



SLOVENSKI STANDARD

SIST EN 13589:2004

01-september-2004

6]li a Yb`]b`V]li a Ybg_Uj Yn]j U!`8c`c Yj Ub`Y`bUHyNb] `Ug]bcg]`a cX]Z]W]fUb] V]li a bcj `!`A YrcXUXc`c Ub`Ug]Ydf]`a Yf`Yb`1`Xi _h]bcg]h

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 modifizierten 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 13589:2003

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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en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13589

December 2003

ICS 91.100.50

English version

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

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

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

This European Standard was approved by CEN on 21 November 2003.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document EN 13589:2003 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 June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

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.

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EN 13589:2003 (E)**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

This European Standard incorporates by dated or undated references, 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 of revision. For undated references, the latest edition of the publication referred to apply (including amendments).

EN 58 ¹⁾, *Bitumen and bituminous binders – Sampling bituminous binders.*

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.*

3 Terms and definitions

For the purposes of this European Standard, 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 Percent elongation is calculated as $[(\text{new length} - \text{initial length}) / \text{initial length}] \times 100$ and is expressed in %.

3.3**tensile stress for a given elongation**

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

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

1) in course of revision

3.4**brittle break**

every rupture before 1333 % of percent elongation performing the force ductility test

4 Principle

A tensile test is carried out either on the bituminous binder or on the residual binder in accordance with EN 13074.

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

NOTE The specimen is a 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 mm/min \pm 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:

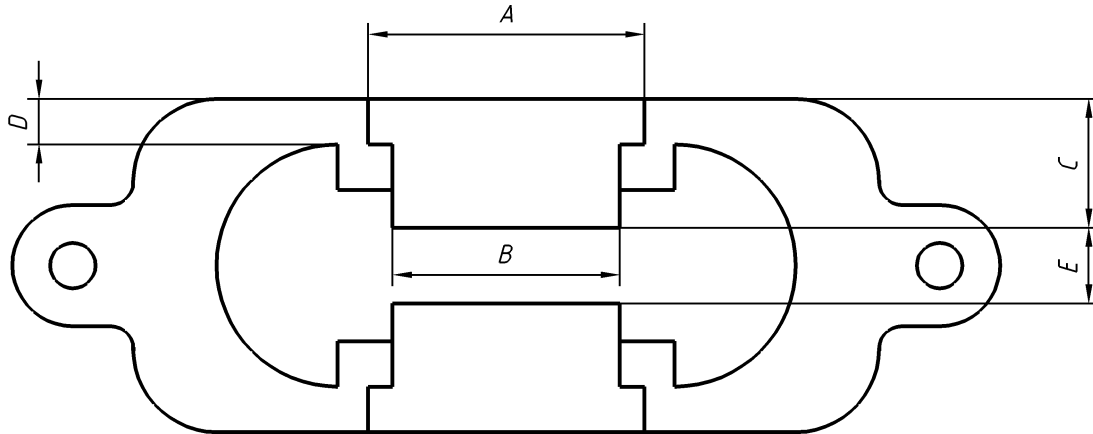
- tensile force exerted on the specimen over the range from 1 N to 300 N, to an accuracy of \pm 0,1 N.
- elongation of the specimen, either by following the movement of the attachment points or by means of an optical extensometer over the range 1 mm to not less than 450 mm to an accuracy of \pm 1 mm.

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

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 two halves, and shall have the dimensions given in Figure 1.

Both halves of a mould shall be kept in place by two diametrically opposed sliding pins. The moulds shall be placed on a base plate, also made of metal, whilst the test specimens are being cast.

**Key**A 36,5 mm \pm 2,0 mmB 30,0 mm \pm 0,1 mmC 17,0 mm \pm 0,1 mmD 6,0 mm \pm 0,1 mmE 10,0 mm \pm 0,1 mmthickness 10,0 mm \pm 0,1 mm

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Figure 1 — Specimen type**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 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. Move the halves of three moulds over each other along the slide pins 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 pieces 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 test specimens in the mould in the water bath maintained at the test temperature for at least 1 h, but not longer than 1 h 30 min, before testing. Testing shall be carried out on the same day.

7 Procedure

Run the test specimen by specimen.