SLOVENSKI STANDARD
oSIST prEN 12697-38:2021

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Bitumenske zmesi - Preskusne metode - 38. del: Splošne zahteve za opremo in umerjanje

Bituminous mixtures - Test methods - Part 38: Common equipment and calibration

Asphalt - Prüfverfahren - Teil 38: Prüfeinrichtung und Kalibrierung

Mélanges bitumineux - Méthodes d'essai - Partie 38: Équipement commun et calibrage

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English Version

Bituminous mixtures - Test methods - Part 38: Common equipment and calibration

Mélanges bitumineux - Méthodes d'essai - Partie 38: Équipement commun et calibrage

Asphalt - Prüfverfahren - Teil 38: Prüfeinrichtung und Kalibrierung

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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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 12697-38:2020) 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 12697-38:2004.

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.

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

1 Scope

This document specifies general requirements for common test equipment, calibration procedures and reagents for the testing of bituminous materials in the EN 12697 series of standards.

NOTE 1 This document makes use by reference of the requirements for common equipment and calibration prepared for aggregates.

NOTE 2 Bodies providing accreditation of test equipment may need to consider alternative requirements and/or calibration frequencies in order to cover the possibilities of National Health & safety, regulatory and legislative requirements.

Advice is also given on recommendations for laboratory management (Annex A), on the accuracy of measurement (Annex B) and on the rounding of values for reported results (Annex C).

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 932-5, *Tests for general properties of aggregates - Part 5: Common equipment and calibration*

EN 61010-2-020, *Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-020: Particular requirements for laboratory centrifuges (IEC 61010-2-020)*

EN ISO 376, *Metallic materials - Calibration of force-proving instruments used for the verification of uniaxial testing machines (ISO 376)*

ISO 48-2, *Rubber, vulcanized or thermoplastic - Determination of hardness - Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 48-5, *Rubber, vulcanized or thermoplastic - Determination of hardness - Part 5: Indentation hardness by IRHD pocket meter method*

ISO 4662, *Rubber, vulcanized or thermoplastic - Determination of rebound resilience*

ISO 11095, *Linear calibration using reference materials*

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 https://www.iso.org/obp

3.1
calibrating
set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards

Note 1 to entry: See ISO 10012.

3.2
checking
operation of assuring either:

— that the results of measurements of a property (such as length, mass, temperature or time) at selected values made by an item, or a set of items, of equipment has not deviated from that which was measured when the equipment was last calibrated within a pre-defined tolerance; or

— that a property (such as hardness) of an item, or a set of items, of equipment complies with the relevant requirements for that equipment

3.3
reference instrument
item of equipment that is used to calibrate other items of equipment that are to be used to perform tests

Note 1 to entry: A reference instrument should not be used to perform a test.

3.4
reference document
item with a property (such as mass or length) whose known value is traceable to national standards and is used in the calibration of items of equipment that is to be used to perform tests

Note 1 to entry: A reference document should not be used to perform a test.

3.5
accuracy (of a measurement)

difference between the measurement and the real or target value; normally, the accuracy consists of two items: accuracy = random error or precision + systematic error or bias (trueness)

Note 1 to entry: The accuracy of measurement is important because there is uncertainty in any measurement of physical properties. This uncertainty results from variations between two measurements of nominally identical samples and can result from various reasons including:

— differences in the composition of the samples tested;

— differences in the dimensions and shape of the samples tested;

— differences in equipment (dimensions, stiffness of moving parts, etc) used to carry out the tests;

— the precise procedure that the test is carried out (often due to different layout of equipment within different laboratories);

— the physical strength (in terms of the time to press buttons or speed in lifting items), speed of reactions and predilections of the operatives; and

— the precise environmental conditions prevalent during the test.

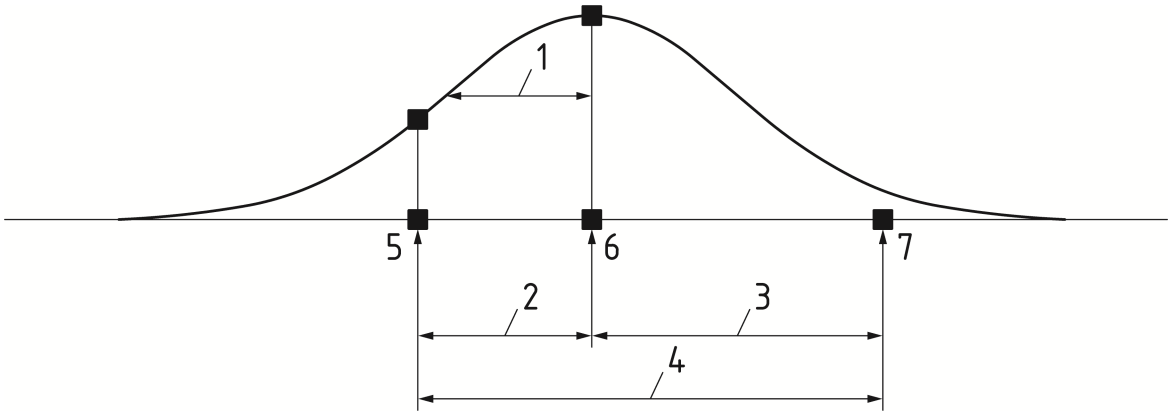
These differences can be so minor that it is impractical to specify them within a test procedure, but they still combine to produce noticeable differences.

Note 2 to entry: There is a distinction between “readability” and “accuracy”. If equipment can be accurately read to 1 unit, then the random error in the value of the reading cannot be less than ± 0,5 units, that is 1 unit. There can also be random errors in the measurement method. Therefore, the accuracy of equipment, that is the total random error plus any bias, can never be closer than its readability and will usually be in excess of that. However, equipment cannot be calibrated to better than the readability, so that the accuracy is generally an order of magnitude greater than the readability and should always be at least twice the readability.

Note 3 to entry: See Figure 1.

3.6
standard deviation (of a measurement)
quantitative statistical expression of the precision of a measurement

Note 1 to entry: There does not have to be a relation between precision and accuracy. A measurement can be precise and not accurate (in which case the bias is large). See Figure 1.



Key

1 standard deviation σ , s
2 random error
3 systematic error or bias δ
4 single measurement
5 average of multiple measurements μ , x
6 target value t
7 accuracy

Figure 1 — Diagram showing definitions

Note 2 to entry: The size of the random error for a single measurement and the systematic error or bias for the target value are illustrative only and do not show the size of these values for all, or even most, cases.

3.7
confidence
expectation that a measurement will be in an interval of results, between a lower and an upper value

Note 1 to entry: The interval normally used is with a confidence of 95 %.

Note 2 to entry: A small confidence interval characterises a confident measurement method. The associated standard deviation of the measurement will be small.

Note 3 to entry: Confidence does not relate to the systematic error or the accuracy of a measurement.

Note 4 to entry: See Table 1 for translations of the different terms that are related to measurements and testing. Table 1 is based on part of Dutch Standard NEN 3114.

Table 1 — Terminology for measurement and testing

English	French	German	Dutch
confidence level: confidence coefficient	niveau de confiance	statistische Sicherheit	betrouwbaarheid
confidence interval	intervalle de confiance	Vertrauensbereich	betrouwbaarheidsinterval
correction	correction	Korrektur	correctie
individual measurement; single observation	mesure unique; observation isolée	Einzelwert; Einzelbeobachtung	enkelvoudige meetuitkomst
sample standard deviation	écart-type d'échantillon	Standardabweichung	gemeten standaardafwijking
deviation from the sample mean; deviation from the arithmetic mean	écart par rapport à la moyenne arithmétique	Abweichung vom Mittelwert	gemeten toevallige afwijking
arithmetic mean; sample mean	moyenne arithmétique	(arithmetischer) Mittelwert	gemiddelde
target value	valeur de consigne	wahrer Wert	gezochte waarde
repeatability	répétabilité	Wiederholbarkeit	herhaalbaarheid
measurement	mesurage; mesure	Messung	meting
measuring instrument; measuring equipment	instrument de mesurage	Messgerät; Messinstrument	meetinstrument
measuring method	Méthode de mesurage	Messmethode	meetmethode
population mean	moyenne théorique	Mittelwert der Grundge-samtheit	meetverwachting
nominal value	valeur nominale	Nennwert	nominale waarde
inaccuracy	imprécision	Messunsicherheit	onnauwkeurigheid
systematic error; bias	erreur systématique; biais	systematischer Fehler	systematische afwijking; onzuiverheid
precision	exactitude	Genauigkeit	precisie
reproducibility	reproductibilité	Reproduzierbarkeit	reproduceerbaarheid
range	Étendue	Variatonsbereich	spreidingsbreedte
standard deviation	Ecart-type	Standardabweichung der Grundgesamtheit	standaardafwijking
standard deviation of the mean	écart-type de la moyenne arithmétique	Standardabweichung des Mittelwertes	standaardafwijking van het gemiddelde
random error	erreur aléatoire	zufälliger Fehler	toevallige afwijking
outlier; maverick	observation aberrante	Ausreißer	uitschieter
coefficient of variation	coefficient de variation	Variationskoeffizient	variatiecoëfficiënt
unbiased; without systematic error	non biaisé; sans erreur systématique	ohne systematische Fehler	zuiver

4 General

4.1 Overriding requirements

The requirements in this document supplement the requirements in other documents that call up this document. When both standards have requirements on a specific aspect, the requirement in the standard calling up this document shall take precedence.

It is recommended that the testing laboratory have adequate documented instructions on all relevant equipment, on the test samples and on standard testing techniques (Annex A).

4.2 Shared requirements

The requirements of EN 932-5 shall apply for all items of equipment covered in EN 932-5. Those requirements of EN 932-5 that are not equipment-specific shall also apply to all equipment covered in this document.

4.3 Equipment identification

Each item of equipment shall be uniquely identified and shall be checked before first use and at regular intervals thereafter (as defined in EN 932-5 or elsewhere in this document) to ensure that it complies with this clause and, if necessary, replaced. When equipment is replaced, the old item shall be calibrated to identify any errors arising since its last calibration. A piece of equipment referred to as a calibrated item shall have been calibrated.

5 Test equipment

NOTE Advice on the required accuracy of measurement for equipment, test actions, test results and their inter-relationship is given in Annex B.

5.1 Constant temperature baths

Constant temperature baths shall incorporate a thermostatic temperature control which can be set to maintain the specified working temperature to within ± 2 °C.

5.2 Centrifuges

Centrifuges shall conform to EN 61010-2-020.

5.3 Rubber

Spare parts for equipment used to measure frictional properties that are made of rubber that hardens due to reaction with oxygen or softened plastic shall be stored according to the supplier's storage instructions when not in use as far as practicable. In the absence of specific supplier instructions, store rubber products away from direct sources of heat and direct sunlight at a temperature below 25 °C. If the storage temperature is below 15 °C, the product shall be raised to a temperature of about 30 °C throughout its mass before being brought into use.

Rubber under these conditions can still have a limited life that should be considered when using rubber parts after extended storage.