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Ceramic tiles — Definitions, classification, characteristics and marking

Carreaux et dalles céramiques — Définitions, classification, caractéristiques et marquage

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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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 189, *Ceramic tile*.

This third edition cancels and replaces the second edition (ISO 13006:2012), which has been technically revised.

This main changes compared to the previous edition are as follows:

— The boiling method in ISO 10545-3 is no longer referenced for the determination of water absorption. The vacuum method is now referenced for the determination of water absorption.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Ceramic tiles — Definitions, classification, characteristics and marking

1 Scope

This document defines terms and establishes classifications, characteristics and marking requirements for ceramic tiles of the best commercial quality (first quality). This document is not applicable to tiles made by other than normal processes of extrusion or dry pressing. It is not applicable to decorative accessories or trim such as edges, corners, skirting, capping, coves, beads, steps, curved tiles and other accessory pieces or mosaics (i.e. any piece that can fit into a square, the side of which is less than 7 cm).

NOTE ISO 10545 (all parts) describes the test procedures required to determine the product characteristics listed in this document. ISO 10545 is a multi-part standard, each part describes a specific test procedure or related matter.

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.

ISO 1006, *Building construction — Modular coordination — Basic module*

ISO 10545-1, *Ceramic tiles — Part 1: Sampling and basis for acceptance*

ISO 10545-2, *Ceramic tiles — Part 2: Determination of dimensions and surface quality*

ISO 10545-3, *Ceramic tiles — Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density*

ISO 10545-4, *Ceramic tiles — Part 4: Determination of modulus of rupture and breaking strength*

ISO 10545-5, *Ceramic tiles — Part 5: Determination of impact resistance by measurement of coefficient of restitution*

ISO 10545-6, *Ceramic tiles — Part 6: Determination of resistance to deep abrasion for unglazed tiles*

ISO 10545-7, *Ceramic tiles — Part 7: Determination of resistance to surface abrasion for glazed tiles*

ISO 10545-8, *Ceramic tiles — Part 8: Determination of linear thermal expansion*

ISO 10545-9, *Ceramic tiles — Part 9: Determination of resistance to thermal shock*

ISO 10545-10, *Ceramic tiles — Part 10: Determination of moisture expansion*

ISO 10545-11, *Ceramic tiles — Part 11: Determination of crazing resistance for glazed tiles*

ISO 10545-12, *Ceramic tiles — Part 12: Determination of frost resistance*

ISO 10545-13, *Ceramic tiles — Part 13: Determination of chemical resistance*

ISO 10545-14, *Ceramic tiles — Part 14: Determination of resistance to stains*

ISO 10545-15, *Ceramic tiles — Part 15: Determination of lead and cadmium given off by glazed tiles*

ISO 10545-16, *Ceramic tiles — Part 16: Determination of small colour differences*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1006 and the following apply.

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

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

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

3.1
ceramic tile
thin slab made from clays and/or other inorganic raw materials, generally used as covering for floors and walls, usually shaped by extruding (A) or pressing (B) at room temperature, but may be formed by other processes (C), then dried and subsequently fired at temperatures sufficient to develop the required properties

Note 1 to entry: Tiles may be glazed (GL) or unglazed (UGL); they are incombustible and are not affected by light.

3.2
porcelain tile
fully vitrified tile with water absorption coefficient less than or equal to a mass fraction of 0,5 %, belonging to groups AI_a and BI_a

3.3
glaze
vitrified covering that is impermeable

3.4
engobed surface
clay-based covering with a matt finish which may be permeable or impermeable

Note 1 to entry: A tile with an engobed surface is regarded as an unglazed tile.

3.5
polished surface
surface of glazed and unglazed tile which has been given a glossy finish by mechanical polishing as the last stage of manufacture

3.6
extruded tile
tile, whose body is shaped in the plastic state in an extruder, the column obtained being cut into tiles of pre-determined dimension, and which is designated as Group A

Note 1 to entry: This document classifies extruded tiles as “precision” or “natural”. The classification is dependent upon the different technical characteristics as listed in the individual product standards.

Note 2 to entry: Traditional terms used for extruded products are “split tiles” and “quarry tiles”. They commonly indicate double-extruded and single-extruded tiles, respectively. The term “quarry tiles” only refers to extruded tiles with a water absorption coefficient of a mass fraction not exceeding 6 %.

3.7
dry-pressed tile
tile, formed from a finely milled body mixture and shaped (e.g. in dies or moulds) at high pressure, and which is designated as Group B

3.8
water absorption
E_v
percentage of water impregnating a tile

Note 1 to entry: This is measured in accordance with ISO 10545-3.

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Note 2 to entry: Water absorption is expressed as a mass fraction of dry mass.

3.9 Sizes

Note 1 to entry The sizes are only defined for rectangular tiles. If the sizes of non-rectangular tiles are required, they are defined by the smallest rectangle into which they fit.

3.9.1
nominal size
size used to describe the product

Note 1 to entry: See Figures 1 and 2.

3.9.2
work size
size of a tile specified for manufacturing to which the actual size shall conform within specified permissible deviations

Note 1 to entry: See Figures 1 and 2.

3.9.3
actual size
size obtained by measuring the face of a tile

Note 1 to entry: This is measured in accordance with ISO 10545-2.

Note 2 to entry: See Figures 1 and 2.

3.9.4
coordinating size
work size plus the joint width

Note 1 to entry: See Figures 1 and 2.

3.9.5
modular size
tile and size based on module M, 2 M, 3 M and 5 M and also their multiples or subdivisions, except for tiles with a surface area of less than 9 000 mm^2

Note 1 to entry: See ISO 1006, where 1 M = 100 mm.

Note 2 to entry: See Figures 1 and 2.

3.9.6
non-modular size
size not based on module M

Note 1 to entry: See ISO 1006, where 1 M = 100 mm.

Note 2 to entry: Tiles of these sizes are those commonly used in most countries.

Note 3 to entry: See Figures 1 and 2.

3.9.7
tolerance
difference between the permissible limits of size

Note 1 to entry: See Figures 1 and 2.

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3.10
spacer lug
projection that is located along certain edges of tiles so that where two tiles are placed together, in line, the lugs on adjacent edges separate the tiles by a distance of not less than the specified width of the joint

Note 1 to entry: See Figure 2.

3.11
rectified tile
ceramic tile that, after firing, is subjected to a precise mechanical finishing of the edges

3.12
back feet
parallel ridges running across the back surface of some exterior wall tiles which possess a geometry intended to facilitate an interlocking connection between tile and cement mortar

Note 1 to entry: See Figure 3.

Note 2 to entry: Back feet dimensions shall be measured with vernier calipers, and each specimen in a 10-tile sample is required to satisfy the requirements in Annexes A to H and Annexes J to M.

4 Classification

4.1 Basis of classification

Ceramic tiles are divided into groups according to their method of manufacture and their water absorption (see 3.8 and Table 1). The groups do not presuppose the usage of the products.

4.2 Methods of manufacture

The following are the two methods of manufacture:

— method A, extruded tiles (see 3.6);

— method B, dry-pressed tiles (see 3.7).

4.3 Water absorption according to group

4.3.1 General

The following are the three groups according to water absorption, E_v.

4.3.2 Subdivision of the three groups

The three groups are divided into tiles of low, medium and high water absorption, namely Groups I, II and III, respectively.

a) Tiles of low water absorption, i.e. absorption coefficient less than or equal to a mass fraction of 3 %, $E_v \leq 3$ %, belong to Group I. Group I consists of the following:

   1) for extruded tiles

      i) $E_v \leq 0{,}5$ % (Group AI_a), and

      ii) $0{,}5\ \% < E_v \leq 3\ \%$ (Group AI_b);

   2) for dry-pressed tiles:

      i) $E_v \leq 0{,}5$ % (Group BI_a);

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