SLOVENSKI STANDARD
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Bitumenske zmesi - Preskusne metode - 56. del: Priprava preskušancev s statičnim zgoščevanjem

Bituminous mixtures - Test methods - Part 56: Specimen preparation by static compaction

Asphalt - Prüfverfahren - Teil 56: Probekörperherstellung durch Statische Verdichtung

Mélanges bitumineux - Méthodes d'essai - Partie 56: Confection d'éprouvettes par compacteur statique

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93.080.20 Materiali za gradnjo cest Road construction materials

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EUROPEAN STANDARD

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Bituminous mixtures - Test methods - Part 56: Specimen preparation by static compaction

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

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European foreword

This document (EN 12697-56:2019) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by March 2020, and conflicting national standards shall be withdrawn at the latest by March 2020.

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1 Scope

This document specifies a method for compacting cylindrical specimens of bituminous mixtures, to be used for subsequent testing. A given mass of bituminous mixture is compacted in a cylindrical mould by applying static compression loads on the top and the bottom of the specimen.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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*

EN 12697-35, *Bituminous mixtures - Test methods - Part 35: Laboratory mixing*

EN 12697-54, *Bituminous mixtures - Test methods - Part 54: Curing of specimen for test of mixtures with bitumen emulsion*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
compaction stress
σ_{comp}
desired vertical stress applied on top and bottom of compaction plates, expressed in MPa

3.2
compaction force
F_{comp}
desired vertical force applied on top and bottom of compaction plates to achieve the compaction stress σ_{comp}, expressed in kN

3.3
compaction time
t_{comp}
timespan within the compaction stress is held constant

3.4
specimen dimensions
dimensions of the specimen are defined by their diameter *d* and their height *h*, expressed in mm

4 Principle

After the mixing, preparation and conditioning of a bituminous mixture in the laboratory or the conditioning of a bituminous mixture sampled at the construction site, the material is placed into the compaction mould within the compaction frame and compacted by applying a constant compaction stress for a predefined time.

After completion of compaction and after a predefined conditioning time within the compaction mould, the specimen is demoulded.

5 Materials

5.1 Filter paper discs, of the same diameter as the diameter *d* of the specimen.

5.2 Release agent, used to prevent the specimen from sticking to the compaction mould and base plates.

6 Apparatus

6.1 Compaction mould and compaction plates

The mould and compaction plates (see Figure 1) shall be made of non-corrosive steel with an adequate surface hardness and strength for allowing the preparation of specimens, which fulfil the requirements on dimensions.

The compaction mould shall have an inner diameter of d and a height of at least 2 × *d*.

The compaction plates (or piston) shall have a diameter of *d* – 1 mm, and shall move freely parallel to the height of the compaction mould to avoid any tilting. This can be achieved by fixing to the movable load piston or the base plate of the test device.

For mixtures containing more than 2 % of water, the compaction mould and compaction plates shall allow the drainage of water from the specimen during the compaction process. This can be reached by one of following methods (or combinations of them):

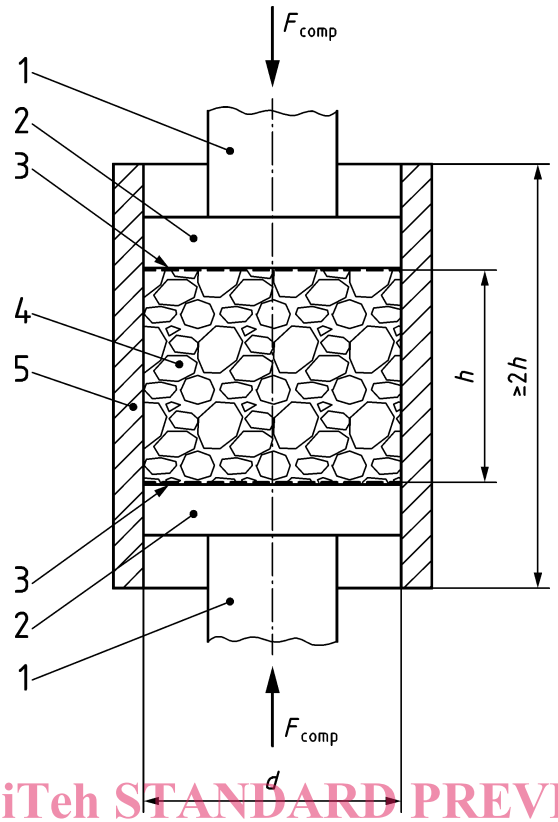
— vertical grooves along the inner surface of the compaction mould (depth and width of the groove ≤ 1 mm);

— slots or holes perforated into the mould (hole diameter or slot width ≤ 1 mm);

— grooves within the outside diameter of the compaction plates with a width of (2,5 ± 0,5) mm and a depth of (1,5 ± 0,5) mm;

— perforated compaction plates (hole diameter ≤ 1 mm).

The applied drainage system will affect the precision of the specimen dimension and surface roughness. Therefore, it is recommended to apply drainage systems within the compaction mould if the specimen will be used for a compression test, where its top and bottom are loaded. If indirect tensile tests are applied, drainage systems within the compaction plate are adequate.



Key

d	specimen diameter
h	height of specimen
F_{comp}	Compaction force
1	loading piston (linked with loading device in load frame)
2	compaction plates
3	filter paper disk
4	sample
5	compaction mould

Figure 1 — Principle of compaction apparatus

6.2 Loading device, capable of maintaining the required compaction force according to 7.5.1 with a precision of ±1 %.

The loading device can be a universal test machine allowing a controlled force loading or a comprising piston with a manually operated pump with pressure gauge of required pressure capacity.

NOTE Manual comprising piston and pressure gauge as used for loading plate tests for evaluating the bearing capacity of unbound road layers can be suitable as manual loading device.

6.3 Mounting device, for allowing double-acting compaction.

A mounting device for holding the compaction mould in place for filling the sample which can be released for allowing relative vertical movements between the compaction mould and the bottom compaction plate during the compaction process. As a mounting device, a pair of shims or at least three distance pieces can be used.

6.4 Stopwatch or clock, for controlling the compaction time.

6.5 Thermometer, for controlling the mixture temperature.

7 Preparation of test specimens

7.1 Compaction stress and compaction force

If not defined elsewhere, a compaction stress of 5 MPa is recommended.

Calculate the required compaction force F_{comp} applied on top and bottom of compaction plates, expressed in [kN] according to Formula (1)

$$F_{comp} = \frac{\sigma_{comp} \cdot d^2 \cdot \pi}{4000} \quad (1)$$

where

σ_{comp} is the compaction stress [MPa] and d is the specimen diameter [mm].

If not defined elsewhere, a compaction time of t_{comp} = (300 ± 5) s is recommended.

7.2 Compaction temperature

The compaction temperature shall be the reference compaction temperature, as specified in EN 12697-35.

7.3 Mixture sample preparation

Prepare the bituminous mixture according to EN 12697-35, or take samples from the production of the plant or from the construction site according to EN 12697-27.

The cylindrical test specimens shall have a diameter of (80 ± 2) mm, (100 ± 3) mm, (120 ± 3) mm, (150 ± 3) mm or (160 ± 3) mm. For 80 mm nominal diameter specimens, the maximum aggregate size of the bituminous mixture shall not exceed 11 mm. For 100 mm nominal diameter specimens, the maximum aggregate size shall not exceed 22 mm. For 120 mm nominal diameter specimens, the maximum aggregate size shall not exceed 31,5 mm. For 150 mm and 160 mm nominal diameter specimens, the maximum aggregate size shall not exceed 40 mm.

7.4 Preparation of compaction equipment

If the compaction temperature is ≥ 30 °C, the compaction mould and compaction plates shall be covered and stored in a heating cabinet at the reference compaction temperature according to EN 12697-35 for at least 2 h.

Prepare the compaction apparatus by implementing the bottom compaction plate and the compaction mould on top of the bottom loading piston. Fix the vertical position of the compaction mould in order to allow vertical relative movement between compaction mould and bottom loading plate during the compaction process.

NOTE For holding the compaction mould in place, it can be supported on end pieces until the compaction process is started. When the end pieces are removed, a relative vertical movement between compaction mould and compaction plate is allowed.

Lightly spray the mould and base plate with a release agent that is non miscible with bituminous binder.

Place a filter paper disk on top of the bottom compaction plate.

Fill the mould with the required mass (M ± 0,2) % of the bituminous mixture, taking care to spread the mixture evenly in the mould with a shovel and avoiding any segregation. Tamp or poke the mixture including the edges to achieve an even as possible surface before compaction commences.