



SLOVENSKI STANDARD
SIST EN 12697-16:2025

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Nadomešča:

SIST EN 12697-16:2016

Bitumenske zmesi - Preskusne metode - 16. del: Obraba zaradi gum ježevk

Bituminous mixtures - Test methods - Part 16: Abrasion by studded tyres

Asphalt - Prüfverfahren - Teil 16: Abrieb durch Spikereifen

Mélanges bitumineux - Méthodes d'essai - Partie 16 : Abrasion par pneus à crampons

Ta slovenski standard je istoveten z: EN 12697-16:2024

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93.080.20 Materiali za gradnjo cest Road construction materials

SIST EN 12697-16:2025

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12697-16

December 2024

ICS 93.080.20

Supersedes EN 12697-16:2016

English Version

Bituminous mixtures - Test methods - Part 16: Abrasion by studded tyres

Mélanges bitumineux - Méthodes d'essai - Partie 16 :
Abrasion par pneus à crampons

Asphalt - Prüfverfahren - Teil 16: Abrieb durch
Spikereifen

This European Standard was approved by CEN on 25 November 2024.

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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 12697-16:2024) 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of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.

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 12697-16:2016.

EN 12697-16:2024 includes the following significant technical changes with respect to EN 12697-16:2016:

- [2] deletion of “for hot mix asphalt” from the titles of test methods in the EN 12697 series;
- [4.2.1] NOTE deleted;
- [4.2.4] completed paragraph with “Rockwell C-scale” for clarity;
- [4.2.9] revised description of requirement. “Accuracy” amended to “maximum permissible error”;
- [4.3.2] deletion of Clause 4.3.2. Following Clauses re-numbered;
- [4.3.3] clarification of paragraph. Deletion of NOTE. (Clause 4.3.4 in the previous edition);
- [4.7] update of the contents in the test report;
- [5.2.5] introduction of key “A” and “X” to Figure 3;
- [5.2.6], [5.2.7], [5.2.9] “accuracy” amended to “maximum permissible error”;
- [5.3.2] deletion of Clause 5.3.2. Following Clauses re-numbered;
- [5.7] update of the contents in the test report;
- [B.2.1.1] clause title amended to read “Spring balance”. Paragraph amended to clarify that the measuring capacity refers to a balance. Added reference to new sub-Clause B.2.1.2;
- [B.2.1.2] new sub-clause for “Dynamometer” introduced;
- [B.2.1.3] re-numbered sub-clause for “Measuring table”. Previously B.2.1.2;
- [B.2.2.4] NOTE deleted as no longer relevant due to introduction of Clause B.2.1.2;
- [B.2.2.4, Figure B.1] introduction of key “F” to Figure B.1;
- [Bibliography] deleted reference to EN 12697-29, *Bituminous mixtures — Test method for hot mix asphalt — Part 29: Determination of the dimensions of a bituminous specimen*.

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A list of all parts in a series can be found on the CEN website: www.cencenelec.eu.

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.

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1 Scope

This document specifies two test methods (method A and method B) for determining the susceptibility of abrasion by studded tyres, tested on cylindrical specimens of bituminous mixtures. The test methods are applicable to bituminous mixtures with aggregate with upper sieve size not exceeding 22 mm.

The tests are applicable to laboratory produced specimens or cores drilled from a slab or pavement.

NOTE 1 Method A originates from the “Prall”-method, which has been improved by comprehensive Nordic research work. The method correlates with abrasion in the field when using paving grade bitumen. According to Nordic experience, by method A the correlation between laboratory and abrasion in field is not established when polymer modified bitumen or rubber modified bitumen, etc. is used.

NOTE 2 Method B originates from Finnish experience and is suitable also when polymer modified bitumen is used. The correlation between laboratory and abrasion in field is not established when rubber is used.

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 12697-6, *Bituminous mixtures — Test methods — Part 6: Determination of bulk density of bituminous specimens*

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

EN 12697-30, *Bituminous mixtures — Test methods — Part 30: Specimen preparation by impact compactor*

EN 12697-31, *Bituminous mixtures — Test methods — Part 31: Specimen preparation by gyratory compactor*

EN 12697-32, *Bituminous mixtures — Test methods — Part 32: Specimen preparation by vibratory compactor*

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

ISO 3290-1, *Rolling bearings — Balls — Part 1: Steel balls*

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

abrasion

loss of mass by abrasive action

Note 1 to entry: Expressed as volume loss in millilitres (ml).

EN 12697-16:2024 (E)

4 Method A

4.1 Principle

A cylindrical specimen having a diameter of 100 mm and a height of 30 mm is brought to a temperature of 5 °C. The specimen is worn by abrasive action during 15 min by 40 steel spheres. The loss of volume in millilitre is recorded and is reported as the abrasion value.

4.2 Apparatus

Abrasion apparatus according to Figure 1, including a stroke, (43 ± 1) mm, and a connection rod, length (200 ± 5) mm.

The stroke height shall be measured in a way that possible backlash is included in the stroke height.

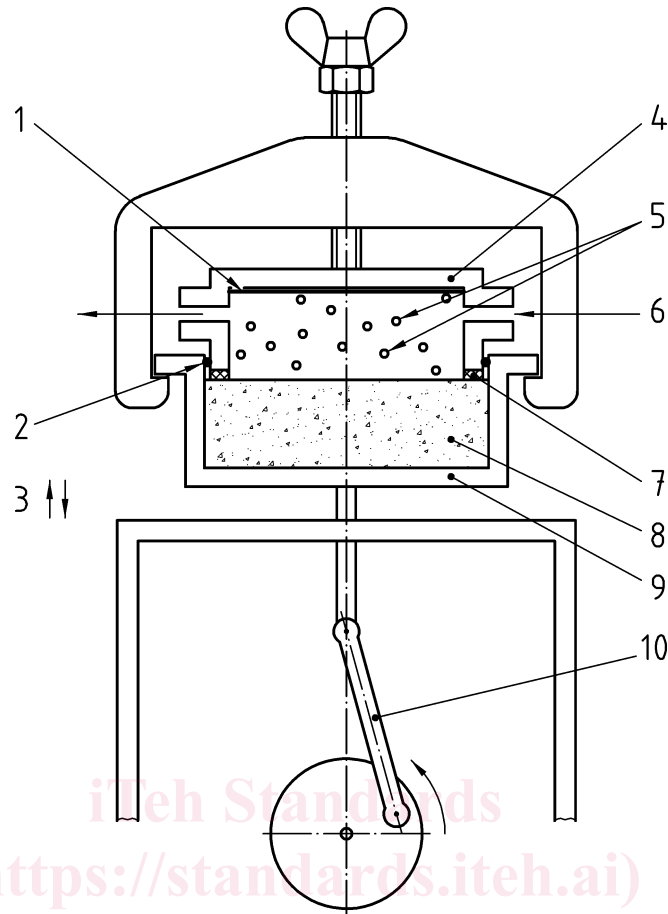
The equipment shall be mounted on a concrete foundation, the mass should be at least 300 kg, or be attached to a concrete floor. If rubber feet are used, they shall be of such quality that the equipment does not come into self-oscillation.

4.2.1 Sample collar of stainless steel for test specimen with inner diameter $(102,0 \pm 0,2)$ mm, to enable fitting of specimens made by EN 12697-30, and inner height at least 35 mm. Thickness about 6 mm. (See Figure 1, key 9).

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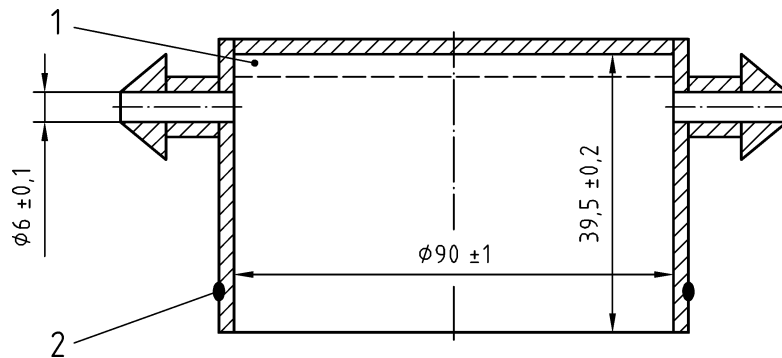
**Key**

- | | | | |
|---|---------------|----|---------------------------------|
| 1 | rubber plate | 6 | inlet/ outlet for cooling water |
| 2 | O-ring | 7 | flat rubber ring |
| 3 | stroke | 8 | specimen |
| 4 | lid | 9 | sample collar |
| 5 | steel spheres | 10 | connection rod |

Figure 1 — Abrasion apparatus, in general

4.2.2 Lid to abrasion apparatus of stainless steel with ports for water flow. The lid shall have an inner diameter (90 ± 1) mm and inner height $(39,5 \pm 0,2)$ mm. Thickness about 6 mm to enable tight fitting (with o-ring) into the sample collar. Diameter of the outlet ports $\varnothing (6,0 \pm 0,1)$ mm. (See Figure 2).

Dimensions in millimetres

**Key**

- 1 rubber plate
- 2 O-ring

Figure 2 — Lid of stainless steel

4.2.3 Steel clamp to fasten the lid on top of the machine adjustable by means of the screw at the top.

4.2.4 Spheres made of stainless steel according to ISO 3290-1 with a diameter between 11,50 mm and 12,01 mm. The hardness, expressed in Rockwell C-scale (HRC), shall be 58-65 and the weight of 40 steel balls shall be between 265 g and 285 g.

NOTE The diameter of the spheres can be checked quickly by passing them over parallel bars 11,50 mm apart.

4.2.5 Flat rubber ring made of Nitrile Butadiene Rubber (NBR) or similar, to protect the edges of the specimen (see Figure 1), outer diameter (102,0 ± 0,2) mm, internal diameter (87,4 ± 0,2) mm and thickness (6,3 ± 0,1) mm.

4.2.6 O-ring made of Nitrile Butadiene Rubber (NBR) or similar, for the groove outside of the cylindrical part of the lid (see Figure 2), internal diameter 90,0 mm, diameter of cross-section 3,0 mm.

4.2.7 Rubber plate made of Polychloroprene or similar, with diameter (90,0 ± 1,0) mm, thickness (2,0 ± 0,2) mm. The rubber plate shall be glued firmly without bubbles at the underside of the lid (see Figure 2). The rubber plate shall be replaced when it becomes damaged or brittle.

NOTE The rubber plate undergoes continuous quality degradation over time and during use.

4.2.8 Water reservoir for cooling water and for adjustment of specimen temperature to (5 ± 1) °C.

4.2.9 Balance with a maximum permissible error of 0,1 g.

4.2.10 Water pump with capacity not less than 2,0 l/min.

4.3 Test specimen

4.3.1 The cylindrical test specimens shall have a diameter of (100 ± 2) mm. The specimens shall be either laboratory-produced in accordance with EN 12697-30, EN 12697-31, or EN 12697-32, or cores drilled from the road according to EN 12697-27, or cores drilled from slabs produced in accordance with EN 12697-33.