SLOVENSKI STANDARD
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Bitumenske zmesi - Preskusne metode za vroļ e asfaltne zmesi - 34. del: Preskus po Marshallu

Bituminous mixtures - Test methods for hot mix asphalt - Part 34: Marshall test

Asphalt - Prüfverfahren für Heißasphalt - Teil 34: Marshall-Prüfung

Mélanges bitumineux - Méthodes d'essai pour mélange hydrocarboné a chaud - Partie 34: Essai Marshall

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Bituminous mixtures - Test methods for hot mix asphalt - Part 34: Marshall test

Mélanges bitumineux - Méthodes d'essai pour mélange hydrocarboné à chaud - Partie 34: Essai Marshall

Asphalt - Prüfverfahren für Heißasphalt - Teil 34: Marshall-Prüfung

This European Standard was approved by CEN on 1 April 2004 and includes Amendment 1 approved by CEN on 16 May 2007.

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Contents

page

Foreword 3
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Principle 7
5 Apparatus 7
6 Procedure 7
7 Expression of results 8
8 Test report 9
9 Precision 9
Annex A (normative) **Marshall quotient** 10
Annex B (normative) **Testing head** 11
Bibliography 13

Foreword

This document (EN 12697-34:2004+A1:2007) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by January 2008 and conflicting national standards shall be withdrawn at the latest by January 2008.

This document includes Amendment 1, approved by CEN on 2007-05-16.

This document supersedes EN 12697-34:2004.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

This European Standard 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 method 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 12697-9, *Bituminous mixtures — Test methods for hot mix asphalt — Part 9: Determination of the reference density*

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 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*

EN 12697-17, *Bituminous mixtures — Test methods for hot mix asphalt — Part 17: Partial loss of porous asphalt specimen*

prEN 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 Marshall specimens*

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 pre-coated 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 deicing fluids*

EN 12697-42, *Bituminous mixtures — Test methods for hot mix asphalt — Part 42: Amount of coarse foreign matters in reclaimed asphalt*

EN 12697-43, *Bituminous mixtures — Test methods for hot mix asphalt — Part 43: Resistance to fuel*

The annexes A and B are normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard specifies a test method for determining the stability, flow and the Marshall Quotient values of specimens of bituminous mixtures mixed according to [A1] EN 12697-35:2004+A1 [A1] and prepared using the impact compactor method of test [A1] EN 12697-30:2004+A1 [A1]. It is limited to dense graded asphalt concrete and hot rolled asphalt.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

EN 12697-29, *Bituminous mixtures — Test methods for hot mix asphalt — Part 29: Determination of the dimensions of a bituminous specimen*

[A1] EN 12697-30:2004+A1 [A1], *Bituminous mixtures — Test methods for hot mix asphalt — Part 30: Specimen preparation by impact compactor*

EN ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines (ISO 7500-1:1999)*

3 Terms and definitions

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

3.1
stability
S
maximum resistance to deformation, in kilonewtons (kN), of a moulded asphalt specimen

3.2
flow
F
deformation of the moulded specimen in millimetres (mm) at maximum load less the nominal deformation obtained by extrapolation the tangent of the graph of load against deformation back to zero load (A to M' in annex A)

3.3
tangential flow
F_t
nominal deformation of the moulded specimen, in millimetres (mm) obtained by extrapolation the tangent of the graph of load against deformation forward to the stability load less the nominal deformation obtained by extrapolation the tangent back to zero load (A to B' in annex A)

3.4
Marshall quotient
ratio of the stability, S, to the flow, F, S/F, see annex A

4 Principle

Marshall specimens are compacted in accordance with [A1] EN 12697-30:2004+A1 [A1]. The Marshall stability, flow and quotient are subsequently determined on these specimens using defined procedures and reported along with the bulk density of the specimen.

5 Apparatus

5.1 Compression testing machine of Grade 2 or better according to EN ISO 7500-.1 having a recommended minimum capacity of 28 kN and capable of applying loads to test specimens at a constant rate of deformation of (50 ± 2) mm/min after a transitory period less than 20 % of the loading time. The rate of deformation is to be maintained.

5.2 A flow [A1] measuring [A1] device capable of determining deformation to an accuracy of ± 0,1 mm.

5.3 Graphical plotter: device for evaluating the curve of force versus flow, e.g. graphical plotter, strip recorder or software program.

5.4 Testing head: upper and lower breaking heads with the dimensions given in annex B.

5.5 Water bath, at least 150 mm deep and capable of thermostatically maintaining the water at a temperature of (60 ± 1) °C. This bath shall have a perforated false bottom or shelf that can suspend the test specimens at least 25 mm above the bottom of the bath, and allow at least 25 mm depth of water above the specimens. The size of the bath shall allow specimens to be placed face down and not in contact with one another. A device to ensure continuous circulation of water shall also be fitted.

5.6 Thermometer, capable of measuring a temperature of 60 °C accurate to 0,5 °C.

5.7 Oven, capable of maintaining temperature of (110 ± 5) °C.

6 Procedure

6.1 Specimen preparation

6.1.1 Specimens shall be compacted in accordance with [A1] EN 12697-30:2004+A1 [A1] ensuring that 50 blows are applied to each side within the acceptable temperature range given.

6.1.2 The compacted specimens shall be demoulded ensuring that they are cooled in air to avoid any danger of deformation and tested in accordance with section 6.5 to 6.7. After demoulding wait at least 4 h before further testing begins. All tests shall be complete within 32 h of demoulding.

The bulk density of each specimen shall be determined in accordance with EN 12697-6.

6.1.3 The height of each specimen shall be measured in accordance with EN 12697-29, or the volume shall be calculated from the bulk density measurement.

6.1.4 Immerse the cylindrical specimens, on their flat surface, in the water bath for at least 40 min and not longer than 60 min. Maintain the temperature of the water in the bath at (60 ± 1) °C.

6.2 Test procedure

6.2.1 Thoroughly clean the guide rods and the inside surfaces of the test heads. Lubricate the guide rods to ensure that the upper test head slides freely over them.