

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 13589:2018 sisaldab Euroopa standardi EN 13589:2018 ingliskeelset teksti.	This Estonian standard EVS-EN 13589:2018 consists of the English text of the European standard EN 13589:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
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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 22 July 2016.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## European foreword

This document (EN 13589:2018) 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 December 2018, and conflicting national standards shall be withdrawn at the latest by December 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 13589:2008 and EN 13703:2003.

This document contains the following changes compared to EN 13589:2008:

- updated normative references;
- additional terms and definitions;
- deleting determination of deformation energy by EN 13703;
- introduction of calculation methods of deformation energy in the standard;
- updated bibliography;
- combining time frame EN 13589 with EN 13587;
- renaming “conventional energy” by “cohesion energy”;
- complying with CEN/CENELEC Internal Regulations – Part 3:2011, 6.6.8.3: “Each group of three digits reading to the left and to the right of the comma sign shall be separated by a small space from preceding digits or following digits respectively, except for four-digit numbers designating years”;
- complying with CEN/CENELEC Internal Regulations – Part 3 – June 2015, 6.6.8.1: “The decimal point shall be a comma on the line in all language versions”.

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 European Standard specifies a method for determining the tensile properties of an unaged, aged, residual or recovered 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 13398, *Bitumen and bituminous binders — Determination of the elastic recovery of modified bitumen*

## 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 1 to entry: Elongation is also expressed in % from the initial length. It is calculated as  $[(\text{new length} - \text{initial length}) / \text{initial length}] \times 100$ .

### 3.3

#### **break**

every rupture before 1 333 % of elongation performing the force ductility test

### 3.4

#### **deformation energy**

$E_i$

energy in joules (J) supplied by test pieces, until displacement,  $i$ , of the moving element