

**SLOVENSKI STANDARD**  
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Bitumen and bituminous binders - Determination of the elastic recovery of modified bitumen

Bitumen und bitumenhaltige Bindemittel - Bestimmung der elastischen Rückstellung von modifiziertem Bitumen

Bitumes et liants bitumineux - Détermination du retour élastique des bitumes modifiés

**Ta slovenski standard je istoveten z: FprEN 13398**

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**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 elastic recovery of modified bitumen

Bitumes et liants bitumineux - Détermination du retour élastique des bitumes modifiés

Bitumen und bitumenhaltige Bindemittel - Bestimmung der elastischen Rückstellung von modifiziertem Bitumen

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (FprEN 13398:2009) has been prepared by Technical Committee CEN/TC 336 “Bituminous binders”, the secretariat of which is held by AFNOR.

This document is currently submitted to the Unique Acceptance Procedure.

This document will supersede EN 13398:2003.

## FprEN 13398:2009 (E)

### 1 Scope

This document specifies a method for the determination of the elastic recovery of bituminous binders in a ductilometer at the test temperature (typically 25 °C or 10 °C; other temperatures can be used).

It is especially applicable to bituminous binders modified with thermoplastic elastomers, but can also be used with other bituminous binders which generate only small recovery.

**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 12594, *Bitumen and bituminous binders — Preparation of test samples*

EN 13589, *Bitumen and bituminous binders — Determination of the tensile properties of modified bitumen by the force ductility method*

ISO 5725 (all parts), *Accuracy (trueness and precision) of measurement methods and results*

### 3 Terms and definitions

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

#### 3.1

##### **bitumen thread**

test specimen of moulded bitumen, stretched to a thread

#### 3.2

##### **half-threads**

two pieces obtained, when a bitumen specimen has been stretched by 200 mm to a thread and then cut in the middle

#### 3.3

##### **elastic recovery**

expressed as a percentage of the distance between the ends of the half-threads, which has developed 30 min after the division relative to the elongation length of 200 mm

### 4 Principle

A bituminous binder specimen is stretched at the test temperature and a constant rate of 50 mm/min to a predetermined elongation (200 mm). The bitumen thread thus produced is cut in the middle to obtain two halves of thread. After a predetermined time for recovery has elapsed, the shortening of the half threads is measured and expressed as the percentage of the elongation length.

## 5 Apparatus

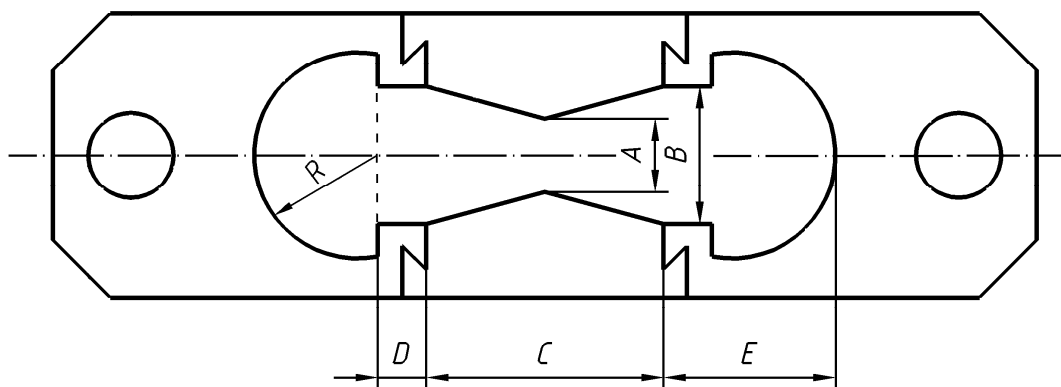
Usual laboratory apparatus and glassware, together with the following:

**5.1 Specimen moulding equipment**, the moulds shall be made of metal, shall consist of two halves, 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 13589. The inner radius  $R$  of the clips should be of  $(15,5 \pm 0,7)$  mm, the opening width  $B$  ( $20,0 \pm 0,2$ ) mm and the inner length of the clips  $E$  ( $= R + D$ ) should be  $(22,8 \pm 0,9)$  mm (see Figure 1).

**IMPORTANT — Tolerances of dimensions  $D$  and  $R$  are larger than usual, thus ASTM D113 mould can also be used.**

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, and pressed together by the knurled screw whilst the test specimens are being cast.



### Key

	Dimension mm	Tolerance mm
A	10,0	$\pm 0,2$
B	20,0	$\pm 0,2$
C	30,0	$\pm 0,3$
D	7,3	$\pm 0,5$
$E = R + D$	22,8	$\pm 0,9$
R	15,5	$\pm 0,7$
Thickness	10,0	$\pm 0,1$

Figure 1 — Mould type (normative dimensions, informative design)

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**5.2 Ductilometer**, consisting of a water bath (5.2.1) with a temperature control (5.2.3) and a traction device (5.2.2).

### 5.2.1 Water bath

The water bath shall allow elongation of the test specimen to at least 200 mm. It shall be designed in such a way that at least two specimens can be tested in parallel. The distance between each mould and between the walls of the water bath shall be at least 10 mm. The water level shall be such that there is at least 25 mm of water above and below the specimen.

Circulation of the bath water via a thermostat and, possibly, additional thermal insulation of the water bath shall guarantee the required test temperature within  $\pm 0,5$  °C. Circulation shall be maintained during the test at a reduced rate of approximately 1,5 l/min.

NOTE It may be advisable to direct the water stream at the inlet against a baffle plate to avoid turbulent water flow.

### 5.2.2 Traction device

The traction device shall allow two specimens to be tested in parallel. The traction plates shall be exactly positioned by a stop switch allowing easy introduction of the pins into the holes of the clips with ease. The drive of the traction device shall be designed in such a way that the combined movement of the pins during the entire test is steady at a constant rate of  $(50,0 \pm 2,5)$  mm/min. The drive should be sufficiently powerful to overcome high deformation resistance at the beginning of the test without speed loss.

### 5.2.3 Temperature control

The temperature control shall be capable of maintaining the test temperature within the water bath of the ductilometer constant within a limit of  $\pm 0,5$  °C.

**5.3 Knife**, with a straight blade of at least 40 mm length or a plane blade.

**5.4 Mould release agent**, mixture of one part glycerine and one part dextrine.

**5.5 Scissors**

**5.6 Ruler** with scale divisions to 1 mm.

## 6 Preparation of test samples

### 6.1 General

Ensure that the laboratory sample is representative of the bituminous binder to be analysed, in accordance with EN 58. Ensure that the laboratory sample is homogeneous and non-contaminated. The test samples shall be prepared in accordance with EN 12594.

### 6.2 Preparation of the moulds

The base plate and the inner walls of the sides-pieces shall be applied with a thin coat of the release agent. Assemble the clips and sides on the base plate and arrest them with the knurled screw. Ensure that the specified distance between the sides is achieved (Dimension A on Figure 1).

### 6.3 Filling the moulds

The slightly heated moulds shall be carefully filled with the bitumen up to the surfaces of the moulds with a meniscus protruding.