



SLOVENSKI STANDARD
oSIST prEN ISO 10545-16:2015
01-julij-2015

Keramične ploščice - 16. del: Ugotavljanje majhnih barvnih razlik in vrednosti odboja svetlobe (ISO/DIS 10545-16:2015)

Ceramic tiles - Part 16: Determination of small colour differences and light reflectance values (ISO/DIS 10545-16:2015)

Keramische Fliesen und Platten - Teil 16: Bestimmung kleiner Farbabweichungen und des Lichtreflexionsgrades (ISO/DIS 10545-16:2015)

Carreaux et dalles céramiques - Partie 16 : Détermination de faibles différences de couleur et (ISO/DIS 10545-16:2015)

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ICS:

91.100.23 Keramične ploščice Ceramic tiles

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 10545-16

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Ceramic tiles —

Part 16: Determination of small colour differences and light reflectance values

Carreaux et dalles céramiques —

Partie 16: Détermination de faibles différences de couleur

ICS: 91.100.23

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the European Committee for Standardization (CEN), and processed under the **CEN lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 10545-16 was prepared by Technical Committee ISO/TC 189, *Ceramic Tiles*,

This third edition cancels and replaces the second edition (ISO 10545-16:2010), which has been technically revised.

ISO 10545 consists of the following parts, under the general title *Ceramic tiles* —:

- *Part 1: Sampling and basis for acceptance*
- *Part 2: Determination of dimensions and surface quality*
- *Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density*
- *Part 4: Determination of modulus of rupture and breaking strength*
- *Part 5: Determination of impact resistance by coefficient of restitution*
- *Part 6: Determination of resistance to deep abrasion for unglazed tiles*
- *Part 7: Determination of resistance to surface abrasion for glazed tiles*
- *Part 8: Determination of linear thermal expansion*
- *Part 9: Determination of resistance to thermal shock*
- *Part 10: Determination of moisture expansion*
- *Part 11: Determination of crazing resistance for glazed tiles*
- *Part 12: Determination of frost resistance*
- *Part 13: Determination of chemical resistance*
- *Part 14: Determination of resistance to stains*
- *Part 15: Determination of lead and cadmium given off by glazed tiles*

— Part 16: Determination of small colour differences and light reflectance value

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Ceramic tiles —

Part 16:

Determination of small colour differences and light reflectance values

1 Scope

This part of ISO 10545 describes methods for utilizing colour measuring instruments:

- for quantifying the small colour differences between plain coloured ceramic tiles, which are designed to be of uniform and consistent colour. It permits the specification of a maximum acceptable value which depends only on the closeness of match and not on the nature of the colour difference;

NOTE 1 Colour variations produced for artistic purposes are not covered in this part of ISO 10545.

NOTE 2 This test should only be used when small colour differences between plain coloured tiles are important in a specification or by agreement.

- for determining the Light Reflectance Value (LRV) of ceramic tiles. The method of test is applicable to tiles that have multi-coloured surfaces including those that cause extreme angular dependences of reflected light and those that have a surface texture of ≤ 2 mm.

2 Normative references

<https://standards.iteh.ai/catalog/standards/sist/70c1d2a5-08dd-416b-b834-aa4750c6-41/osist-pr-en-iso-10545-16-2015>

The following documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 10545. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 10545 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

CIE 15:2004, ¹⁾ *Colourimetry, 3rd Edition* ISBN 3 901 906 33 9

CIE 130:1998, *Practical Methods for the Measurement of Reflectance and Transmission* ISBN 3 900 734 88 7

ISO 105-J03:2009, *Textiles — Tests for colour fastness — Part J03: Calculation of colour differences.*

3 Terms and definitions

For the purposes of this part of ISO 10545, the following definitions apply.

3.1

Light Reflectance Value (LRV)

proportion of visible light reflected by a surface, weighted for the sensitivity to light of the human eye

Note 1 to entry: This is equivalent to CIE Tristimulus Y10 when viewed under Illuminant D65 and when measured with the appropriate specimen and measurement geometry. Further details of the CIE Tristimulus values are given in CIE 15:2004 and further details of the measurement of reflection are given in CIE 130:1998.

1) Commission Internationale de l'Éclairage (CIE).

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3.2

Multi-coloured surfaces

surfaces formed by distinct areas of different colour, which when viewed from a maximum distance of 3 m, remain distinct or surfaces formed from small colour specks, which when viewed from a distance, assume the appearance of one colour

3.3

Chroma

Chroma is an attribute of colour which is defined as deviation from grey of the same lightness

Note 1 to entry: The more a colour deviates from grey, the higher the chroma.

3.4

Lightness

Lightness is a parameter which relates the colour to a continuous grey scale between white and black

3.5

CIE²⁾ 1976 $L^* a^* b^*$ (CIELAB) values

CIELAB values calculated from measured spectral reflectance curves given in CIE Publication No. 15.2

3.6

CMC³⁾ colour difference

ΔE_{cmc}

ΔE_{cmc} describes a set of colour difference equations which utilizes CIELAB (ΔL^* , DC^*ab , DH^*ab) values calculated between a test specimen and a reference standard to determine the ellipsoidal boundary containing all colours which would be visually acceptable when compared to the reference standard

3.7

Commercial factor, cf

The commercial factor is a measurement of the tolerance agreed upon by all parties or those commonly utilized in the tile industry for determining the acceptability of the colour difference, ΔE_{cmc} .

3.8

Metamerism

metamerism is the matching of apparent colour of objects with different [spectral power distributions](#). Colours that match this way are called **metamers**

4 Principle

4.1 Small colour differences

Colourimetric measurements are made on reference standard tiles and a test specimen of tiles of the same colour and the differences are calculated. The calculated CMC colour difference (ΔE_{cmc}) of a test specimen is compared to a reference value, using a previously agreed upon commercial factor (cf) or the cf commonly used in the tile industry, to determine the acceptability of the colour match.

NOTE Colourimetry describes a measure of colour difference, not appearance difference. Calculations are only valid when the reference and test specimens have essentially the same gloss and texture.

4.2 Light reflectance value

The amount of light reflected from the surface at a number of wavelengths evenly spaced across the visible spectrum is to be measured. These measurements shall include the spectral component of reflected light, commonly termed the SPIN measurement.

2) Commission Internationale de l'Eclairage (International Commission on Illumination), Central Bureau, Kegelgasse 27, A-1030 Vienna, Austria.

3) Colour Measurement Committee, Society of Dyers and Colourists, P.O. Box 244, Perkin House, 82 Grattan Road, GB-Bradford BD1 2JB, United Kingdom.