BS EN 12596:2023

BSI Standards Publication

Bitumen and bituminous binders — Determination of dynamic viscosity by vacuum capillary

National foreword

This British Standard is the UK implementation of EN 12596:2023. It supersedes BS EN 12596:2014, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PTI/13, Petroleum Testing and Terminology.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Bitumen and bituminous binders - Determination of dynamic viscosity by vacuum capillary

Bitumes et liants bitumineux - Détermination de la viscosité dynamique par viscosimètre capillaire sous vide

Bitumen und bitumenhaltige Bindemittel - Bestimmung der dynamischen Viskosität mit Vakuum-Kapillaren

This European Standard was approved by CEN on 28 May 2023.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword

This document (EN 12596:2023) 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of an identical text or by endorsement, at the latest by January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

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 12596:2014.

In comparison with the previous edition, the main technical changes are:

— amended scope (clarification of applicability of test methods); deletion of notes from scope;

— “accuracy” is changed to “maximum permissible error” in several clauses (5.2, 5.4, 5.5 and 5.6);

— reference to mercury thermometer deleted (5.2);

— reference to total immersion thermometer deleted (5.2);

— maximum permissible error for temperature of bath changed from 0,5 °C to 0,3 °C (5.3);

— the required precision of the oven reduced to (135 ± 5) °C in (5.7, 7.2, 7.4 and 7.5);

— time to reach thermal equilibrium prolonged to 1 hour;

— “bulb” changed into “tube section” in 5.1.2, 5.1.3, Figures A.2 and A.3, and added “tube section” to Clause 9 (consistency of wording);

— new subclause 5.8 added on Calibration/Verification;

— information on validity of individual test data to calculate mean value added in Clause 8; including a new NOTE 2 and renumbering existing notes respectively;

— appropriate range of flow time readings added in Clause 9;

— Table B.1 updated with informative values for viscosity standards;

— all time measurements with a maximum permissible error of 0,1 s in B.3.1;

— Annex C deleted;

— new Annex C introduced with examples on calculation;

— ASTM E77-98 deleted from the Bibliography;

— reference to ASTM D2171-01 in Bibliography updated and reference (footnote) to Institute of Petroleum deleted.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies a method for the determination of the dynamic viscosity of bituminous binders by means of a vacuum capillary viscometer at 60 °C in a range between 0,003 6 Pa·s and 580 000 Pa·s. Other temperatures are possible if calibration constants are known. Bituminous emulsions and non-newtonian binders (e.g. some polymer modified bitumen) are not within the scope of this method.

WARNING — The use of this document can involve hazardous materials, operations and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this document 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.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 3696:1995, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
dynamic viscosity
ratio between the applied shear stress and the velocity gradient

Note 1 to entry: Dynamic viscosity is a measure of the resistance to the flow of a liquid and is commonly called the viscosity of the liquid. For the purposes of this document, the word viscosity means the dynamic viscosity of a liquid.

Note 2 to entry: The SI unit of dynamic viscosity is Pa·s.

3.2
newtonian liquid
liquid with a viscosity that is independent of the rate of shear

Note 1 to entry: The constant ratio of the shear stress to the velocity gradient is the dynamic viscosity of the liquid. If this ratio is not constant, the liquid is non-Newtonian.