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Bituminous mixtures - Test methods - Part 49: Determination of friction after polishing

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Bituminous mixtures - Test methods - Part 49: Determination of friction after polishing

Mélanges bitumineux - Méthodes d'essai - Partie 49 : Détermination du frottement après polissage

Asphalt - Prüfverfahren - Teil 49: Messung der Griffigkeit nach dem Polieren

This European Standard was approved by CEN on 15 November 2021.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 12697-49:2022) 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of an identical text or by endorsement, at the latest by August 2022, and conflicting national standards shall be withdrawn at the latest by August 2022.

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 12697-49:2014.

The main changes compared to the previous edition are listed below:

— The title no longer refers to hot mix asphalt;

— [Introduction] added, giving the general context of the test method and the need to improve it;

— [1] Possibility of following Friction After Polishing (FAP) evolution as a function of the number of polishing passes. NOTE deleted since the Wehner and Schulze method is now mentioned in the Introduction;

— [2] and [5.1.4.5] Change of normative reference to ISO 48-4 for the determination of Shore hardness;

— [3.1.1] Rewording of the definition of pass, and information given as a Note to entry;

— [3.1.2] Definition of FAP added;

— [3.2] Title completed;

— [3.2] Introduction of the symbol μ, and rewording of μ_{ref} and μ_{FAP} definition;

— [3.2] Deletion of the symbol Ø;

— [5.1.1] Addition of reference to Annex A;

— [5.1.1] Completed with obligation to work in specified temperature and humidity room conditions;

— [5.1.2.3] Requirements for H modified (value and tolerance);

— [5.1.2.3] Figure 2 corrected (D_1 and D_2);

— [5.1.2.3] Introduction of additional requirements for polishing rollers storage;

— [5.1.2.3] Modification of requirement for the number of conditioning passes;

— [5.1.2.5] Addition of a clause about the washing device;

— [5.1.4] Rewording of title;

— [5.1.4.2] Rewording of title, and deletion of the requirement for inertia moment;

— [5.1.4.3] Modification the title. And “moment” replaced by “torque” in all the document;

— [5.1.4.3] Modification of the tolerance for torque measurement;

— [5.1.4.5] Modification of the criteria for resilience of sliding blocks. Deletion of Table 1 and following paragraph. Following tables renumbered accordingly;

— [5.1.4.5] Figure 4 corrected since it was mirror inverted. Correction of the rotation radius value;

— [5.2] Rewording of title, definition of μ_{ref} value transferred to 3.2;

— [5.3] Additional requirements for sand-blasting equipment;

— [6.1] Additional recommendations for quartz powder;

— [6.2] Additional requirements for water/quartz-powder mixture;

— [6.3] Addition of a footnote about the supplier of corundum;

— [7.1.1] Addition of a new sub-heading “7.1.1 General”. Following subclauses renumbered accordingly;

— [7.1.1] Achievement – or not – of sandblasting according to the test and/or product context;

— [7.1.2] Rewriting of sandblasting procedure, and change of storage position;

— [7.1.3] Modification of thickness requirement and change of storage position;

— [7.1.4] New clause added for the conditioning of specimens;

— [7.2] Polishing procedure completed for conditioning, water/quartz-powder mixture, washing;

— [7.2] Clause now subdivided in tree sub clauses;

— [7.2.3] Clarification of the number of passes for “other applications”;

— [7.2.3] Requirement for the consistency of torque value imported from 5.1.2.3;

— [7.3.1] Obligation of pre-test check for each specimen;

— [7.3.2] Additional dispositions about water introduction, torque values recording and control plate test;

— [8.1] Title modified and Clause totally rewritten for more clarity and consistency;

— [8.1] Formula (1) modified;

— [8.2] Formula (2) moved to 8.1 Formula (3);

— [8.2] Rewording of the criterion for validating the test, and possibility of a curve FAP against passes;

— [9] Information to be reported simplified. Added references to Clauses 8.1 and 8.2 for the calculation;

— [10] Update of the precision values;

— [Annex A] In Figure A.1, correction of the key line 4;

— [Annex B] New informative annex added to provide results from the curve FAP against passes;

— [Annex C] New informative annex added to provide information about national experiences;

— [Bibliography] Updated.

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

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, Turkey and the United Kingdom.

Introduction

Regarding skid resistance of road surfaces, the test of the polished stone value, PSV according to EN 1097-8 has long been a reference [1]. It characterizes a curved specimen of a coarse aggregate, but cannot alone predict the adhesion of a bituminous mixture once it is in place. A second limit is that it characterizes one surface state of the coarse aggregate, but does not provide any information about its speed of evolution under a polishing action.

In the 1960s Pr B. Wehner and K.-H. Schulze developed testing devices, able to polish and characterize the skid resistance of a flat specimen, of coarse aggregate, sand, or bituminous mixture, and to follow its evolution as a function of the number of polishing passes [2]. After different developments of the so-called “Wehner and Schulze apparatus”, this test method, applied to bituminous mixtures, became in 2014 the European Standard EN 12697-49, *Bituminous mixtures - Test methods for hot mix asphalt - Part 49: Determination of friction after polishing*. It characterizes one surface state of a bituminous mixture after a fixed number of polishing passes.

The use of this standard in different European countries (see Annex C) in recent years, in contexts of tenders and/or research, brought to light the need to improve it in both metrological and operating aspects. It is the subject of this document, which should accordingly lead to improve the reproducibility of the test.

1 Scope

This document specifies a method to determine the friction at 60 km/h after polishing during a fixed number of passes on surfaces of bituminous mixtures samples, or to follow its evolution as a function of the number of polishing passes.

The samples used are either produced in a laboratory or are cores taken from the site.

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

EN 12697-33, *Bituminous mixtures - Test method - Part 33: Specimen prepared by roller compactor*

ISO 4662, *Rubber, vulcanized or thermoplastic — Determination of rebound resilience*

ISO 48-4, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)*