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मानक

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Mazdoor Kisan Shakti Sangathan

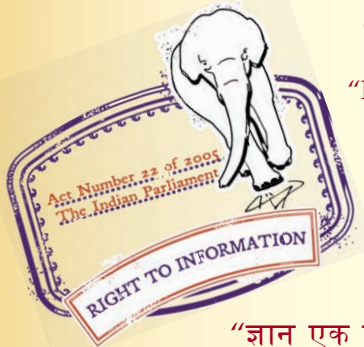
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“पुराने को छोड़ नये के तरफ”

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“Step Out From the Old to the New”

IS 13630-2 (2006): Ceramic Tiles-Methods of test, Sampling and Basis of Acceptance, Part 2: Determination of water absorption (see IS 13630 : Parts 1 to 15) [CED 5: Flooring, Wall Finishing and Roofing]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

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

Bhartḥari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS 13630 (Part 2) : 2006

भारतीय मानक
सिरैमिक टाइलें - परीक्षण पद्धतियाँ,
नमूने लेने तथा स्वीकार्यता का आधार
(पहला पुनरीक्षण)

Indian Standard

**CERAMIC TILES — METHODS OF TEST,
SAMPLING AND BASIS FOR ACCEPTANCE**

(First Revision)

ICS 91.100.23

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (Parts 1 to 15) (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 various parts in 1992-93. This is the first revision; having all parts combined in one publication, of the standard in which the following major changes have been incorporated:

- a) As per the decision taken in the last meeting, the requirements of all the parts have been included in one volume and the revised standard has been brought in line with ISO 10545 (various parts).
- b) The requirements for determination of bulk density have been added in Part 2 and a few changes have been made in the requirements for determination of water absorption.
- c) A few modifications have also been made in Part 3.
- d) Requirements for determination of breaking strength have also been added in Part 6.
- e) Requirements for determination of glazing resistance tests have also been modified in Part 9.
- f) A new test for determination of impact resistance by measurement of co-efficient of restitution has been added as Part 14.
- g) IS 13711 : 1993 'Sampling and basis for acceptance' has been amalgamated with Part 15 of this standard.

In formulation of this standard considerable assistance have been derived from the following standards:

- 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 : 2004 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 : 2004 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 13006 : 1998 Ceramic tiles — Definitions, classification, characteristics and marking

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 — METHODS OF TEST,
SAMPLING AND BASIS FOR ACCEPTANCE****PART 2 DETERMINATION OF WATER ABSORPTION AND BULK DENSITY***(First Revision)***1 SCOPE**

This standard (Part 2) covers methods of test for determining the water absorption of all ceramic tiles.

2 TERMINOLOGY

2.1 For the purpose of this standard, the following definition shall apply.

2.2 **Water Absorption** — The increase in mass (expressed as a percentage of the mass of the dry material) of tiles which after determination of the dry mass are placed under water, then boiled and, afterwards, cooled during specified times while still completely immersed, taken out of the water and reweighed after removing excess of water.

3 APPARATUS

3.1 **Drying Oven** — Capable of operation at about 110°C.

3.2 **Heating Apparatus** — Constructed of suitable inert material, in which the boiling will take place.

3.3 Source of Heat

3.4 **Balance** — Accurate to 0.01 percent of the mass of a test specimen.

3.5 De-ionized or Distilled Water**3.6 Desiccator****3.7 Chamois Leather**

3.8 **Wire Loop, Halter, Basket** — Capable of supporting specimens under water for making suspended mass measurements.

4 TEST SPECIMENS

4.1 A sample for each type of tile under test shall consist of 10 whole tiles.

4.2 If the proper surface area of each individual tile is greater than 0.04 m², then only 5 whole tiles shall be used for the tests.

4.3 When the mass of each individual tile is below 50 g, a sufficient number of tiles shall be taken

so that each test specimen reaches a mass of 50 g to 100 g.

4.4 Tiles with sides larger than 200 mm may be cut up, but all pieces shall be included in the measurement. With polygonal and other non-rectangular tiles, the length and width shall be those of the enclosing rectangles.

5 PROCEDURE**5.1 Water Impregnation**

5.1.1 Dry the tiles in the oven at $110 \pm 5^\circ\text{C}$ until constant mass is reached, that is, when the difference between two successive weighing at intervals of 24 h is less than 0.1 percent.

5.1.2 Cool the tiles in the desiccator over silica gel or other suitable desiccant, but not an acid, until cooled to room temperature.

5.1.3 Weigh each tile and record the results of the corresponding accuracy shown in Table 1.

Table 1 Tile Mass: Accuracy of Measurement

SI No.	Mass of Tiles g	Accuracy of Measurements g
(1)	(2)	(3)
i)	0 to 100	0.02
ii)	101 to 500	0.05
iii)	501 to 1 000	0.25
iv)	1 001 to 3 000	0.50
v)	Above 3 000	1.00

5.1.4 Place the tiles vertically, with no contact between them, in water in the heating apparatus/water bath so that there is a depth of 50 mm water above and below the tiles. Maintain the water level of 50 mm above the tiles throughout the test.

5.1.5 Heat the water until boiling and continue to boil for 2 h. Then remove the source of heat and allow the tiles to cool, still completely immersed in this water overnight.

5.1.6 Remove the surface water from the tile pieces by chamois leather.

5.1.7 Immediately after this procedure weigh each tile and record the results to the same accuracy as for the dry state.

5.2 Suspended Weight

After water impregnation of the test specimens, determine to the nearest 0.01 g the mass m_3 , of each specimen while suspended in water. Perform the weighing by placing the specimen in the wire loop, halter, or basket (*see* 3.8) that is suspended from one arm of the balance. Before actually weighing, counterbalance the scale with the wire loop, halter, basket in place and immerse in water to the same depth as is used when the specimens are in place.

6 EXPRESSION OF RESULTS

6.1 Water Absorption

6.1.1 For each tile, calculate the water absorption as a percentage of the dry mass using the expression:

$$\frac{m_2 - m_1}{m_1} \times 100$$

where

m_1 = mass of the dry tile; and

m_2 = mass of the wet tile.

6.1.2 The results shall be given to the first decimal place.

6.1.3 Calculate the average water absorption of the sample as the average of the individual results.

6.2 Bulk Density

6.2.1 Bulk density, B , in g/cm³, of a specimen is the quotient of its dry mass divided by the exterior volume, including pores. Calculate the bulk density as follows:

$$B = (m_1/V)$$

where

m_1 = mass of the dry tile;

V = exterior volume, in cm³: ($m_2 - m_3$); and

m_3 = mass of suspended tile impregnated by boiling water method.

NOTE — For determination of bulk density by boiling water method, the specimen size should not be more than 0.01 m² (100 mm × 100 mm) to facilitate proper weighing of tile under suspended conditions by boiling water method.

6.3 Test Report

The test report shall contain the following:

- a) Description of the tiles;
- b) Water absorption and bulk density of each individual tile; and
- c) Average water absorption and bulk density.

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This Indian Standard has been developed from Doc: No. CED 5 (7358 to 7372).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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