Bitumen and bituminous binders - Determination of the resistance to hardening under influence of heat and air - Part 2: TFOT method

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NATIONAL FOREWORD

See Eesti standard EVS-EN 12607-2:2014 sisaldab Euroopa standardi EN 12607-2:2014 inglisekeelset teksti.	This Estonian standard EVS-EN 12607-2:2014 consists of the English text of the European standard EN 12607-2:2014.
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.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 05.11.2014.	Date of Availability of the European standard is 05.11.2014.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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English Version

Bitumen and bituminous binders - Determination of the resistance to hardening under influence of heat and air - Part 2: TFOT method

Bitumes et liants bitumineux - Détermination de la résistance au durcissement sous l'effet de la chaleur et de l'air - Partie 2: Méthode TFOT

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Beständigkeit gegen Verhärtung unter Einfluss von Wärme und Luft - Teil 2: TFOT-Verfahren

This European Standard was approved by CEN on 16 August 2014.

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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.

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Foreword

This document (EN 12607-2:2014) 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of an identical text or by endorsement, at the latest by May 2015 and conflicting national standards shall be withdrawn at the latest by May 2015.

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 12607-2:2007.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

In comparison with EN 12607-2:2007, the following significant changes have been made:

— changed/added wording of the Warning in the Scope;

— EN 12595, *Bitumen and bituminous binders — Determination of kinematic viscosity* has been added to Clause 2;

— the reference to mercury thermometer has been deleted (see subclause 4.2) and Annex A is informative.

EN 12607 consists of the following parts under the general title “*Bitumen and bituminous binders – Determination of the resistance to hardening under the influence of heat and air*”:

— *Part 1: RTFOT method;*

— *Part 2: TFOT method;*

— *Part 3: RFT method.*

The scope of this standard has been enlarged by adding oxidized bitumens and hard industrial bitumens that are not used for paving applications. The reason is to facilitate that EN 13303, *Bitumen and bituminous binders – Determination of the loss of mass after heating of industrial bitumen* can be replaced in product standards by EN 12607-2 at the next revision of EN 13303.

It is to be noted that this – if so decided – will change the property from loss in mass into change in mass in EN 13304, *Bitumen and bituminous binders – Framework for specification of oxidized bitumens* and in EN 13305, *Bitumen and bituminous binders – Framework for specification of hard industrial bitumens*.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This part of EN 12607 specifies a method for measuring the combined effects of heat and air on a film of bitumen or bituminous binder, simulating the hardening which most bituminous binders undergo during mixing in an asphalt mixing plant. The method is suitable for other bituminous binders than paving grade bitumen, but the reference temperature might give excessive hardening that does not resemble real conditions during mixing at the plant. The method may not represent the hardening that occurs during mixing of warm mix binders.

Additionally, this part of EN 12607 specifies a method for the determination of the change in mass of oxidized bitumens and hard industrial bitumens after heating. The method is used to detect volatile components.

The method is referred to as TFOT, i.e. Thin Film Oven Test.

WARNING — Use of this European Standard can 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 identify the hazards and assess the risks involved in performing this test method and to implement sufficient control measures to protect individual operators (and the environment). This includes appropriate safety and health practices and determination of the applicability of regulatory limitations prior to use.

If there is a likelihood of volatile components being present in a binder, this procedure should not be used. It should not be used for cut-back bitumen or bituminous emulsions before these products have been stabilized, e.g. in accordance with EN 13074-2**.**

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 1425, *Bitumen and bituminous binders - Characterization of perceptible properties*

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

EN 12595, *Bitumen and bituminous binders - Determination of kinematic viscosity*

3 Principle

A film of bituminous binder is heated in an oven at a specified temperature for a given period of time.

For bituminous binders for paving applications, the effects of heat and air are determined based on the change in mass (expressed as a percentage) and on the change in the bituminous binder's properties such as kinematic viscosity according to EN 12595, before and after the period in the oven.

For bituminous binders for industrial applications, the combined effects of heat and air and loss of volatiles are determined based on the change in mass (expressed as a percentage). This will be the value from this conditioning method that will be utilized in EN 13304 and EN 13305 as loss in mass (change in sign).

NOTE Penetration according to EN 1426 and softening point according to EN 1427 can be measured on harder grades before and after oven treatment at 163 °C.