



SLOVENSKI STANDARD
SIST EN 12697-15:2022

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Nadomešča:
SIST EN 12697-15:2004

Bitumenske zmesi - Preskusne metode - 15. del: Ugotavljanje občutljivosti na segregacijo

Bituminous mixtures - Test methods - Part 15: Determination of the segregation sensitivity

Asphalt - Prüfverfahren - Teil 15: Bestimmung der Entmischungsneigung

Mélanges bitumineux - Méthodes d'essai - Partie 15: Détermination de la sensibilité à la ségrégation

Ta slovenski standard je istoveten z: EN 12697-15:2022

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ICS:

93.080.20 Materiali za gradnjo cest Road construction materials

SIST EN 12697-15:2022

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EUROPEAN STANDARD

EN 12697-15

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2022

ICS 93.080.20

Supersedes EN 12697-15:2003

English Version

Bituminous mixtures - Test methods - Part 15: Determination of the segregation sensitivity

Mélanges bitumineux - Méthodes d'essai - Partie 15 :
Détermination de la sensibilité à la ségrégation

Asphalt - Prüfverfahren - Teil 15: Bestimmung der
Entmischungsneigung

This European Standard was approved by CEN on 19 December 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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 12697-15:2022) 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 12697-15:2003.

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

- the title no longer refers to hot mix asphalt;
- (ge) editorial update according to current standard template;
- addition of new clause “Introduction” according to CEN/CENELEC Internal Regulations Part 3:2019;
- Clause 1, scope clarified according to CEN/CENELEC Internal Regulations Part 3:2019;
- Clause 4, previous clause “Significance and use” deleted. 1st and 2nd paragraph transferred to Introduction. 3rd paragraph including NOTE transferred to Scope (modified);
- Clause 4, revised title to “Principal”. Following clauses renumbered;
- Clause 5, correction of Figure 1 (Clause 6 in previous version);
- Clause 9, completed with references to formulas: “(percentage)” replaced by: “to the nearest 0,1 %”;
- 9.2, correction to 1 % for the calculation of the aggregate segregation value;
- Clause 10, revision of data to be reported.

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

The homogeneity of the quality level of a bituminous pavement is among others determined by the homogeneity of the composition of the bituminous mixtures applied. The homogeneity of a bituminous mixture in the pavement is influenced by the mixing quality during production and by its segregation sensitivity during handling. The latter is influenced by the mixture composition in terms of type and amount of aggregate and binder. Some segregation is inherent to the nature of bituminous materials. Undue segregation is caused by e.g. not appropriate mixing, improper loading of the hopper, lorry or finisher.

This test method provides useful information on the homogeneity quality of a bituminous mixture. The test data provide information on the efficacy of the mixing procedure and on the sensitivity of the mixture for segregation in its composition during the handling so that appropriate measures can be taken to minimize such segregation where considered necessary.

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1 Scope

This document specifies a test method for the determination of the mixing quality and the tendency of segregation in composition of bituminous mixtures. This test method is considered suitable for mix-design purposes and for client information.

NOTE This test method is based on hot bituminous mixtures. There is no experience for other types of bituminous mixtures, e.g. asphalt concrete with bituminous emulsions.

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 933-1, *Tests for geometrical properties of aggregates - Part 1: Determination of particle size distribution - Sieving method*

EN 12697-1, *Bituminous mixtures - Test methods - Part 1: Soluble binder content*

EN 12697-2, *Bituminous mixtures - Test methods - Part 2: Determination of particle size distribution*

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

EN 12697-35, *Bituminous mixtures - Test methods - Part 35: Laboratory mixing*

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:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

mixing quality

homogeneity of the composition of a bituminous mixture immediately after mixing

3.2

segregation

variability of the aggregate grading and the corresponding binder content in a well-mixed bituminous mixture, due to differential movements of coarse and fine aggregate particles when handling the mixture

3.3

segregation value

difference in bitumen content or sieving result between the fine and the coarse parts of a segregated mixture

EN 12697-15:2022 (E)**4 Principle**

A sample of the bituminous mixture is placed in a temperature-conditioned conical hopper. The bottom slide board of the hopper is opened, and the mixture falls down onto a platform. A conical stockpile is formed. A deadfall in the platform under the centre of the stockpile is opened. The interior finer part of the stockpile flows through the opening. The opening is then expanded further and an intermediate part flows through the expanded opening. The bitumen content and the grading of the finer interior part and the remaining coarser part of the bituminous mixture are determined.

The binder segregation value is calculated as the difference between the bitumen content of the finer interior part and the remaining coarser part. The aggregate segregation value is calculated per sieve for the coarse aggregate sieves as the difference of the sieve result between the finer part and the coarser part. The mixing quality value is calculated as the difference of the binder content between the mastic subpart of the finer part and of the coarser part.

For more detailed information, the intermediate part could be analysed to calculate the differences between the three parts in the same way.

5 Apparatus

5.1 Segregator (see Figure 1). A mechanical device shall facilitate the displacement of the bottom slide board.

NOTE It is advised that the segregator can be disassembled in order to preheat the storage bin.

5.2 At least three containers with a diameter of 500 mm or more.

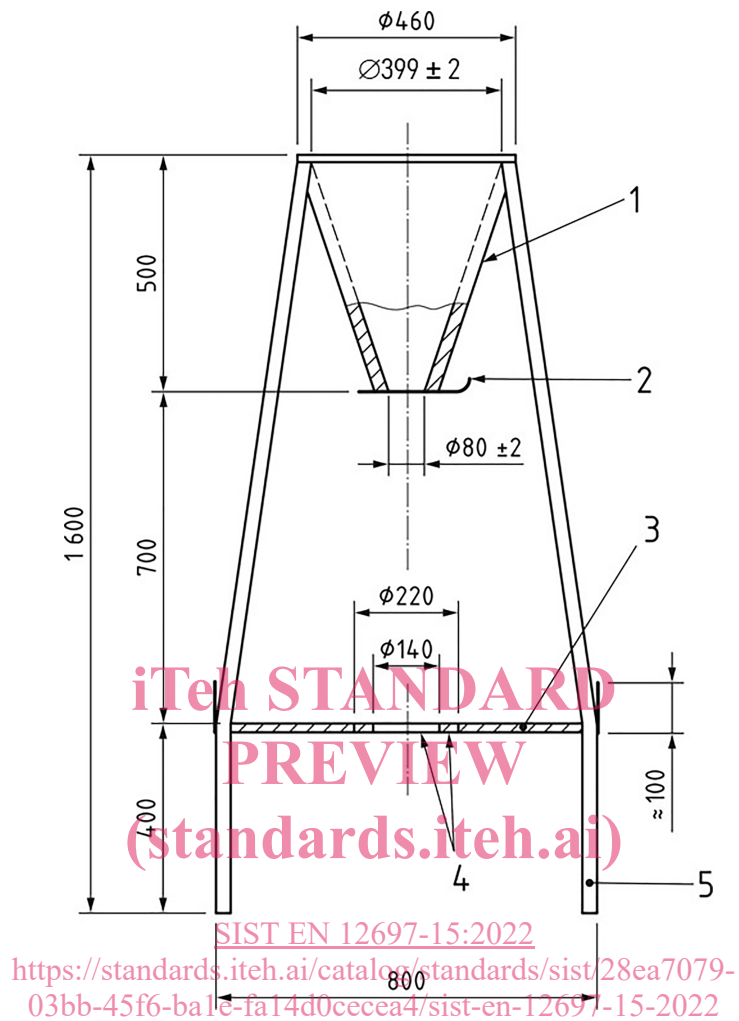
5.3 Balance with a maximum permissible error of 0,1 kg.

5.4 Heating arrangement for the storage bin of the segregator capable of maintaining temperatures up to 200 °C with a maximum permissible error of 2 °C, e.g. a drying oven capable of accommodating the storage bin or electric cables for the heating of the storage bin.

5.5 Stopwatch with a maximum permissible error of 0,5 s.

5.6 Thermometer, to measure bituminous mixtures in a range of 100 °C to 200 °C, with a maximum permissible error of 2 °C.

Dimensions in millimetres

**Key**

- 1 insulated conical hopper
- 2 slide board
- 3 platform
- 4 deadfalls
- 5 stand

Figure 1 — Segregator with a tolerance of ± 5 mm except where other is specified

6 Preparation of test portion

The test portion can be prepared from a mixture sample produced in the laboratory, or by an asphalt plant.

In case of plant produced mixture, preferably take the sample from the mixer, or as near the mixer as possible. The mass of the bulk sample shall be at least 30 kg.

Reduce the bulk sample to test portion according to EN 12697-27. The mass of the test portion shall be (10 ± 1) kg.

EN 12697-15:2022 (E)**7 Procedure**

The hopper shall be clean and free from lubricants.

Heat the test portion to the reference temperature as specified in EN 12697-35.

NOTE When using the test for mixtures with other binders, a temperature providing the same binder viscosity can be chosen.

Heat the hopper to the reference temperature as specified in EN 12697-35 (+ 10 °C). Erect the segregator and perform immediately the following working sequence:

- place the heated test portion in the hopper;
- measure the temperature of the mixture;
- open the bottom slide board of the hopper rapidly. The test portion falls approximately 700 mm onto the platform;
- determine the time in seconds for the test portion to leave the hopper;
- open the inner deadfall (Ø 140 mm) mechanically. Collect in the first container the interior fine part of the test portion, leaving the stockpile. Determine the mass of the interior fine part to the nearest 0,1 g;
- open the outer deadfall (Ø 220 mm) mechanically. Collect in the second container the intermediate part of the test portion, leaving the stockpile. Determine the mass of the intermediate part to the nearest 0,1 g;
- collect the material remaining on the platform in the third container as the coarse part of the test portion. Determine the mass of the coarse part to the nearest 0,1 g.

8 Analysis

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Determine the bitumen content and the aggregate grading of the fine and coarse parts of the test portion according to EN 12697-1 and EN 12697-2. All material of each part shall be analysed.

Analysis of the intermediate part is not required for determination of segregation sensitivity and may be omitted from the test procedure. However, it should be included in cases where it is deemed necessary to confirm that the found binder content of this part lies between those of the two parts.

9 Calculation**9.1 The binder segregation value**

Calculate the binder segregation value to the nearest 0,1 %, according to Formula (1):

$$SV_{\text{binder}} = B_f - B_c \quad (1)$$

where

SV_{binder} is the binder segregation value, in percentage by mass, to the nearest 0,1 %;

B_f is the binder content of the fine part, in percentage by mass, to the nearest 0,1 %,

B_c is the binder content of the coarse part, in percentage by mass, to the nearest 0,1 %.