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मानक

IS 2690-1 (1993): Burnt clay flat terracing tiles-Specification, Part 1: Machine made [CED 30: Clay and Stabilized Soil Products for Construction]



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पक्की मिट्टी की चपटी टैरेस टाइल — विशिष्टि

भाग 1 मशीन से बनी

(दूसरा पुनरीक्षण)

Indian Standard

BURNT CLAY FLAT TERRACING TILES — SPECIFICATION

PART 1 MACHINE MADE

(Second Revision)

UDC 666^{.754}

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BUREAU OF INDIAN STANDARDS MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG NEW DELHI 110002

January 1993

Price Group 2

FOREWORD

This Indian Standard (Second Revision) (Part 1) was adopted by the Bureau of Indian Standards, after the draft finalized by the Clay Products for Buildings Sectional Committee had been approved by the Civil Engineering Division Council.

Burnt clay flat terracing tiles, which may be machine-pressed/machine extruded or hand-made, are used for flat roof finishing over lime concrete or cement concrete base, and depending on the degree of protection necessary, they are used in two or more courses. This standard was first published in 1964 and subsequently revised in 1975. In this revision, burnt clay flat terracing machine extruded tiles have also been included.

In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

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

PART 1 MACHINE MADE

(Second Revision)

1 SCOPE

1.1 This standard (Part 1) lays down the requirements for machine-made burnt clay flat terracing tiles.

2 REFERENCES

2.1 The Indian Standard IS 2248: 1992 'Glossary of terms relating to structural clay products (*second revision*)' is a necessary adjunct to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard the definitions given in IS 2248 : 1992 shall apply.

4 GENERAL QUALITY

4.1 The terracing tile shall be made from good soil of even texture and shall be uniformly well burnt. They shall be uniform in shape and sizes and shall be free from irregularities, such as twists, bends, cracks and particles of stones. The face of the tile shall be either plain or grooved but the back of the tile should be corrugated so as to adhere to mortar.

5 DIMENSIONS, SHAPE, TOLERANCES AND WARPAGE

5.1 The size of terracing tiles and the tolerances shall be as given in 5.1.1 to 5.1.4.

5.1.1 Length

250 to 150 mm in the stages of 25 mm.

5.1.2 Width

200 to 100 mm in the stages of 25 mm.

5.1.3 Thickness

20 mm and 15 mm.

5.1.4 Tolerances

The tolerances in length, width and thickness shall be ± 2 percent in the case of machine pressed tile and ± 3 percent in the case of machine extruded tile.

5.2 Warpage

The maximum warpage for the tiles measured as described in 5.2.1 shall not exceed in any direction by one percent. 5.2.1 Place a straight-edge flat over the tile resting on a plane surface so as to leave maximum gap between the straight-edge and the surface of the tile, as judged by naked eye, insert the measuring metallic wedge in the gap and measure the maximum value of gap.

6 WATER ABSORPTION

6.1 The average water absorption of six tiles when tested by the method described in Annex A shall not exceed 15 percent.

7 FLEXURAL STRENGTH

7.1 The average modulus of rupture in bending of six tiles when tested by the method described in Annex B shall not be less than 2 N/mm².

8 SAMPLING AND TESTING

8.1 Procedure for Sampling

For conducting the tests specified in 6 and 7, at least six tiles shall be selected at random for every 1000 tiles or fraction thereof in a lot. Additional specimens may be taken for tests at the discretion of the purchaser. The number of tiles taken from a lot for tests shall be not less than 15 in any one lot.

8.2 Tiles shall be tested for water absorption and flexural strength in accordance with 6.1 and 7.1. If any of the tiles in the sample fails to comply with the requirements of any of the tests, another sample shall be similarly drawn and tested. If any of the tiles in the second sample also fails to comply with requirements of any of the tests specified in 6.1 and 7.1, then the whole lot, from where the samples were taken, shall be rejected as not complying with this standard.

9 MARKING

9.1 Each terracing tile shall be legibly and indelibly marked with indication of source of manufacture; the marking shall not cover more than five percent of the area of the specimen. The tile be also marked by letter 'M' to indicate machine made.

9.1.1 Each terracing tile may be marked with the Standard Mark.

ANNEX A

(Clause 6.1)

WATER ABSORPTION TEST

A-1 TEST SPECIMENS

A-1.1 Tiles shall be used for this test from the sample selected in the manner described in 8.

A-2 PROCEDURE

A-2.1 Dry the tiles in an oven at a temperature of 100 to 110° C till they attain a constant weight and then cool; weigh when cool and immerse the dry specimen (completely in clean water at 24 to 30°C for 24 hours. Remove each specimen, wipe off the surface water carefully with a damp cloth and weigh the specimen correct to a gram within three minute after removing the specimen from water.

A-3 CALCULATION AND REPORT OF TEST RESULTS

A-3.1 The percentage water absorption shall be calculated as follows:

$$\frac{\text{Percentage water}}{\text{absorption}} = \frac{(B-A)}{A} \times 100$$

where

B = weight of the specimen after 24 hours immersion in cold water, and

A = weight of the dry specimen.

A-3.2 The average percentage water absorption of the tiles shall be calculated and reported as the percentage water absorption.

ANNEX B

(*Clause* 7.1)

DETERMINATION OF FLEXURAL STRENGTH

B-1 TEST SPECIMENS

B-1.1 Tiles shall be used for this test from the sample selected in the manner described in **8**.

B-2 APPARATUS

B-2.1 The apparatus (see Fig. 1) shall consist of two parallel self-aligning cylindrical steel bearers, with the bearing surface rounded to 40 mm diameter, and so placed that the distance between the centres can be altered. The load shall be applied through a third steel bearer of similar shape placed midway between the parallel to the supports. The length of all the bearers shall exceed the maximum width of the tile under test for square and rectangular tiles.

B-2.1.1 The loading device may consist of **a** bucket connected either directly or through levers to the loading arm. The loading shall be at a uniform rate of 450 to 550 N/min (45-55 kg/min). Provision shall be made to arrest the flow of lead shots immediately the tile breaks.

B-2.2 Alternatively, a compression testing machine with a minimum load free capacity of 10 tonnes may be used (*see* Fig. 2). In this system the bearer assembly is mounted on a rigid mild steel plate and the third central loading bearing is fixed through a suitable dial micrometer (least count 0.25 mm) or an

equally sensitive device to bear on the loading member or on the specimen at midspan. The specimen is support on the bottom parallel bearers separated by a distance of minimum three fourth of the length of the tile.

B-2.2.1 The error on the load reading shall not exceed 2.2 N for loads up to 220 N and for greater load the error shall not exceed one percent of the maximum load. The rate of loading should be uniform and vary in the range of 450-550 N/min (45-55 kg/min).

B-3 PROCEDURE

B-3.1 Test the tiles as described in B-3.1.1 and B-3.1.2.

B-3.1.1 Soak the tiles in water at a temperature of $27 \pm 2^{\circ}$ C for 24 hours.

B-3.1.2 Support the tile evenly flat-wise on the bearers set, with a span equal to three-fourths the dimensions of the tile and resting on the natural bottom surface. Rectangular tiles shall be supported along longer face. To ensure uniform distribution of load at supports, provide suitable packing between the tile and the bearers. Apply the load with the direction of the load perpendicular to the span at a uniform rate of 45 to 55 kg/min.



All dimensions in millimetres.

FIG. 1 TILE TESTING MACHINE (FOR THE DETERMINATION OF FLEXURAL STRENGTH OF ROOFING TILE)

B-4 CALCULATION AND REPORT OF TEST RESULTS

B-4.1 The flexural strength shall be calculated for each individual tile by the following formula:

Flexural strength =
$$\frac{150 WS}{bt^2} \text{ kg/cm}^2$$

where

W = breaking load in kg;

- S = span in mm (that is, three-fourths length of tile);
- b = width of tile in mm; and
- t =thickness of tile in mm.

B-4.2 The average value shall be calculated.



X=SPAN AS PER TILE SIZE







FIG. 2 ESSENTIALS OF APPARATUS FOR TRANSVERSE TEST

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Doc: No. CED 30 (4979)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected
	<u> </u>	

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