



SLOVENSKI STANDARD
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Bitumenske zmesi - Preskusne metode - 51. del: Preskus strižne trdnosti površine

Bituminous mixtures - Test methods - Part 51: Surface shear strength test

Asphalt - Prüfverfahren - Teil 51: Scherfestigkeitsprüfung für Asphaltdecken

Mélanges bitumineux - Méthodes d'essai - Partie 51: Essai de résistance de liaison au cisaillement

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ICS:

93.080.20 Materiali za gradnjo cest Road construction materials

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TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CEN/TS 12697-51

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ICS 93.080.20

English Version

**Bituminous mixtures - Test methods - Part 51: Surface
shear strength test**

Mélanges bitumineux - Méthodes d'essai - Partie 51:
Essai de résistance au cisaillement

Asphalt - Prüfverfahren - Teil 51:
Scherfestigkeitsprüfung für Asphaltdecken

This Technical Specification (CEN/TS) was approved by CEN on 20 April 2015 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (CEN/TS 12697-51:2017) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by DIN.

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 Technical Specification is one of a series of standards as listed below:

- EN 12697-1, *Bituminous mixtures — Test methods for hot mix asphalt — Part 1: Soluble binder content*
- EN 12697-2, *Bituminous mixtures — Test methods — Part 2: Determination of particle size distribution*
- EN 12697-3, *Bituminous mixtures — Test methods for hot mix asphalt — Part 3: Bitumen recovery: Rotary evaporator*
- EN 12697-4, *Bituminous mixtures — Test methods — Part 4: Bitumen recovery: Fractionating column*
- EN 12697-5, *Bituminous mixtures — Test methods for hot mix asphalt — Part 5: Determination of the maximum density*
- EN 12697-6, *Bituminous mixtures — Test methods for hot mix asphalt — Part 6: Determination of bulk density of bituminous specimens*
- EN 12697-7, *Bituminous mixtures — Test methods for hot mix asphalt — Part 7: Determination of bulk density of bituminous specimens by gamma rays*
- EN 12697-8, *Bituminous mixtures — Test methods for hot mix asphalt — Part 8: Determination of void characteristics of bituminous specimens*
- EN 12697-10, *Bituminous mixtures — Test methods for hot mix asphalt — Part 10: Compactability*
- EN 12697-11, *Bituminous mixtures — Test methods for hot mix asphalt — Part 11: Determination of the affinity between aggregate and bitumen*
- EN 12697-12, *Bituminous mixtures — Test methods for hot mix asphalt — Part 12: Determination of the water sensitivity of bituminous specimens*
- EN 12697-13, *Bituminous mixtures — Test methods for hot mix asphalt — Part 13: Temperature measurement*
- EN 12697-14, *Bituminous mixtures — Test methods for hot mix asphalt — Part 14: Water content*
- EN 12697-15, *Bituminous mixtures — Test methods for hot mix asphalt — Part 15: Determination of the segregation sensitivity*
- EN 12697-16, *Bituminous mixtures — Test methods for hot mix asphalt — Part 16: Abrasion by studded tyres*

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- EN 12697-17, *Bituminous mixtures — Test methods for hot mix asphalt — Part 17: Particle loss of porous asphalt specimen*
- EN 12697-18, *Bituminous mixtures — Test methods — Part 18: Binder drainage*
- EN 12697-19, *Bituminous mixtures — Test methods for hot mix asphalt — Part 19: Permeability of specimen*
- EN 12697-20, *Bituminous mixtures — Test methods for hot mix asphalt — Part 20: Indentation using cube or cylindrical specimens (CY)*
- EN 12697-21, *Bituminous mixtures — Test methods for hot mix asphalt — Part 21: Indentation using plate specimens*
- EN 12697-22, *Bituminous mixtures — Test methods for hot mix asphalt — Part 22: Wheel tracking*
- EN 12697-23, *Bituminous mixtures — Test methods for hot mix asphalt — Part 23: Determination of the indirect tensile strength of bituminous specimens*
- EN 12697-24, *Bituminous mixtures — Test methods for hot mix asphalt — Part 24: Resistance to fatigue*
- EN 12697-25, *Bituminous mixtures — Test methods for hot mix asphalt — Part 25: Cyclic compression test*
- EN 12697-26, *Bituminous mixtures — Test methods for hot mix asphalt — Part 26: Stiffness*
- EN 12697-27, *Bituminous mixtures — Test methods for hot mix asphalt — 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 12697-29, *Bituminous mixtures — Test method for hot mix asphalt — Part 29: Determination of the dimensions of a bituminous specimen*
- EN 12697-30, *Bituminous mixtures — Test methods for hot mix asphalt — Part 30: Specimen preparation by impact compactor*
- EN 12697-31, *Bituminous mixtures — Test methods for hot mix asphalt — Part 31: Specimen preparation by gyratory compactor*
- EN 12697-32, *Bituminous mixtures — Test methods for hot mix asphalt — Part 32: Laboratory compaction of bituminous mixtures by vibratory compactor*
- EN 12697-33, *Bituminous mixtures — Test methods for hot mix asphalt — Part 33: Specimen prepared by roller compactor*
- EN 12697-34, *Bituminous mixtures — Test methods for hot mix asphalt — Part 34: Marshall test*
- EN 12697-35, *Bituminous mixtures — Test methods — Part 35: Laboratory mixing*
- EN 12697-36, *Bituminous mixtures — Test methods for hot mix asphalt — Part 36: Determination of the thickness of a bituminous pavement*

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- EN 12697-37, *Bituminous mixtures — Test methods for hot mix asphalt — Part 37: Hot sand test for the adhesivity of binder on precoated chippings for HRA*
- EN 12697-38, *Bituminous mixtures — Test methods for hot mix asphalt — Part 38: Common equipment and calibration*
- EN 12697-39, *Bituminous mixtures — Test methods for hot mix asphalt — Part 39: Binder content by ignition*
- EN 12697-40, *Bituminous mixtures — Test methods for hot mix asphalt — Part 40: In situ drainability*
- EN 12697-41, *Bituminous mixtures — Test methods for hot mix asphalt — Part 41: Resistance to de-icing fluids*
- EN 12697-42, *Bituminous mixtures — Test methods for hot mix asphalt — Part 42: Amount of foreign matter in reclaimed asphalt*
- EN 12697-43, *Bituminous mixtures — Test methods for hot mix asphalt — Part 43: Resistance to fuel*
- EN 12697-44, *Bituminous mixtures — Test methods for hot mix asphalt — Part 44: Crack propagation by semi-circular bending test*
- EN 12697-45, *Bituminous mixtures — Test methods for hot mix asphalt — Part 45: Saturation Ageing Tensile Stiffness (SATS) conditioning test*
- EN 12697-46, *Bituminous mixtures — Test methods for hot mix asphalt — Part 46: Low temperature cracking and properties by uniaxial tension tests*
- EN 12697-47, *Bituminous mixtures — Test methods for hot mix asphalt — Part 47: Determination of the ash content of natural asphalts*
- prEN 12697-48, *Bituminous mixtures — Test methods for hot mix asphalt — Part 48: Interlayer Bonding*
- EN 12697-49, *Bituminous mixtures — Test methods for hot mix asphalt — Part 49: Determination of friction after polishing*
- CEN/TS 12697-50, *Bituminous mixtures — Test methods — Part 50: Resistance to scuffing*
- CEN/TS 12697-51, *Bituminous mixtures — Test methods — Part 51: Surface shear strength test*
- CEN/TS 12697-52, *Bituminous mixtures — Test methods — Part 52: Conditioning to address oxidative ageing*
- prEN 12697-53, *Bituminous mixtures — Test methods — Part 53: Cohesion increase by spreadability-meter method*

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: 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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1 Scope

This Technical Specification describes a test method for measuring the surface shear strength for airfield surface courses, which is a measure of the robustness of asphalt surface courses against shearing. The surface shear strength will depend on the depth of the surface course together with the properties of the surface course material. The binder course material and any bonding agent applied between the two layers may have an influence on the test result for, in particular, ultra-thin surface course.

NOTE The test was designed for use on airfield runways and taxiways.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

3 Terms and definitions

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

3.1

surface shear strength

torsional strength around the circumference of loading within the surface course and, possibly, a combination of the rotational shear strength between layers of an asphalt pavement and the torsional strength around the circumference of loading within the binder course

Note 1 to entry: The surface shear strength will depend on the thickness of the surface course together with the properties of the surface course material, the binder course material and any bonding agent applied between the two layers.

Note 2 to entry: The depth of the surface course will determine the extent to which the test measures the rotational shear strength between layers of an asphalt pavement or the torsional strength around the circumference of loading within the surface course. The greater the thickness, the less the test will measure rotational shear strength between layers.

Note 3 to entry: If the thickness of the surface course is sufficiently shallow and the torsional strength of the binder course is sufficiently less than that of the surface course, the failure plane could go through the binder course.

3.2

surface course

top layer of an asphalt pavement

3.3

binder course

layer below the surface course, irrespective of whether it was originally intended to be the binder course and whether or not it is an asphalt layer

4 Principle

A 100 mm diameter plate is bonded to the surface course and rotated using a torque meter to determine the torsional strength of the top layer and, in the case of ultra-thin surface courses, the rotational shear strength between layers. The test can be carried out either *in situ* or in the laboratory

using a nominal 200 mm diameter core which may be subjected to curing conditions. The *in situ* test is done without the necessity to core into the substrate. A curing procedure can be used to assess the effect of moisture in the development of surface shear strength with time.

5 Apparatus

5.1 Torque meter, fitted with a reading gauge that indicates the maximum torque obtained. The device shall be calibrated over a range of 0 Nm to 400 Nm with a scale accurate and readable to at least 10 Nm. The device shall be fitted with a socket fitting allowing steel plates to be fitted and removed.

5.2 Metal plates, each having a diameter of (95 ± 5) mm and a thickness of (14 ± 2) mm. The plate shall incorporate a fitting enabling it to be coupled to the torque meter.

NOTE 1 Mild steel has been found suitable for the plate.

NOTE 2 Fittings of 12,7 mm and 19,05 mm have been found to be suitable for the fitting.

5.3 Thermometer, capable of measuring temperatures from room temperature to 100 °C, readable to 0,1 °C and accurate to 0,5 °C.

5.4 Steel rule, readable to 1 mm.

5.5 Callipers, for measurement of the diameter of the metal plate, if necessary.

5.6 Watch or timer, accurate and readable to 1 s.

5.7 Adaptors and extension rods (optional).

5.8 Core cutting apparatus, suitable for cutting 200 mm diameter cores in bituminous and cementitious materials (laboratory testing only).

NOTE Air cooled coring may be necessary for some mixtures.

5.9 Mould, for confining specimens (laboratory testing only).

5.10 Spirit level (laboratory testing only).

5.11 Oven or refrigerated incubator (laboratory testing and conditioning procedure only).

5.12 Water bath, of suitable size to accommodate at least one specimen and thermostatically controlled such that a temperature of $(20 \pm 0,5)$ °C can be maintained (conditioning procedure only).

6 Materials

6.1 Adhesive of sufficient stiffness to avoid failure within the adhesive or at the interfaces between the adhesive and the asphalt layers.

NOTE Rapid-setting epoxy resins have been found to be suitable. Polyester resins that are used for repair of a variety of materials have also been found suitable as adhesive.

6.2 Mounting material, such as rapid-hardening mortar, concrete or grout (laboratory testing only).