SLOVENSKI STANDARD
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Bitumenske zmesi - Preskusne metode za vroče asfaltne zmesi - 43. del: Odpornost proti gorivu

Bituminous mixtures - Test methods for hot mix asphalt - Part 43: Resistance to fuel

Asphalt - Prüfverfahren für Heißasphalt - Teil 43: Treibstoffbeständigkeit

Mélanges bitumineux - Essais pour enrobés à chaud - Partie 43: Résistance aux carburants

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English Version

Bituminous mixtures - Test methods for hot mix asphalt - Part 43: Resistance to fuel

Mélanges bitumineux - Essais pour enrobés à chaud - Partie 43: Résistance aux carburants

Asphalt - Prüfverfahren für Heißasphalt - Teil 43: Treibstoffbeständigkeit

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 227.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (prEN 12697-43:2012) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12697-43:2005.

The significant changes from that document are

a) the note that jet fuel is usually used is removed,

b) the principle is revised and clarified,

c) the oven is replaced with a conditioning chamber,

d) the use of the glass rod is clarified,

e) roller compactor included as third alternative for compaction,

f) two alternative brush test devices instead of just the mixer,

g) wear on the brush and the rotation speed of the brush are redefined,

h) storage time for samples revised to that used for other tests in the series,

i) the depth of fuel during soaking is revised,

j) the change in storage time for specimen with polymer-modified bitumen is removed,

k) cleaning of specimens after soaking tightened up,

l) combined parameter added to measure overall performance,

m) the categories for good, moderate and poor resistance are removed,

n) the estimated precision is removed.

This document 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 for hot mix asphalt — 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 for hot mix asphalt — 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: Compactibility*;

— EN 12697-11, *Bituminous mixtures — Test methods for hot mix asphalt — Part 11: Determination of the affinity between aggregates 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*;

— 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 for hot mix asphalt — 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 methods 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 for hot mix asphalt — 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*;

— 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 12397-44, *Bituminous mixtures — Test methods for hot mix asphalt — Part 44: Crack propagation by semi-circular bending test*;

— EN 12397-45, *Bituminous mixtures — Test methods for hot mix asphalt — Part 45: Saturation Ageing Tensile Stiffness (SATS) Conditioning test*;

— EN 12397-46, *Bituminous mixtures — Test methods for hot mix asphalt — Part 46: Low temperature cracking and properties by uniaxial tension tests*;

— EN 12397-47, *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 bond strength* [1];

— prEN 12697-49, *Bituminous mixtures — Test methods for hot mix asphalt — Part 49: Determination of friction after polishing* [1];

— prEN 12697-50, *Bituminous mixtures — Test methods for hot mix asphalt — Part 50: Scuffing resistance of surface course asphalt* [1].

1) In preparation.

1 Scope

This European Standard specifies a test method to determine the resistance of a bituminous mixture or pavement to fuels. The procedure involves initial soaking of a test specimen made in the laboratory or cored from a pavement in a fuel, followed by a brushing period with a brush test device. The material loss of the specimen is a measure of the resistance to that fuel for that bituminous mixture.

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

EN 12697-27, *Bituminous mixtures — Test methods for hot mix asphalt — Part 27: Sampling*

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 12697-33, *Bituminous mixtures — Test methods for hot mix asphalt — Part 33: Specimen prepared by roller compactor*

EN 12697-35, *Bituminous mixtures — Test methods for hot mix asphalt — Part 35: Laboratory mixing*

EN 13108-20:2006, *Bituminous mixtures — Material specifications — Part 20: Type Testing*

3 Terms and definitions

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

3.1
fuels
liquid (petroleum product) that might be spilled accidentally or sprayed deliberately onto an asphalt pavement and can cause damage to the asphalt mixture

3.2
laboratory mixer
mixer as described in EN 12697-35 capable of epicyclical motions

4 Principle

A cylindrical test specimen with a known mass is immersed partly in a bath with the specified fuel for a specified period of time. After removal from the bath, cleaning with water and drying for 24 h in a ventilated oven at 25 °C, the loss of mass of the specimen is measured and the immersed surface is visually inspected. Then an abrasive loading is applied onto the immersed surface of the test specimen by a steel brush mounted onto a brush test device. The steel brush moves in epicycloids passages over the surface. After 30 s the brushing stops and the specimen is removed. The loss of mass is measured and the brushed surface is visually inspected. After that, the specimen is put back and the same procedure is carried out again after 30 s and after 60 s, when the brushed surface is visually inspected again.

The total brushing time is 120 s (two brushing periods of 30 s and one of 60 s). The combined material loss after the immersion and the brush test is the main parameter for the resistance to the particular fuel. As additional information, the material loss after the immersion (chemical loading) and the brush test (mechanical loading) are further informative parameters for the resistance to the particular fuel.

NOTE To find differences between mixtures with modified binders more severe test conditions can be reasonable. This can be accomplished by using a longer immersion time of 72 h.

5 Equipment

5.1 Beaker with glass rod

Cylindrical beaker made of glass for soaking the test specimen in the fuel. The container shall be flat-bottomed and have an internal diameter of at least 140 mm (with porous asphalt specimens at least 190 mm) and an internal depth of at least 150 mm. A glass rod with a length of 70 mm and a diameter of 8 mm is put on one side of the bottom of the beaker so that one side of the immersed specimen can rest on the bottom of the beaker and the other side on the glass rod to prevent the enclosure of air under the immersed specimen.

5.2 Glass funnel

The size of the funnel shall be chosen in such a way that the rate of flow of the fluid into the beaker is as small as possible to prevent any damage to the specimen because of the injection of the fluid in the beaker.

5.3 Balance

Balance, with sufficient capacity and an accuracy of at least ± 0,1 g suitable for weighing,

5.4 Conditioning chamber

Ventilated conditioning chamber, capable of maintaining temperature of (25 ± 2) °C in the vicinity of the specimen.

5.5 Impact hammer, gyrator or roller compactor

Impact hammer (according to EN 12697-30), gyrator (according to EN 12697-31) or roller compactor (according to EN 12697-33) to prepare laboratory made specimens.

5.6 Brush test devices

Two different devices for the brush test are available.

5.6.1 Test device based on a laboratory mixer

Any mixer according to EN 12697-35 can be used. This mixer with epicyclical motion covers an area with a diameter 5 mm less than the diameter of the specimen. The rotation speed shall be (60 ± 3) rpm.

The steel brush is connected to the mixer (see Figure 1).

To press the specimen with a constant force to the brush a special frame has to be built. In Figure 2, an example of this frame is shown. A pneumatic actuator is using compressed air to press the specimen against the brush. The frame itself is placed under the rotating disk of the mixer.

The pressure shall be kept constant.

NOTE This can be achieved by means of a manometer between the actuator and compressed air control valve.