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मानक

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Mazdoor Kisan Shakti Sangathan

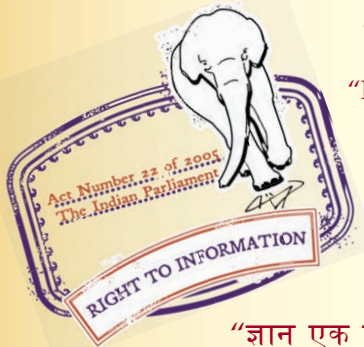
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“पुराने को छोड़ नये के तरफ”

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“Step Out From the Old to the New”

IS 13712 (2006): Ceramic tiles - Definitions, classifications, characteristics and marking [CED 5: Flooring, Wall Finishing and Roofing]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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सिरैमिक टाइलें — परिभाषाएँ, वर्गीकरण, लक्षण
तथा सूचनांकन
(पहला पुनरीक्षण)

Indian Standard

CERAMIC TILES — DEFINITIONS, CLASSIFICATIONS,
CHARACTERISTICS AND MARKING

(First Revision)

ICS 01.020; 91.100.23

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1993. In the formulation of this standard considerable assistance have been derived from the following standard:

ISO 13006 : 1998 Ceramic tiles — Definitions, classification, characteristics and marking

Since the first publication of the standard pertaining to the specification of ceramic tiles, several new technologies and product categories have emerged. This revised standard has been designed to reflect these changes, namely degree of variation of water absorption depending on degree of vitrification of the tiles.

With the rapid increase in the consumption and usage of ceramic tiles and with the emergence of new categories of tiles, it was felt that the classification of tiles needs to be made more consumer-friendly. Accordingly, a trade-based nomenclature along with water absorption has been introduced for identification of the various groups of tiles.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CERAMIC TILES — DEFINITIONS, CLASSIFICATIONS, CHARACTERISTICS AND MARKING

(First Revision)

1 SCOPE

1.1 This standard gives definitions, classifications, characteristics and marking requirements for ceramic tiles generally used for floor and wall surfaces. Ceramic tiles also include mosaics, factory slabs, pavers and components for swimming pools as well as the corresponding accessories (edge, corner and skirting and beads and other pieces).

1.2 This standard applies to tiles of the best quality (first quality) unless otherwise specified in the relevant product standard.

2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 DEFINITIONS

3.1 **Ceramic Tiles** — Thin slabs made from clays, silica, fluxes, colouring and other mineral raw materials, generally used as coverings for floors, walls or facades. They are prepared by grinding, sieving, mixing, moistening etc, and are shaped by pressing, extruding, casting or other processes, usually at room temperature. They are then dried and subsequently fired at a high temperature. Tiles may be glazed (GL), unglazed (UGL) or engobed and are incombustible and unaffected by light. Depending on degree of vitrification, water absorption may vary. A low water absorption tile is also called porcelain tile. An extremely low water absorption tile is called a fully vitrified tile and this may be either in polished or unpolished form.

3.2 **Glaze** — A vitrified covering that is practically impermeable.

3.3 **Engobe** — A clay-based covering with a matt finish which can be permeable or impermeable.

3.4 **Once Fired** — Glazed before firing.

3.5 **Twice Fired** — Glazed after a first firing, then fired a second time.

3.6 **Extruded Tiles (Shaping A)** — Tiles whose body is shaped in the plastic state in an extruder, the column obtained being cut into tiles of predetermined length.

3.6.1 **Split Tiles (Split Pattern)** — Formed as double tiles that are separated after firing to obtain single tiles. They can be glazed or unglazed and have characteristic parallel ridges on the back.

3.6.2 **Quarry Tiles** — Tiles that are cut in succession from a single extruded column and are either pressed or not pressed and are sometimes glazed.

3.7 **Pressed Tiles (Shaping B)** — Tiles formed from a body reduced to powder or small grains and shaped in moulds at high pressure. They may be glazed or unglazed.

3.8 **Cast Tiles (Shaping C)** — The body is cast into a mould or on to a porous refractory batt that absorbs the water. They can be glazed or unglazed.

3.9 **Water Absorption** — The water absorption (percent by mass) measured in accordance with IS 13630 (Part 2).

3.10 **Coordinating Size** — The size of coordinating dimension, *see* IS 4993.

3.11 **Nominal Size** — The size used to describe the product.

3.12 **Work Size** — The size of a tile specified for manufacturing to which the actual size has to conform within specified permissible deviations.

3.13 **Actual Size** — The size obtained by measuring a tile in accordance with IS 13630 (Part 1).

3.14 **Tolerances** — The difference between actual and permissible limits of size.

3.15 Sizes

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.

3.15.1 **Modular Sizes** — This covers tiles and sizes based on M (*see* IS 10316 where M = 100 mm), 2M, 3M and 5M and also their multiples or submultiples or

sub-divisions, except for tiles with a surface area of less than 9 000 mm².

NOTE — The most important examples of modular sizes are listed in the individual product standards. A general definition of dimensions is given in Table 1.

3.15.2 Non-modular Sizes — The sizes excluding those that are based on M.

4 CLASSIFICATION

Ceramic tiles are divided into groups according to their method of manufacture and their water absorption (see 3.9 and Table 2). The groups do not presuppose the usage of the products.

4.1 Methods of Manufacture

See 3.6 to 3.8.

4.2 Water Absorption Groups

4.2.1 Tiles of Very Low and Low Water Absorption (Group I)

- $E \leq 0.08$ percent (Group BIa) — Ceramic fully vitrified tiles, and
- 0.08 percent $< E \leq 3$ percent (Group BIb) — Ceramic porcelain tiles.

4.2.2 Tiles of Medium Water Absorption (Group II)

3 percent $< E \leq 6$ percent (Group BII) — Ceramic floor tiles.

4.2.3 Tiles of High Water Absorption (Group III)

$E > 10$ percent (Group BIII) — Ceramic wall tiles.

5 CHARACTERISTICS

Characteristics for different applications of ceramic floor and wall tiles are given in Table 3.

6 MARKING AND SPECIFICATION

6.1 Marking

Ceramic tiles and/or their packaging shall be marked as follows:

- Manufacturer's mark and/or a suitable work's mark and the country of origin;
- Quality;
- Reference to the standard with which they comply;
- Nominal size and work size, modular (M) or non-modular, for example
M 100 mm × 100 mm ($W = 98$ mm × 98 mm) or 152 mm × 152 mm ($W = 152.4$ mm × 152.4 mm); and
- Nature of the tile surface, that is, whether glazed or unglazed.

6.2 Specification

A brief specification shall be supplied which shall include the following:

- Description of the tile, for example, split, dust pressed etc;
- Number of the relevant standard;
- Classification as given in this standard (see Table 2);
- Nominal size and the work size; and
- Nature of tile surface: whether glazed or unglazed.

7 ORDERING, SAMPLING AND ACCEPTANCE CONDITIONS

7.1 When an order is placed, items such as size, thickness, nature of surface, colour, relief and any special properties shall be agreed by the parties concerned.

7.2 Reference shall be made to the individual product standards, which deal with the appropriate tolerances, requirements and acceptance conditions for each producer group.

7.3 Sampling and basis for acceptance are described in a separate standard [see IS 13630 (Part 15)].

Table 1 General Definition of Dimensions

(Clause 3.15.1)

Dimensions (1)	Symbol (2)	Modular (3)	Non-modular (4)
Coordinating dimension	C	$W + J$	$N + J$ or $W + J$
Nominal dimension	N_1	$W + J$	—
	N_2	—	$N_2 - W$
Work dimension	W	W	W
Joint width	J	J	J

Table 2 Classification of Ceramic Tiles According to Their Group

[Clauses 4 and 6.2(c)]

Shaping \ Water Absorption	Group Ia	Group Ib	Group II	Group III
	$E \leq 0.08\%$	$0.08\% < E \leq 3\%$	$3\% < E \leq 6\%$	$E > 10\%$
A	Group AIa	Group AIb	Group AII	Group AIII
B	Group BIa	Group BIb	Group BII	Group BIII
C	Group CIa	Group CIb	Group CII	Group CIII

Table 3 Characteristics for Different Application

(Clause 5)

Characteristics (1)	Floors		Walls		Methods of Test, Ref to Part of IS 13630 (6)
	Interior (2)	Exterior (3)	Interior (4)	Exterior (5)	
Dimensions and Surface Quality					} Part 1
a) Length and width	x	x	x	x	
b) Thickness	x	x	x	x	
c) Straightness of sides	x	x	x	x	
d) Rectangularity	x	x	x	x	
e) Surface flatness (curvature and warpage)	x	x	x	x	
f) Surface quality	x	x	x	x	
Physical Properties					
g) Water absorption	x	x	x	x	Part 2
h) Modulus of rupture	x	x	x	x	Part 6
j) Linear thermal expansion	x	x	x	x	Part 4
k) Resistance to thermal shock	x	x	x	x	Part 5
m) Crazeing resistance glazed tiles	x	x	x	x	Part 9
n) Frost resistance	x	x	x	x	Part 10
p) Moisture expansion	x	x	x	x	Part 3
q) Resistance to surface abrasion of glazed tiles	x	x			Part 11
r) Resistance to deep abrasion of unglazed tiles	x	x			Part 12
s) Scratch hardness of surface	x	x	x	x	Part 13
t) Impact Resistance	x	x			Part 14
Chemical Properties					
u) Resistance to staining of glazed tiles	x	x	x	x	Part 8
v) Resistance to household chemicals and swimming pool water cleansers	x	x	x	x	} (Part 7 and Part 8)
w) Resistance to acids	x	x	x	x	
y) Resistance to alkalis	x	x	x	x	

NOTE — Frost resistance is an optional test.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
4993 : 1983	Glossary of terms relating to modular co-ordination (<i>second revision</i>)	(Part 7) : 2006	Determination of chemical resistance — Unglazed tiles (<i>first revision</i>)
10316 : 1986	Recommendations for modular co-ordination — Basic module and sub-modular increments	(Part 8) : 2006	Determination of chemical resistance — Glazed tiles (<i>first revision</i>)
13630	Ceramic tiles — Methods of test, sampling and basis for acceptance:	(Part 9) : 2006	Determination of crazing resistance — Glazed tiles (<i>first revision</i>)
(Part 1) : 2006	Determination of dimensions and surface quality (<i>first revision</i>)	(Part 10) : 2006	Determination of frost resistance (<i>first revision</i>)
(Part 2) : 2006	Determination of water absorption and bulk density (<i>first revision</i>)	(Part 11) : 2006	Determination of resistance of surface abrasion — Glazed tiles (<i>first revision</i>)
(Part 3) : 2006	Determination of moisture expansion using boiling water — Unglazed tiles (<i>first revision</i>)	(Part 12) : 2006	Determination of resistance to deep abrasion — Unglazed tiles (<i>first revision</i>)
(Part 4) : 2006	Determination of linear thermal expansion (<i>first revision</i>)	(Part 13) : 2006	Determination of scratch hardness of surface according to Mohs (<i>first revision</i>)
(Part 5) : 2006	Determination of resistance to thermal shock (<i>first revision</i>)	(Part 14) : 2006	Determination of impact resistance by measurement of coefficient of restitution
(Part 6) : 2006	Determination of modulus of rupture and breaking strength (<i>first revision</i>)	(Part 15) : 2006	Sampling and basis for acceptance (<i>Superseding</i> IS 13711)

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Amendments Issued Since Publication

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