

Bitumen and bituminous binders - Determination of cohesion of bituminous binders with pendulum test

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 13588:2017 sisaldab Euroopa standardi EN 13588:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 13588:2017 consists of the English text of the European standard EN 13588:2017.
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English Version

Bitumen and bituminous binders - Determination of  
cohesion of bituminous binders with pendulum test

Bitumes et liants bitumineux - Détermination de la  
cohésion des liants bitumineux par la méthode du  
mouton-pendule

Bitumen und bitumenhaltige Bindemittel -  
Bestimmung der Kohäsion von bitumenhaltigen  
Bindemitteln mit der Pendelprüfung

This European Standard was approved by CEN on 7 August 2017.

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## European foreword

This document (EN 13588:2017) 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of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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

This document supersedes EN 13588:2008.

This document contains the following main changes compared to EN 13588-2008:

- More extensive description of the types of binders to which the test is applicable and reduction of the scope in terms of temperature range (Clause 1);
- Normative references are updated (Clause 2 and Bibliography);
- More precise description on how to determine peak cohesion and its associated temperature. More precise description on how to determine the end points of a full cohesion curve (value  $C_L$  of cohesion) and the associated temperatures ( $T_{low}$  and  $T_{high}$ ). This leads to modifications in Clause 4, Clause 5 (Figure 1) and Clause 10 as well as in Clause 7 (selection of test temperatures) and Clause 8 (introduction of Figures 6 and 7);
- Dials graduated in grades and equipment with digital display are allowed (6.1.3);
- Clarification on the estimated number of needed test assemblies (6.1.4);

A NOTE is introduced under Clause 6.3 to recommend the use of stainless steel cubes and cube supports and warn against the risk of adhesive failure when water baths are used. Storage times in liquid or air baths are revised (7.4);

- 6.4 (thermometer) is discarded since this clause is not called by the test procedure and temperature control requirements are already covered by 6.3;
- Greater emphasis is given to the control and reporting of the thermal history of the test sample (7.2.3 and 10);
- More detailed instructions on how to prepare (7.3) and store (7.4) the test assemblies. Introduction of a new informative Annex describing a possible feature for maintaining cubes in place;
- Clarification on the number of test assemblies to be tested and the definition of a valid result (7.6.1, 7.6.2 and 8.1);
- Possibility is given for a simplified determination of an average value for  $\alpha'$  (7.6.3);
- Improved explanations on special precautions which may have to be taken (7.6.4);

- Figures 3, 4 and 5 are corrected so as to be in agreement with 6.1.4 and 7.5;
- Worksheet in Annex B is no longer mandatory and required in the test report (Clause 10) but is given as an example.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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.

## Introduction

The cohesion is one of the measures of the performance of a bituminous binder. It is important to use binders which have a sufficient level of cohesion according to the level of traffic to be supported. Cohesion test with the pendulum has originally been developed for surface dressing however it can be used for any type of binder which is to be used in different types of road applications. Knowledge of cohesion enables the choice of binder type for given traffic and site conditions.

This European Standard describes the method for determining the cohesion of a bituminous binder with a pendulum and how to draw the cohesion curve as a function of temperature.

## 1 Scope

This European Standard specifies a method for measuring the cohesion of bituminous binders at temperatures in the range of (+ 10 °C) to (+ 70 °C) and for expressing the relationship between cohesion and temperature.

In the case of cut-back and fluxed bituminous binders and for bituminous emulsions, the tested binder may be the result of a specific distillation, recovery and/or stabilization procedure.

The method may also be applied to binders which have undergone a specific ageing procedure.

**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 1427, *Bitumen and bituminous binders - Determination of the softening point - Ring and Ball method*

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

## 3 Terms and definitions

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

### 3.1 cohesion

energy per unit area required to fully detach a cube from the support, with the previously-bonded faces of cube and support remaining fully covered by binder

Note 1 to entry: If the cube remains attached to the support after the test, the value measured by the test is always less than the actual cohesion value. In such case, the test result can however be used to establish that the binder has more than a specified minimum value of cohesion.

## 4 Symbols

For the purposes of this European Standard, the following symbols apply.

$\alpha$	angle indicated by the device after launching the pendulum and impacting a cube placed on and adhered to the support by binder
$\alpha'$	angle indicated by the device after launching the pendulum and impacting a cube with binder, placed on but not adhered to the clean support
$C$	cohesion of the binder determined for a specified temperature
$C_L$	limit value of cohesion at the low and high temperature end-points of the cohesion curve
$C_m$	maximum value of cohesion at the top of the curve