
Bitumenske zmesi - Preskusne metode za vroče asfaltne zmesi - 32. del:
Laboratorijska zgostitev bitumenskih zmesi z vibracijskim zgoščevalnikom

Bituminous mixtures - Test methods for hot mix asphalt - Part 32: Laboratory compaction of bituminous mixtures by vibratory compactor

Asphalt - Prüfverfahren für Heißasphalt - Teil 32: Laborverdichtung von Asphalt mit einem Vibrationsverdichter

Matériaux enrobés - Méthodes d'essai pour enrobés à chaud - Partie 32 : Compactage en laboratoire de mélanges bitumineux par compacteur vibratoire

<https://standards.iteh.ai/catalog/standards/sist/16524ceb-18e1-43d7-8aef-52c960860b87/osist-pr-en-12697-32-2013>

Ta slovenski standard je istoveten z: prEN 12697-32 rev

ICS:

93.080.20 Materiali za gradnjo cest Road construction materials

oSIST prEN 12697-32:2013**en,fr,de**

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 12697-32:2013](https://standards.iteh.ai/catalog/standards/sist/16524ceb-18e1-43d7-8aef-52c960860b87/osist-pren-12697-32-2013)

<https://standards.iteh.ai/catalog/standards/sist/16524ceb-18e1-43d7-8aef-52c960860b87/osist-pren-12697-32-2013>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 12697-32 rev

October 2013

ICS

Will supersede EN 12697-32:2003+A1:2007

English Version

**Bituminous mixtures - Test methods for hot mix asphalt - Part
32: Laboratory compaction of bituminous mixtures by vibratory
compactor**

Matériaux enrobés - Méthodes d'essai pour enrobés à
chaud - Partie 32 : Compactage en laboratoire de
mélanges bitumineux par compacteur vibratoire

Asphalt - Prüfverfahren für Heißasphalt - Teil 32:
Laborverdichtung von Asphalt mit einem
Vibrationsverdichter

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.

This draft European Standard was established by CEN 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.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	Page
Foreword.....	3
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Principle.....	7
5 Materials	7
6 Apparatus	7
7 Preparation of test specimens	8
7.1 Core Specimens.....	8
7.2 Plant-mixed materials.....	9
7.3 Laboratory-mixed materials.....	9
8 Calculation and expression of results.....	9
9 Test report	9
10 Precision.....	9
Annex A (normative) Test method for determining the suitability of a vibrating hammer for laboratory compaction	11
A.1 Principle.....	11
A.2 Apparatus	11
A.3 Materials	11
A.4 Preparation of sample	11
A.5 Procedure	11
A.6 Calculation and expression of results.....	12
A.7 Calibration certificate	13
Bibliography	14

Foreword

This document (prEN 12697-32:2013) 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 12697-32:2003+A1:2007.

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

- The scope includes compaction with a vibratory slab compactor;
- EN 1097-5 replaces EN 12697-14 for water content;
- the compaction time is limited to 4 min;
- corrections to the key to Figure 2.

This European Standard is one of a series of standards as follows:

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: Binder recovery: Rotary evaporator*

EN 12697-4, *Bituminous mixtures — Test methods for hot mix asphalt — Part 4: Binder 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 specimen*

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 aggregate and binder*

EN 12697-12, *Bituminous mixtures — Test methods for hot mix asphalt — Part 12: Determination of the water sensitivity of bituminous specimens*

prEN 12697-32:2013 (E)

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 a vibratory compactor*

EN 12697-33, *Bituminous mixtures — Test methods for hot mix asphalt — Part 33: Specimen preparation 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 of 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*

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 strength¹⁾*

prEN 12697-49, *Bituminous mixtures — Test methods for hot mix asphalt — Part 49: Determination of friction after polishing¹⁾*

prTS 12697-50, *Bituminous mixtures — Test methods for hot mix asphalt — Part 50: Scuffing resistance of surface course¹⁾*

The applicability of this European Standard is described in the product standards for bituminous mixtures.

Annex A is normative.

¹⁾ In preparation

1 Scope

This European Standard describes a test method for the preparation of bituminous test specimens using a vibratory compaction technique. The test specimens can include compaction with a vibratory slab compactor from which smaller samples can be cored if required.

This European Standard is applicable to loose mixtures and cores and is used to establish a reference density for a bituminous mixture in accordance with the procedures described in prEN 13108-20, or the ease of compaction as described in EN 12697-10.

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 1097-5, Test for mechanical and physical properties of aggregates – Determination of water content by drying in a ventilated oven

EN 12697-6, *Bituminous mixtures — Test methods for hot mix asphalt — Part 6: Determination of bulk density of bituminous specimen by hydro-static method*

EN 12697-10, *Bituminous mixtures — Test methods for hot mix asphalt — Part 10: Compactibility*

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

EN 13108-20, *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**
bulk density
mass in air per unit volume of the compacted specimen at ambient temperature
- 3.2**
refusal density
mass per unit volume, including voids, of the compacted specimen after having been further compacted to refusal
- 3.3**
percentage refusal density
ratio of the initial bulk density of the compacted specimen to its refusal density, expressed as a percentage

4 Principle

After the mixing, preparation and conditioning of a bituminous specimen in the laboratory, the heating of a core extracted from the road surface to compaction temperature, or the conditioning of plant-mixed material, the material or core is placed in a standard mould with attached base plate and collar and compacted by a vibratory hammer.

If required the specimen is compacted to refusal and the refusal density is determined in accordance with prEN 13108-20.

After completion of compaction, the bulk density of the compacted specimen is determined in accordance with EN 12697-6.

NOTE For loose material prepared or compacted in the laboratory, or plant mixed material compacted in the laboratory, the refusal density is an indication of the potential maximum density which may be achieved under field conditions.

5 Materials

- 5.1 Sealing compound.
- 5.2 Paper discs, to prevent the ends of the specimen from sticking to the base plate or the tamping foot.
- 5.3 Silicone grease, for use as a release agent.
- 5.4 Inert void filling material.

6 Apparatus

- 6.1 Drying oven, to maintain a temperature of between 25 °C and 45 °C
- 6.2 Balance.
- 6.3 Water bath.
- 6.4 Split core mould and base plate (see Figure 1).
- 6.5 One spare base plate.

NOTE Only one spare base plate is needed for a complete set of moulds.

- 6.6 Heating oven, with fan-assisted circulation.
- 6.7 Electric vibrating hammer, conforming to Annex A and suitable for laboratory compaction. The hammer shall have a power consumption of 750 W to 1 000 W and shall operate at a frequency of 20 Hz to 50 Hz.
- 6.8 A 50 mm or 75 mm wide point stripping knife and a pallet knife.
- 6.9 A (102 ± 2) mm diameter tamping foot and a (146 ± 2) mm diameter tamping foot, for use with the electric vibrating hammer (see 6.7).
- 6.10 A 300 mm steel rule.
- 6.11 A pair of external callipers.
- 6.12 A stopwatch or clock.

prEN 12697-32:2013 (E)

6.13 Thermometer.

6.14 A saw, suitable for slicing a core to suitable size.

6.15 A paint brush.

7 Preparation of test specimens

7.1 Core Specimens

7.1.1 After determination of the bulk density of the core in accordance with EN 12697-6, coat the split mould and base plate with a thin film of silicone grease and place a paper disc on the base plate.

7.1.2 After removing any sealing compound (wax or tape) present, insert the core, with the flatter of its two ends uppermost, into the mould. Tighten the mould and clamp the mould to the base plate.

7.1.3 Place the assembly, without the shank and tamping foot but including the additional base plate, in a preheated oven maintained at the compaction temperature defined in EN 12697-35 for the grade of binder in use. Retain in the oven until the centre of the core has attained the compaction temperature defined in EN 12697-35.

NOTE It may be found convenient to measure the temperature of a dummy specimen placed in the oven at the same time as the specimens to be compacted. The dummy specimen may have a thermocouple probe inserted into its centre.

7.1.4 Condition the operating mechanism of the vibrating hammer by running it for at least 2 min on a dummy specimen before beginning 7.1.6 and 7.1.7.

7.1.5 Remove the assembly from the oven and place it on a level rigid floor. Ensure the mould is tightened until the split is closed. Place a paper disc on the exposed surface of the core.

7.1.6 Immediately compact the core with the vibrating hammer, using the 102 mm diameter tamping foot, previously warmed to above 60 °C and coated with a thin layer of silicone grease. Hold the hammer firmly with the shaft vertical and move the tamping foot from one position to another around the mould in accordance with 7.1.7. Compact for 2 s to 10 s at each position. Move the tamping foot from one position to the next before material bulges above the edge of the tamping foot.

7.1.7 Position the tamping foot in contact with the side of the mould and compact the material in the following points of the compass sequence: N, S, W, E, NW, SE, SW, NE. Repeat the sequence until total compaction time period amounts to 2 min ± 5 s. The compaction procedure shall be completed within 4 min.

NOTE 1 To keep the mould in position whilst compaction is taking place, a panel of 20 mm plywood with a central hole of suitable dimensions to accommodate the mould base should be used. The operator should stand on the board to keep the assembly steady.

NOTE 2 The period of compaction at each position will depend on the material.

NOTE 3 A means of determining the downward force applied to the compaction hammer is described in A.5.3.

7.1.8 When the compaction period specified in 7.1.7 is complete, remove any irregularities on the surface of the specimen by using the vibrating hammer fitted with the previously warmed 146 mm tamping foot coated with a thin layer of silicone grease.

7.1.9 Clamp the spare base plate, lightly greased, to the top of the mould. Invert the mould and remove the original base plate ensuring that a paper disc adheres to each end of the core. Place the original base plate in the oven; this now becomes the spare base plate. Drive the core into contact with the base plate with the vibrating hammer fitted with the 146 mm tamping foot coated with silicone grease.