - Stabilisation of binder from bituminous emulsion or from cut-back and fluxed bituminous binders*

3 Terms and definitions

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

3.1
tensile force
force undergone by a specimen subjected to extension, expressed in N

3.2
elongation
increase in length of a specimen, expressed in metres

NOTE Elongation is also expressed in % from the initial length. It is calculated as [(new length – initial length)/initial length] × 100 and.

3.3
tensile stress for a given elongation
tensile stress required to perform a given elongation to the significant part of a specimen

NOTE In general, the given elongation is an elongation of 1333 %, corresponding to an elongation of 400 mm.

3.4
brittle break
every rupture before 1333 % of elongation performing the force ductility test

4 Principle

A tensile test is carried out either on:

— the bituminous binder, or

— the recovered binder in accordance with EN 13074, or

— the residual binder after distillation in accordance with EN 1431, or

— the aged binder in accordance with the EN 14895.

NOTE 1 EN 13074 and EN 14895 are currently under revision, revised draft ENs are respectively numbered prEN 13074-1 and prEN 13074-2.

A moulded test specimen is extended in ductilometer at the test temperature and at constant speed until fracture or an elongation of at least 1333 % (400 mm) is achieved.

NOTE 2 The specimen is a symmetrical shaped block of bitumen (Figure 1).

5 Apparatus

5.1 Ductilometer

The ductilometer consists of a traction device (5.1.1) and a water bath (5.1.2).

5.1.1 Traction device

5.1.1.1 The traction device shall be capable of maintaining a constant speed of the moving elements at (50 ± 2,5) mm/min.

5.1.1.2 The specimen attachment device located at both ends of the specimen shall not exert on any part of the ends of specimen, localised stresses liable to cause tearing or fracture of the specimen.

5.1.1.3 Appropriate facilities shall permit the following measurements to be made:

a) tensile force exerted on the specimen over the range from 1 N to 300 N, to an accuracy of ± 0,1 N;

b) elongation of the specimen, either by following the movement of the attachment points or by means of an optical extensiometer over the range 1 mm to not less than 450 mm to an accuracy of ± 1 mm.

5.1.2 Water bath, temperature-controlled, capable of maintaining the specimen and the attachment device at the specified temperature throughout the test to an accuracy of ± 0,5 °C, provided with a means of checking the test temperature.

When the test is performed at 0°C (see Clause 7) or at a lower temperature, the liquid bath shall be water added with 15 % mass fraction of ethanol.

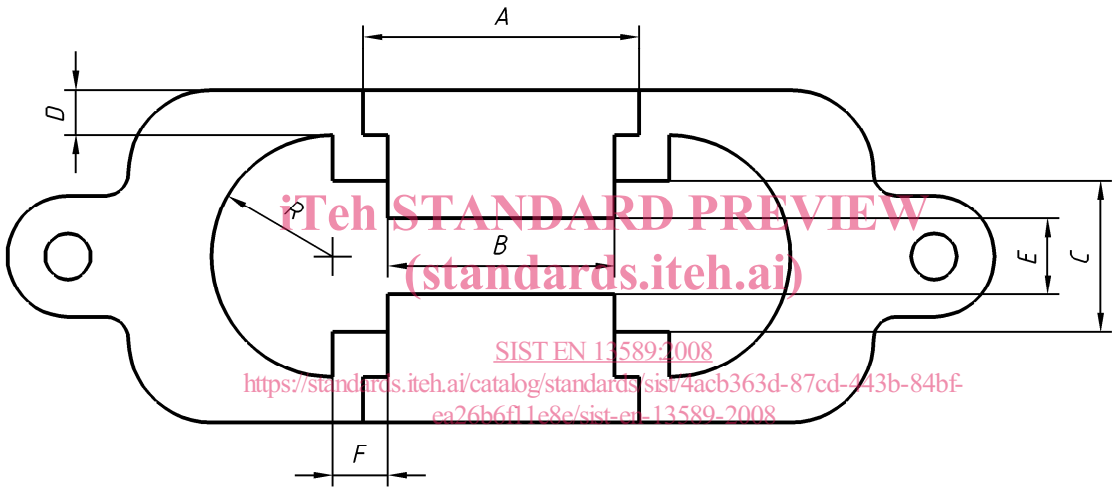
5.2 Recording device, for force applied and elongation of the test specimen.

5.3 Specimen moulding equipment

The moulds shall be made of metal, shall consist of four parts (2 side halves and 2 clips), and shall have the dimensions given in Figure 1.

The ends for the moulds are known as clips and are similar to those specified in EN 13398. The inner radius of the clips should be of (15,5 ± 0,1) mm, the opening width (20,0 ± 0,2) mm and the inner length of the clips should be (22,8 ± 0,2) mm.

While testing, both clips of a mould shall be kept in place by two diametrically opposed sliding pins. Whilst the test specimens are being cast and kept on test temperature, the moulds shall be placed on a base plate, also made of metal, and they shall be pressed together with a knurled screw.



Key

A	36,5 mm ± 2,0 mm	E	10,0 mm ± 0,1 mm
B	30,0 mm ± 0,1 mm	F	7,3 mm ± 0,1 mm
C	20,0 mm ± 0,2 mm	R	15,5 mm ± 0,1 mm
D	≥ 5,5 mm	thickness	10,0 mm ± 0,1 mm

Figure 1 — Symmetrical mould

6 Preparation and conservation of samples for testing

Take the sample in accordance with EN 58 and prepare the sample in accordance with EN 12594.

Coat the base plate and the interior side of the lateral walls of the side parts of the mould with a release agent consisting of one part by mass of dextrine (or mineral talc) and one part by mass of glycerine, or with silicone. Assemble the parts of the three moulds and place them on the base plate. Press both halves of the moulds together using the knurled screw.

Add the amount of sample needed for three test specimen to a melting dish and heat it as described in EN 13398. Immediately fill the three moulds using a backward and forward motion in the longitudinal direction of the mould, in order to give a uniform sample distribution in the mould, until a convex meniscus is obtained.

Keep the moulded specimens for about 1 h at room temperature then remove the excess sample using a heated knife. Reject any specimens exhibiting defects. Place the moulded specimens in the water bath maintained at the test temperature for (90 ± 10) min, before testing. Testing shall be carried out on the same day.

7 Procedure

Run the test specimen by specimen.

NOTE 1 If the traction and recording device allow the individual addressing of several specimen at once, more than one specimen may be tested at the same time.

Once the level filled moulds have been kept at the test temperature for (90 ± 10) min, remove the moulded specimen from the base plate, transfer the test specimen to the traction plates and remove the sides of mould. Then stretch the specimen at the usual test temperature, i.e. (5,0 ± 0,5)°C and at a speed of (50,0 ± 2, 5) mm/min up to an elongation of 1 333 % (400 mm). Repeat any test in which a brittle break occurs. If the second specimen also breaks, raise the temperature by steps of 5 °C until the test is complete without brittle break.

As mentioned above, the test temperature is generally (5,0 ± 0,5) °C. However, in case of:

— soft bituminous binders, the test may be performed at a lower temperature, e. g. (0,0 °C ± 0,5 °C), and

— hard PMBs, the test should be performed at (10,0 ± 0,5) °C, or even at (15,0 ± 0,5) °C.

NOTE 2 In general for hard PMB (i.e. PMB 10/30 – 63 and similar), no brittle break occurs at 10 °C. If necessary the test should be run at 15 °C.

8 Expression of results

Calculate the result according to EN 13703.

9 Precision

Since the result is calculated according to EN 13703, precision data from round robin test are indicated in EN 13703.

10 Test report

The test report shall contain at least the following information:

a) type and complete identification of the sample under test;

b) reference to this European Standard;

c) identity of the tester;

d) results of the test (see Clause 8);