SLOVENSKI STANDARD
SIST ISO 13006:1999

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Nadomeġļ a:
SIST EN 87:1998

Keramiļ ne ploġļ ice - Definicije, razvrstitev, lastnosti in oznaļ evanje

Ceramic tiles -- Definitions, classification, characteristics and marking

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

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01.040.91	Gradbeni materiali in gradnja (Slovarji)	Construction materials and building (Vocabularies)
91.100.23	Keramiļ ne ploġļ ice	Ceramic tiles
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SIST ISO 13006:1999 **en**

INTERNATIONAL STANDARD

ISO 13006

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Ceramic tiles — Definitions, classification, characteristics and marking

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

Reference number
ISO 13006:1998(E)

Contents

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 13006 was prepared by Technical Committee ISO/TC 189, *Ceramic tile*.

Annexes A to L form an integral part of this International Standard. Annexes M to P and the Bibliography are for information only.

Ceramic tiles — Definitions, classification, characteristics and marking

1 Scope

This International Standard defines terms and establishes classifications, characteristics and marking requirements for ceramic tiles of the best commercial quality (first quality).

NOTE ISO 10545 describes the test procedures required to determine the product characteristics listed in ISO 13006. ISO 10545 is divided into parts each describing a specific test procedure or related matter.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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.

ISO 1006:1983, *Building construction — Modular coordination — Basic module.*

ISO 10545-1:1995, *Ceramic tiles — Part 1: Sampling and basis for acceptance.*

ISO 10545-2:1995, *Ceramic tiles — Part 2: Determination of dimensions and surface quality.*

ISO 10545-3:1995, *Ceramic tiles — Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density.*

ISO 10545-4:1994, *Ceramic tiles — Part 4: Determination of modulus of rupture and breaking strength.*

ISO 10545-5:1996, *Ceramic tiles — Part 5: Determination of impact resistance by measurement of coefficient of restitution.*

ISO 10545-6:1995, *Ceramic tiles — Part 6: Determination of resistance to deep abrasion for unglazed tiles.*

ISO 10545-7:1996, *Ceramic tiles — Part 7: Determination of resistance to surface abrasion for glazed tiles.*

ISO 10545-8:1994, *Ceramic tiles — Part 8: Determination of linear thermal expansion.*

ISO 10545-9:1994, *Ceramic tiles — Part 9: Determination of resistance to thermal shock.*

ISO 10545-10:1995, *Ceramic tiles — Part 10: Determination of moisture expansion.*

ISO 10545-11:1994, *Ceramic tiles — Part 11: Determination of crazing resistance for glazed tiles.*

ISO 10545-12:1995, *Ceramic tiles — Part 12: Determination of frost resistance.*

ISO 10545-13:1995, *Ceramic tiles — Part 13: Determination of chemical resistance.*

ISO 10545-14:1995, *Ceramic tiles — Part 14: Determination of resistance to stains.*

ISO 10545-15:1995, *Ceramic tiles — Part 15: Determination of lead and cadmium given off by glazed tiles.*

ISO 10545-16:—[1)], *Ceramic tiles — Part 16: Determination of small colour differences.*

ISO 10545-17:—[1)], *Ceramic tiles — Part 17: Determination of coefficient of friction.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 1006 and the following apply.

3.1
ceramic tiles
thin slabs made from clays and/or other inorganic raw materials, generally used as coverings 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; tiles can be glazed (GL) or unglazed (UGL) and are incombustible and unaffected by light

3.2
glaze
vitrified covering which is impermeable

3.3
engobed surface
clay-based covering with a matt finish which can be permeable or impermeable

NOTE A tile with an engobed surface is regarded as an unglazed tile.

3.4
polished surface
surface of an unglazed tile which has been given a glossy finish by mechanical polishing as the last stage of manufacture

3.5
extruded tiles
[designated as A]
tiles whose body is shaped in the plastic state in an extruder, the column obtained being cut into tiles of pre-determined dimension

NOTE 1 This International Standard 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 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 not exceeding 6 %.

3.6
dry-pressed tiles
[designated as B]
tiles formed from a finely milled body mixture and shaped in moulds at high pressure

3.7
tiles made by other processes
[designated as C]
tiles made by other than the normal commercial processes, i.e. extruded or dry-pressed

NOTE These tiles are not covered in this International Standard.

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1) To be published.

3.8
spacer lugs
projections which are located along certain edges of tiles so that when two tiles are placed together, in line, the lugs on adjacent edges separate the tiles by a distance not less than the specified width of the joint

See figure 2.

NOTE 1 Lugs are positioned so that the joint between the tiles may be filled with grout without the lugs remaining exposed.

NOTE 2 Dry-pressed tiles may be made with other spacer lug systems and, in such cases, the manufacturer's work size applies.

3.9
water absorption
[symbol E]
percentage of water by mass, measured in accordance with ISO 10454-3

3.10 Description of sizes
See figures 1 and 2.

NOTE These 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 will fit.

3.10.1
nominal size
size used to describe the product

3.10.2
work size
[symbol W]
size of a tile specified for manufacturing to which the actual size has to conform within specified permissible deviations

NOTE This is specified by the dimensions length, width and thickness.

3.10.3
actual size
size obtained by measuring the face of the tile in accordance with ISO 10545-2

3.10.4
coordinating size
[symbol C]
work size plus the joint width

3.10.5
modular size
tiles and sizes 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 See ISO 1006 where 1 M = 100 mm.

3.10.6
non-modular sizes
sizes not based on module M

NOTE 1 See ISO 1006 where 1 M = 100 mm.

NOTE 2 Tiles of these sizes are those commonly used in most countries.

3.10.7
tolerance
difference between the permissible limits of size

4 Classification

4.1 Basis of classification

Ceramic tiles are divided into groups according to their method of manufacture and their water absorption (see 3.9 and table 1). The groups do not presuppose the usage of the products.

4.2 Methods of manufacture

There are three methods of manufacture as follows:

— method A, extruded tiles (see 3.5);

— method B, dry-pressed tiles (see 3.6);

— method C, tiles made by other processes (see 3.7).

4.3 Water absorption (E) groups

There are three water absorption groups as follows.

a) Tiles of low water absorption (Group I), $E \leqslant 3$ %

Group I is further divided as follows for dry-pressed tiles:

1) $E \leqslant 0{,}5$ % (Group BI_a);

2) $0{,}5\ \% < E \leqslant 3\ \%$ (Group BI_b).

b) Tiles of medium water absorption (Group II), $3\ \% < E \leqslant 10\ \%$

Group II is further divided as follows for extruded tiles:

1) $3\ \% < E \leqslant 6\ \%$ (Group AII_a, Parts 1 and 2);

2) $6\ \% < E \leqslant 10\ \%$ (Group AII_b, Parts 1 and 2).

c) Tiles of high water absorption (Group III), $E > 10$ %

5 Characteristics

Characteristics for different applications of ceramic tiles are given in table 2.

6 Sampling and basis for acceptance

The sampling and basis for acceptance shall be in accordance with that presented in ISO 10545-1.

7 Requirements

Dimensional and surface quality requirements and physical and chemical properties shall be as given in the specific annex (annexes A through L) for each tile class (see contents).

8 Marking and specifications

8.1 Marking

Tiles and/or their packaging shall bear the following marking:

a) manufacturer's mark and/or trademark and the country of origin;

b) mark to indicate first quality;

c) type of tile and reference to the appropriate annex in this International Standard;

d) nominal and work sizes, modular (M) or non-modular;

e) nature of the surface, i.e. glazed (GL) or unglazed (UGL).

8.2 Product literature

Product literature for tiles intended for use on floors shall state:

a) the results obtained in accordance with ISO 10545-17;

b) the abrasion class for glazed tiles.

NOTE See also annex M for informative symbols.

8.3 Specifications

Tiles shall be specified by designating the following:

a) the method of shaping;

b) the annex in this International Standard covering the specific class of tile;

c) nominal and work sizes, modular (M) and non-modular;

d) the nature of the surface, i.e. glazed (GL) or unglazed (UGL).

EXAMPLES

Precision extruded tile, ISO 13006:1998, annex A

AI M25 cm × 12,5 cm (*W* 240 mm × 115 mm × 10 mm) GL

Natural extruded tile, ISO 13006:1998, annex A

AI 15 cm × 15 cm (*W* 150 mm × 150 mm × 12,5 mm) UGL

9 Ordering

When an order is placed, items such as size, thickness, type of surface, colour, profile, abrasion class for glazed tiles and other properties shall be agreed by the parties concerned.

Table 1 — Classification of ceramic tiles with respect to water absorption and shaping

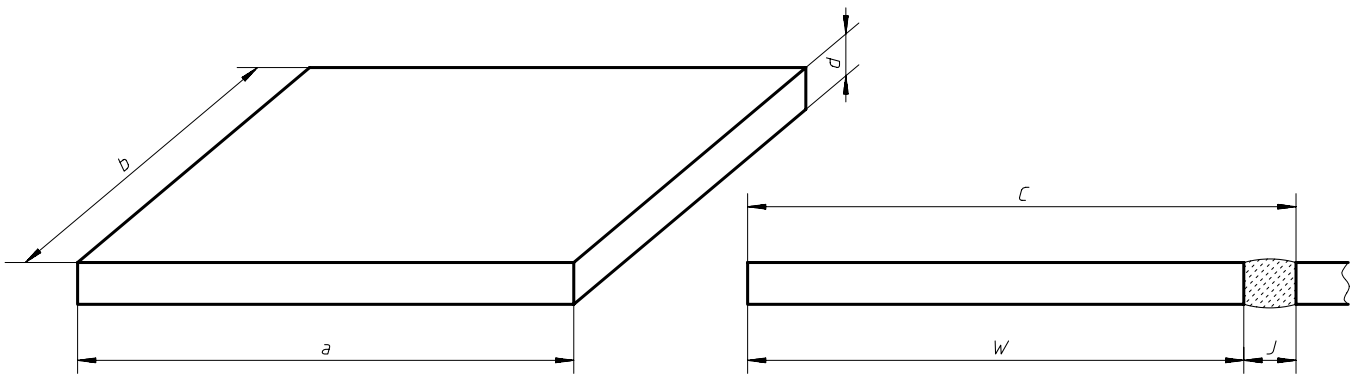
Shaping	Group I $E \leqslant 3$ %	Group II_a 3 % $\leqslant E <$ 6 %	Group II_b 6 % $\leqslant E <$ 10 %	Group III $E >$ 10 %
A **Extruded**	Group AI (see annex A)	Group AII_{a-1} [1] (see annex B)	Group AII_{b-1} [1] (see annex D)	Group AIII (see annex F)
		Group AII_{a-2} [1] (see annex C)	Group AII_{b-2} [1] (see annex E)	
B **Dry pressed**	Group BI_a $E \leqslant$ 0,5 % (see annex G)	Group BII_a (see annex J)	Group BII_b (see annex K)	Group BIII [2] (see annex L)
	Group BI_b 0,5 % $< E \leqslant$ 3 % (see annex H)			
C **Tiles made by other processes**	Group CI [3]	Group CII_a [3]	Group CII_b [3]	Group CIII [3]

1) Groups AII_a and AII_b are divided into two parts (Parts 1 and 2) with different product specifications.
2) Group BIII covers glazed tiles only. There is a low quantity of dry-pressed unglazed tiles produced with water absorption greater than 10 % that is not covered by this product group.
3) These tiles are not covered in this International Standard.

Table 2 — Characteristics required for different applications

Characteristics	Floors		Walls		Test
Dimensions and surface quality	**Interior**	**Exterior**	**Interior**	**Exterior**	**Reference**
Length and width	X	X	X	X	ISO 10545-2
Thickness	X	X	X	X	ISO 10545-2
Straightness of sides	X	X	X	X	ISO 10545-2
Rectangularity	X	X	X	X	ISO 10545-2
Surface flatness (curvature and warpage)	X	X	X	X	ISO 10545-2
Surface quality	X	X	X	X	ISO 10545-2
Physical properties	**Interior**	**Exterior**	**Interior**	**Exterior**	**Reference**
Water absorption	X	X	X	X	ISO 10545-3
Breaking strength	X	X	X	X	ISO 10545-4
Modulus of rupture	X	X	X	X	ISO 10545-4
Resistance to deep abrasion – unglazed tiles	X	X			ISO 10545-6
Resistance to surface abrasion – glazed tiles	X	X			ISO 10545-7
Linear thermal expansion [1)]	X	X	X	X	ISO 10545-8
Resistance to thermal shock [1)]	X	X	X	X	ISO 10545-9
Resistance to crazing – glazed tiles	X	X	X	X	ISO 10545-11
Frost resistance [2)]		X		X	ISO 10545-12
Coefficient of friction	X	X			ISO 10545-17
Moisture expansion [1)]	X	X	X	X	ISO 10545-10
Small colour differences [1)]	X	X	X	X	ISO 10545-16
Impact resistance [1)]	X	X			ISO 10545-5
Chemical properties	**Interior**	**Exterior**	**Interior**	**Exterior**	**Reference**
Resistance to staining					ISO 10545-14
— glazed tiles	X	X	X	X	ISO 10545-14
— unglazed tiles [1)]	X	X	X	X	ISO 10545-14
Resistance to low concentrations of acids and alkalis.	X	X	X	X	ISO 10545-13
Resistance to high concentrations of acids and alkalis.[1)]	X	X	X	X	ISO 10545-13
Resistance to household cleaners and swimming pool salts.	X	X	X	X	ISO 10545-13
Lead and cadmium release – glazed tiles [1)]	X	X	X	X	ISO 10545-15

1) Test method available.
2) For tiles intended to be used in situations where frost conditions apply.



Coordinating size (C) = Work size (W) + Joint (J)

Work size (W) = Dimension of the visible face (a), (b) and thickness (d)

Figure 1 — Tile

Key

1 Spacer lugs

Coordinating size (C) = Work size (W) + Joint (J)

Work size (W) = Dimension of the visible face (a), (b) and thickness (d)

Figure 2 — Tile with spacer lug

Annex A
(normative)

Extruded ceramic tiles
$E \leqslant 3$ %
Group AI

A.1 Requirements

Dimensional and surface quality requirements and physical and chemical properties shall be in accordance with table A.1.

Table A.1 — Requirements for extruded ceramic tiles, Group AI, $E \leqslant 3$ %

Dimensions and surface quality	Precision	Natural	Test
Length and width			
The manufacturer shall choose the work size as follows: a) for modular tiles in order to allow a nominal joint width of between 3 mm and 11 mm[1)]; b) for non-modular tiles so that the difference between the work size and the nominal size is not more than ± 3 mm.			
The deviation, in percent, of the average size for each tile (2 or 4 sides) from the work size (W).	± 1,0 % to a maximum of ± 2 mm	± 2,0 % to a maximum of ± 4 mm	ISO 10545-2
The deviation, in percent, of the average size for each tile (2 or 4 sides) from the average size of the 10 test specimens (20 or 40 sides).	± 1,0 %	± 1,5 %	ISO 10545-2
Thickness			
a) The thickness shall be specified by the manufacturer.			
b) The deviation, in percent, of the average thickness of each tile from the work size thickness.	± 10 %	± 10 %	ISO 10545-2
Straightness of sides [2)] (facial sides)			
The maximum deviation from straightness, in percent, related to the corresponding work sizes.	± 0,5 %	± 0,6 %	ISO 10545-2