SLOVENSKI STANDARD
oSIST prEN 12697-33:2013

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Bitumenske zmesi - Preskusne metode za vroče asfaltne zmesi - 33. del: Preskušanci, pripravljeni z valjastim zgoščevalnikom

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

Asphalt - Prüfverfahren für Heißasphalt - Teil 33: Probestückvorbereitung mit einem Rollenverdichtungsgerät

Mélanges bitumineux - Méthodes d'essai pour mélange hydrocarboné à chaud - Partie 33: Préparation des corps d'épreuve au compacteur de plaques

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ICS:

93.080.20	Materiali za gradnjo cest	Road construction materials

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English Version

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

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

If this draft becomes a European Standard, 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.

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

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Foreword

This document (prEN 12697-33:2013) 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 12697-33:2003+A1:2007.

The following is a list of significant technical changes since the previous edition:

— Inappropriate definition of moulds for steel wheel rollers deleted;

— equations (1) and (2) corrected;

— distance between twinned wheels clarified;

— requirement on timing added;

— column titles on Tables 2 to 5 corrected;

— hatching for plates in Figure 2 made vertical for clarity;

— “voids content” changed to “air voids content” for clarity;

— informative Annex given of an example of energy-controlled smooth roller compaction procedure.

This European Standard forms a part of a series of tests for mechanical and physical properties of bituminous mixtures 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 specimen*

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 — Requirements — 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 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 asphalt*

prEN 12697-48, *Bituminous mixtures — Test methods for hot mix asphalt — Part 48: Inter-layer bond strength*[1)]

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

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

1) In preparation

1 Scope

This European Standard specifies the methods for compacting parallelepipedal specimens (slabs) of bituminous mixtures, to be used directly for subsequent testing, or from which test specimens are cut.

For a given mass of bituminous mixture, the specimens are prepared either under controlled compaction energy, or until a specified volume and therefore void content is obtained.

This European Standard describes the following methods of compaction:

— pneumatic tyre method,

— steel roller method,

— sliding plates method.

This European Standard is applicable to bituminous mixtures manufactured in the laboratory or in a mixing plant.

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 for hot mix asphalt — Part 27: Sampling*

EN 12697-35:2004, *Bituminous mixtures — Test methods for hot mix asphalt — Part 35: Laboratory mixing*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

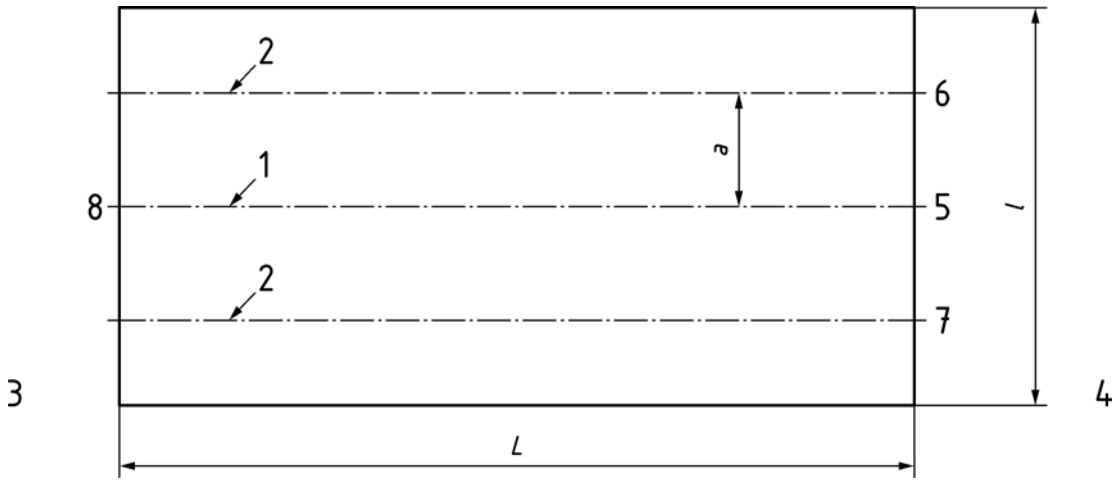
For the purposes of this European Standard, the following terms and definitions apply.

3.1.1
pass
one forward or one backward motion of the rolling load

3.1.2
slab axis
axis of symmetry of slab parallel to the largest dimension of the mould

3.1.3
lateral axis
axis of a pass parallel to largest dimension of a mould; situated at distance *a* from the slab axis (see Figure 1)

3.1.4
lateral translation
distance *a* between the slab axis and the lateral axis



Key

1	axis	5	central position
2	lateral axis	6	rear position
3	left side	7	front position
4	right side	8	longitudinal translation of wheels

Figure 1 — Sketch plan of a slab, front face of equipment

3.1.5
rear position
lateral axis furthest from the front face of the equipment

3.1.6
central position
slab axis

3.1.7
front position
lateral axis nearest to the front face of the equipment

3.1.8
blocked axis mode
equipment operating mode in which the height of the wheel shaft stays constant in relation to the upper edge of mould during a pass

3.1.9
freed axis mode
equipment operation mode in which the load applied into the slab remains constant during a pass

3.1.10
sweep plan
set of modes by which the wheel(s) pass(es) over the slab; including order of execution, and extent of lateral translation

3.2 Symbols and abbreviations

L is the interior length of mould, in millimetres (mm);

l is the interior width of mould, in millimetres (mm);

h is the interior height of mould, in millimetres (mm);

M is the mass of slab, in kilograms (kg);

ρ_m is the maximum density of bituminous mixture, in kilograms per cubic metre (kg/m^3);

v is the air voids content in slab, in percent (%);

F is the load applied onto wheels or roller, in kilonewton (kN);

b is the width of the roller, in millimetres (mm);

D is the diameter of the wheel(s) or roller, in millimetres (mm);

V_t is the velocity of longitudinal translation of wheel(s), in millimetres per second (mm/s);

n_p is the number of passes;

a is the extent of lateral translation, in millimetres (mm);

e is the final thickness of slab, in millimetres (mm);

w is the width of the sliding plates, in millimetres (mm);

t is the thickness of the sliding plates, in millimetres (mm);

n is the number of sliding plates.

4 Principle

A given mass of bituminous mixture is compacted in a rectangular mould under a load applied by a smooth steel roller or equivalent, or by one or more wheel(s) fitted with pneumatic tyres. The smooth steel roller may run directly on the bituminous mixture, or on a number of vertical sliding plates, which apply a kneading action to the mixture. The wheel(s) or roller performs passes at constant velocity, according to a specified sweep plan if applicable.

5 Apparatus

5.1 Method using a wheel or two wheels fitted with pneumatic tyres

5.1.1 One or more moulds with specified interior dimensions ± 2 mm. Usual dimensions are

— L = 500 mm, l = 180 mm, h = 100 mm or h = 50 mm

or

— L = 600 mm, l = 400 mm, h = 150 mm or h = 200 mm.

For moulds 60 mm × 400 mm × 150 mm or 600 mm × 400 mm × 200 mm, dimensions are those of the upper part.

Other dimensions may be used, according to the requirements of specific test methods.

5.1.2 A Device to compact the bituminous mixture which shall:

— enable application of an adjustable load, F, in range 1 kN ± 10 % to 10 kN ± 5 %, onto the wheel(s),

— comprise of one or more wheels equipped with treadless tyres of 400 × 8 size,

— enable translation of the rolling load at constant velocity, $V_t \pm 10$ %,

— comprise a system for positioning wheel(s) along the different axes of compaction according to predetermined set values for ($a \pm 20$ mm),

— enable operation in blocked axis and freed axis modes,

— comprise a system capable of periodically bringing the surface flush with the upper edge of the mould during compaction,

— one or more blocks of a suitable size (only required if the required thickness of the slab, e, is less than the height of the mould, h).

5.2 Methods using a smooth steel roller

5.2.1 Smooth steel roller

5.2.1.1 One or more moulds with specified interior dimensions L, l to ± 1 mm.

5.2.1.2 A device to compact the bituminous mixture in the mould.

It may be either a mechanical self- propelled rolling wheel static compactor with forward-reverse control, or a hand driven roller, or a laboratory device, which simulates the operation of a rolling wheel static compactor such as a segmented roller. The wheel shall be able to move back and forth on the mixture in the mould, or the mould may be placed on a table that moves back and forth beneath a rotating roller. When the method is used to prepare slabs at a specified volume or void content, a vibrating roller or table may also be used.

The device shall enable application of a static load, F, such as

$$\frac{F}{l \times D^2} \geq 10^{-5} \quad (1)$$

where

F is the load, applied onto wheels or rollers, in kilonewtons (kN);

l is the interior width of mould, in millimetres (mm);

D is the diameter of the wheel(s) or roller, in millimetre (mm).

The diameter of the steel roller, D, shall be in the range 400 mm to 1 100 mm.

When the method is used to prepare slabs at a specified volume or air voids content, for a mass as specified in 6.1, the width of the steel roller, b, shall be greater than:

— the internal width of the mould, l, if the roller compactor is not equipped so that compaction stops when the desired height of the slab is reached; or

— the internal width of the mould, l, minus 8 mm if the roller compactor is equipped so that compaction stops when the desired height of the slab is reached.

The load, F, shall be of such magnitude that the specified volume or void content is achieved at a number of roller passes between 10 and 50.