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BSI Standards Publication

Bituminous mixtures - Test methods

Part 5: Determination of the maximum density

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National foreword

This British Standard is the UK implementation of EN 12697-5:2018. It supersedes BS EN 12697-5:2009, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/510/1, Asphalt products.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Amendments/corrigenda issued since publication

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English Version

Bituminous mixtures - Test methods - Part 5: Determination of the maximum density

Mélanges bitumineux - Méthodes d'essai - Partie 5:
Masse volumique réelle (MVR)

Asphalt - Prüfverfahren - Teil 5: Bestimmung der
Rohdichte

This European Standard was approved by CEN on 9 November 2018.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 12697-5:2018) has been prepared by Technical Committee CEN/TC 227 "Road materials", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by June 2019 and conflicting national standards shall be withdrawn at the latest by June 2019.

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 12697-5:2009.

The following is a list of significant technical changes since the previous edition:

- the title no longer makes the method exclusively for hot mix asphalt;
- [3.1] The term "bituminous material" amended to "bituminous mixture" in line with other parts;
- [4] New NOTE explaining when use of solvent is not suitable;
- [5.1] Demineralized water added as an option, including [9.2.3], [9.2.5], [9.3.3];
- [6.4] Amended description of accuracy for balance;
- [6.8] The NOTE has been converted to regular text;
- [7.2] Added description of loose samples and minimum thickness for cored samples for consistency with EN 12697-6;
- [7.3] New subclause and NOTE introduced, describing recording of thickness before cutting and cutting of cored samples;
- [7.4] New subclause describing recording of thickness after cutting and description on when a cut sample shall be regarded as representative with respect to the original thickness;
- [8.2] NOTE 2 added, explaining extended drying time to constant weight when waterabsorbing additives are used; previous NOTE renumbered to "NOTE 1";
- [9.2.3] New NOTE explaining when use of solvent is not suitable;
- [9.4.1] Subclause amended to include also the proportion of additives in total mass;
- [10.1.2] Formula (1) amended according to corrigendum EN 12697-5:2009/AC:2012;
- [10.3] Density of water amended to the nearest "0,0001" Mg/m³ in accordance with [10.1.2]. Change includes also [10.2], [B.5.5] and [C.7];
- [10.4] Symbols for binder density and binder content changed to harmonise with other standards

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- [10.4.1 and 10.4.2] Formula (4) and (5) amended to include also the proportion of additive; paragraph added, explaining that completely dry state is to be considered for additives absorbing water;
- [A.2.5] New subclause describing when use of solvent is not suitable; explanatory NOTE added;
- [Annex B] Symbols for binder density and binder content changed in order to harmonize with other standards.

A list of all parts in the EN 12697 series can be found on the CEN website.

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.

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Introduction

WARNING — The method described in this standard may require the use of dichloromethane (methylene chloride), this solvent is hazardous to health and is subject to occupational limits as detailed in relevant legislation and regulations.

Exposure levels are related to both handling procedures and ventilation provision and it is emphasized that adequate training should be given to staff employed in the usage of these substances.

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1 Scope

This document specifies test methods for determining the maximum density of a bituminous mixture (voidless mass). It specifies a volumetric procedure, a hydrostatic procedure and a mathematical procedure.

The test methods described are intended for use with loose bituminous mixtures containing paving grade bitumens, modified binders or other bituminous binders used for bituminous mixtures. The tests are suitable for both fresh and aged bituminous mixtures.

Samples may be supplied as loose material or as compacted material; it is advised to separate the latter first.

NOTE General guidance on selection of a test procedure to determine the maximum density of a bituminous mixture is given in Annex A.

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 1097 (all parts), *Tests for mechanical and physical properties of aggregates*

EN 12697-1, *Bituminous mixtures — Test methods for hot mix asphalt — Part 1: Soluble binder content*

EN 12697-27, *Bituminous mixtures — Test methods — Part 27: Sampling*

EN 12697-28, *Bituminous mixtures — Test methods for hot mix asphalt — Part 28: Preparation of samples for determining binder content, water content and grading*

EN ISO 3838, *Crude petroleum and liquid or solid petroleum products — Determination of density or relative density — Capillary-stoppered pycnometer and graduated bicapillary pycnometer methods (ISO 3838)*

3 Terms and definitions

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

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

- Electropedia I.E.C. available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 maximum density

mass per unit volume without air voids of the bituminous mixture

3.2 bulk density

mass per unit volume including the air voids of a specimen