SLOVENSKI STANDARD
oSIST prEN 12697-36:2021

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Bitumenske zmesi - Preskusne metode - 36. del: Ugotavljanje debeline bitumenskega vozišča

Bituminous mixtures - Test methods - Part 36: Determination of the thickness of bituminous pavement

Asphalt - Prüfverfahren - Teil 36: Bestimmung der Dicke von Asphalt-Konstruktionen

Mélanges bitumineux - Méthodes d´essai - Partie 36 : Méthode dévaluation d'épaisseur d'un revêtement bitumineux

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English Version

Bituminous mixtures - Test methods - Part 36: Determination of the thickness of bituminous pavement

Mélanges bitumineux - Méthodes d´essai - Partie 36 : Méthode dévaluation d'épaisseur d'un revêtement bitumineux

Asphalt - Prüfverfahren - Teil 36: Bestimmung der Dicke von Asphalt-Konstruktionen

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.

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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.

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

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European foreword

This document (prEN 12697-36:2020) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12697-36:2003.

The main changes compared to the previous edition are listed below:

— the title no longer refers to hot mix asphalt;

— [ge] editorial update according to current standard template;

— [2] new Clause 2. Normative references introduced according to CEN/CENELEC Internal Regulations, Part 3:2019;

— [3] new Clause 3. Terms and definitions introduced according to CEN/CENELEC Internal Regulations, Part 3:2019;

— [4] title of Clause 4 amended to “Apparatus” due to the introduction of Clause 2 and 3;

— [5] title of Clause 5 amended to “Test specimens” due to the introduction of Clause 2 and 3;

— [6] title of Clause 6 amended to “Procedure” due to the introduction of Clause 2 and 4;

— [6.2] editorial corrections of keys to Figure 3 and Figure 4;

— [7] new Clause 7. Test report due to the introduction of Clause 2 and 3;

— [8] new Clause 8. Precision due to the introduction of Clause 2 and 3;

— [10] test report adjusted with reference to this standard according to CEN/CENELEC Internal Regulations, Part 3:2019.

A list of all parts in the EN 12697 series can be found on the CEN website.

1 Scope

This document describes two test methods for determining the thickness of bituminous pavement. The first method describes measurements carried out on one or more cores which have been drilled from the full depth of the slab or road structure (destructive method). The second method electro-magnetic (non-destructive) measurement are used.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Apparatus

4.1 Metal rule or tape.

4.2 Calliper gauge.

4.3 Approved jig or other device.

4.4 Electro-magnetic apparatus for non-destructive measurements consisting of aluminium foil that is stuck on the bituminous layer or aluminium sheet-metal that is fastened on the unbound aggregates of the subgrade. The dimensions of the antipole shall be: width (300 ± 10) mm, length (700 ± 10) mm and thickness 0,05 mm to 0,30 mm. The quality of the antipole shall be the same all the time.

No other metal object may be present within 1 m distance of the antipole, because this can influence the measurement.

5 Test specimens

Cores used as specimens for thickness measurements shall be representative of the bituminous pavement slab from which they are taken. The cores shall be drilled completely through the bituminous pavement slab for which the thickness is to be measured. The core axis shall preferably be within 5° of the normal axis to the pavement. Furthermore, the ends shall be free from all conditions not typical of the surfaces of the paving. Cores that show defects which influence the measurements or that have been damaged appreciably in the drilling operation (e.g. fragmented cores, split cores and curved cores), shall not be used. The recommended diameter of the cores taken is 100 mm or 150 mm.

6 Procedure

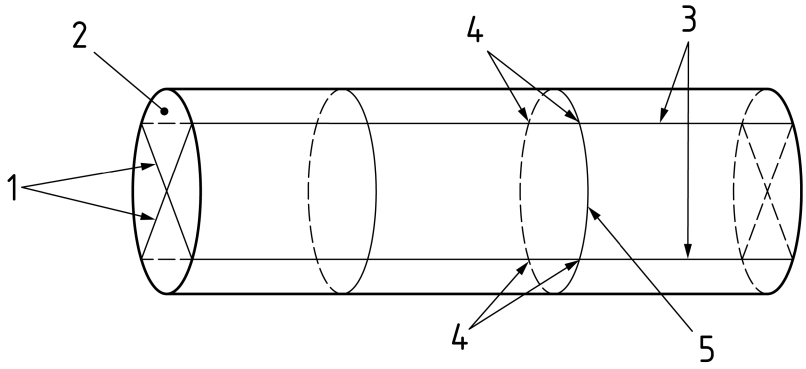
6.1 Destructive measurement

6.1.1 The thickness of each core or each layer shall be measured to the nearest 1 mm. The thickness measurements shall be perpendicular to the upper plane of the core. Measurements shall be between upper and lower surfaces or between well-defined boundary lines in cases where the core consists of more than one layer.

6.1.2 Four measurements shall be taken evenly spaced about the diameter of each core. The position of these measurements shall be clearly marked along each core.

6.1.3 When the core consists of one layer or when only the total thickness of the bituminous pavement is relevant, record the average of the four measurements as the pavement thickness.

6.1.4 When the core consists of more than one layer and also the thickness of the individual layers is relevant, then at each of the four points a line shall be drawn to the bottom surface of the core, perpendicular to the upper surface. The boundary lines of the layers shall then be marked on the drawn lines, as shown in Figure 1.



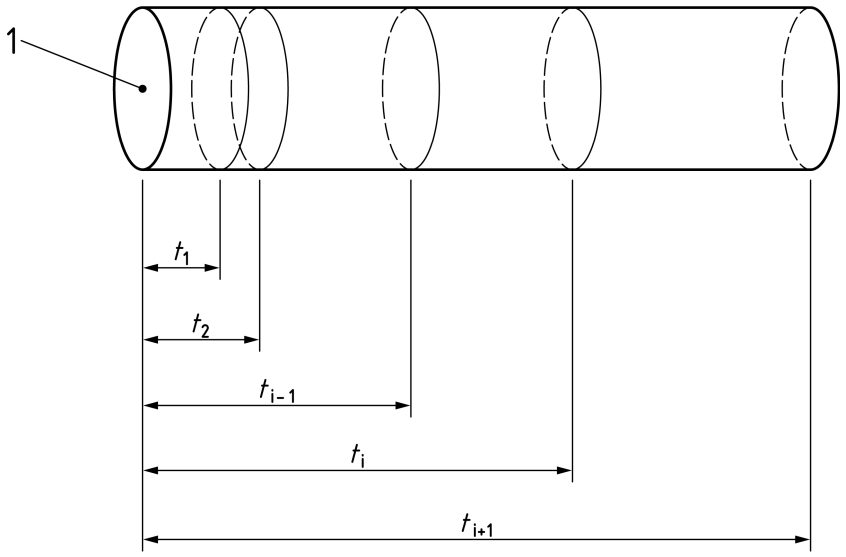
Key

1 markings on the upper surface
2 upper surface
3 lines perpendicular to the upper surface
4 crosspoints
5 boundary line

When it is difficult to distinguish the boundary lines, the core may be rolled on the floor or wetted. When this is not sufficient and the core is not to be used for other purposes, the core may be sawn in half along its length (from top to bottom.

Figure 1 — Marking for thickness measurement of cores with multiple layers

6.1.5 Beginning at the top layer, the thickness of the individual layers shall be measured with cumulative measurement at the crosspoints of the four perpendicular lines with the boundary lines, as shown in Figure 2.



Key

1 upper surface

Figure 2 — Principle of cumulative measurement

6.1.6 Calculate the thickness of an individual layer to the nearest 1 mm as follows:

— Thickness layer $i = t_i - t_{i-1}$ in millimetres (mm)

Define the average of the four measurements for each layer as the layer thickness and express it in millimetres.

6.1.7 When the angle between the wall of the core and a vertical plane is more than 5° then the core shall be placed with its top face on a horizontal surface. The total thickness or the thickness of the individual layers shall be measured relative to the vertical (rather than parallel to the axis of the core) in accordance with 6.1.2 to 6.1.6.

6.2 Electromagnetic measurement

6.2.1 The thickness of the layer (or layers) shall be measured with an electromagnetic apparatus (eddy current principle) and an antipole that is fixed on the road prior to laying the coated material the thickness of which is to be measured. The measurements obtained shall be readable to 1 mm.

6.2.2 Before measuring, the apparatus shall be calibrated, e.g. by means of calibration rings.

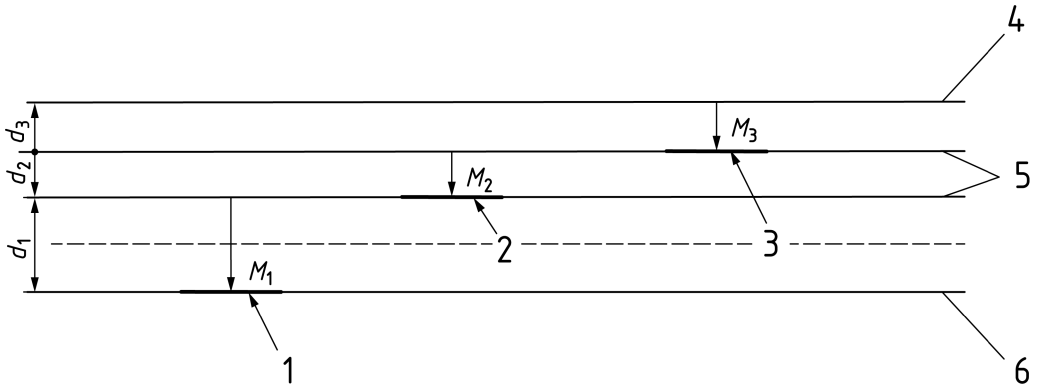
NOTE In general, the calibration procedure of the apparatus is described in the user manual.

As the measurement may be influenced by electrical and magnetic properties of the materials (especially aggregates) the layer calibration should be conducted with at least one independent measurement of thickness using the destructive measuring method.

The thickness of the layers shall be measured individually or cumulatively, as shown in Figure 3 and Figure 4. The thickness shall be measured at one point approximately in the middle of the antipole and shall be expressed to the nearest 1 mm.

The mean of the four measurements shall be defined as the layer thickness expressed in millimetres.

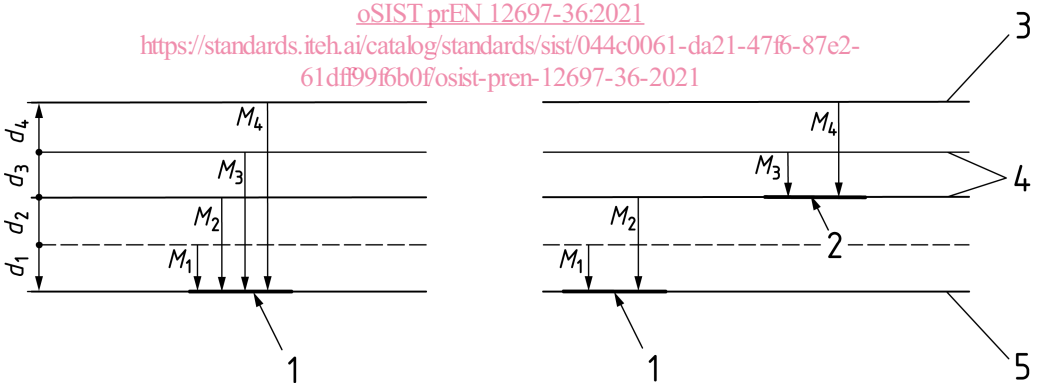
Individual measurement: $d_1 = M_1$; $d_2 = M_2$; $d_3 = M_3$



Key

1 antipole 1
2 antipole 2
3 antipole 3
4 surface
5 boundaries
6 base-layer

Figure 3 — Individual measurement



cumulative measurement $d_1 = M_1$, $d_2 = M_2 - M_1$; $d_3 = M_3 - M_2$; $d_4 = M_4 - M_3$

cumulative measurement variant: $d_1 = M_1$, $d_2 = M_2 - M_1$; $d_3 = M_3$; $d_4 = M_4 - M_3$

Key

1 antipole 1
2 antipole 2
3 surface
4 boundaries
5 base-layer

Figure 4 — Cumulative measurement

7 Test report

The test report shall include the following information.

a) reference to this document;

b) total average thickness of each core to the nearest 1 mm;

c) average thickness of individual layers, to the nearest 1 mm;

d) procedure used.

8 Precision

The precision data of the test are shown in Table 1.

Table 1 — Precision data of the test

Thickness bituminous pavement	Repeatability	Reproducibility
Thickness of a layer	1,2 mm (N = 10)	1,8 mm (N = 22)