भारतीय मानक
Indian Standard

IS 3495 (Part 1) : 2019

निर्माण के लिए पक्की मिट्टी की ईंट — परीक्षण पद्धति

भाग 1 संपीडन सामर्थ्य ज्ञात करना

(चौथा पुनरीक्षण)

Burnt Clay Building Bricks — Methods of Tests

Part 1 Determination of Compressive Strength

(Fourth Revision)

ICS 91.100.25

भारतीय मानक ब्यूरो
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October 2019 **Price Group 2**

Clay and Stabilized Soil Products for Construction Sectional Committee, CED 30

FOREWORD

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

Standard methods of testing burnt clay bricks are essential adjunct to the various burnt clay brick specifications. This standard (Part 1) was first published in 1966 and subsequently revised in 1973, 1976 and 1992. This standard in different parts lays down the procedure for the tests to evaluate the physical properties of different types of burnt clay bricks. Earlier all the tests to evaluate the physical properties of burnt clay bricks were covered in one standard but for facilitating the use of this standard and future revisions, the revised standard has been brought out in different parts, each part covering different tests.

This Indian Standard is published in four parts. The other parts in this series are:

Part 2 Determination of water absorption

Part 3 Determination of efflorescence

Part 4 Determination of warpage

This standard (Part 1) covers determination of compressive strength of burnt clay bricks.

Following are the significant modifications incorporated in this revision:

a) Requirement of cement/sand mortar used for capping and filling the frog and the voids has been introduced.

b) Provision of reporting of average compressive strength to the nearest 0.1 N/mm^2 and compressive strength of all the individual bricks has been introduced.

Efforts have also been made to update the other contents.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

In reporting the result of a test or analysis made in accordance with this standard, if the final value observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’.

Indian Standard

BURNT CLAY BUILDING BRICKS — METHODS OF TESTS

PART 1 DETERMINATION OF COMPRESSIVE STRENGTH

(Fourth Revision)

1 SCOPE

This standard (Part 1) covers the method of determination of compressive strength of burnt clay building bricks.

2 REFERENCES

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

IS No.	*Title*
4031 (Part 6) : 1988	Methods of physical tests for hydraulic cement: Part 6 Determination of compressive strength of hydraulic cement (other than masonry cement) (*first revision*)
5454 : 1978	Methods of sampling of clay building bricks (*first revision*)
14858 : 2000	Requirements of compression testing machine used for testing of concrete and mortar

3 GENERAL

3.1 The dimensions shall be measured to the nearest 1 mm.

3.2 All apparatus and testing equipment shall be calibrated at frequent intervals, as applicable to the respective testing equipment.

3.3 The number of specimens for the test shall be selected according to IS 5454.

4 METHODS

4.1 For Solid Bricks

4.1.1 *Apparatus*

A compression testing machine (conforming to IS 14858).

4.1.2 *Pre-conditioning*

Immerse the brick specimens in water at a temperature of 27 ± 2°C for 24 h. Remove the specimens and drain out any surplus moisture. Remove unevenness observed in the bed faces to provide two smooth and parallel faces by grinding (*see* Note).

Use a cement/sand mortar for capping and filling the frog (where provided) and all voids in the bed faces, expected to attain a minimum compressive strength, when tested in accordance with IS 4031 (Part 6) at the time of testing the brick specimens, at least that of the expected brick strength. Store under the damp jute bags for 24 h followed by immersion in clean water for 3 days at a temperature of 27 ± 2°C. Remove, and wipe out any traces of moisture.

NOTE — If the grinding process is expected to significantly alter the contact area of the tested faces then the capping as mentioned above shall be done to achieve two smooth and parallel faces.

4.1.3 *Procedure*

Place the specimens with flat faces horizontal, and mortar filled face facing upwards between two 3-ply plywood sheets each of 3 mm thickness and carefully centered between plates of the testing machine. Apply load axially at a uniform rate of 7 ± 1 N/mm^2/min till failure occurs and note the maximum load at failure. The load at failure shall be the maximum load at which the specimens fail to produce any further increase in the indicator reading on the testing machine.

4.1.4 *Report*

The report shall be as given below:

Compressive strength, in N/mm^2

$$= \frac{\text{Maximum load at failure, in N}}{\text{Average area of the bed faces, in mm}^2}$$

4.1.4.1 The average compressive strength shall be reported to the nearest 0.1 N/mm^2. Wherever specified in the product specification, the compressive strength of all the individual brick specimens tested shall also be reported.

4.2 For Perforated Bricks

4.2.1 *Apparatus*

See **4.1.1.**

4.2.2 *Pre-conditioning*

Immerse the brick specimens in water at a temperature of 27 ± 2°C for 24 h. Remove the specimens from water and drain out any surplus water. No mortar shall be filled in perforations and no mortar capping shall be provided.

4.2.3 *Procedure*

Place the perforated faces of the brick specimens between two 3-ply plywood sheets each of 3 mm thickness and carefully centered between the plates of the testing machine. Apply the load axially at uniform rate of 7 ± 1 N/mm^2/min till the failure occurs and note the maximum load at failure. The load at failure shall be the maximum load at which the specimens fail to produce any further increase in the indicator reading on the testing machine.

4.2.4 *Report*

The report shall be as given below:

Compressive strength, in N/mm^2

$$= \frac{\text{Maximum load at failure, in N}}{\text{Average net area of the two faces under compression, in mm}^2}$$

4.2.4.1 The average compressive strength shall be reported to the nearest 0.1 N/mm^2. Wherever specified in the product specifications, the compressive strength of all the individual brick specimens tested shall also be reported.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Clay and Stabilized Soil Products for Construction Sectional Committee, CED 30

Organization	*Representative(s)*
CSIR-Central Building Research Institute, Roorkee	Shri A. K. Minocha (***Chairman***)
All India Brick & Tile Manufacturers Federation, New Delhi	Shri R. P. S. Chandel Shri R. K. Verma (*Alternate*)
Auroville Earth Institute, Auroville	Representative
Building Materials &Technology Promotion Council, New Delhi	Shri Sharad Gupta Shri Pankaj Gupta (*Alternate*)
Central Pollution Control Board, New Delhi	Shri B. Vinod Babu
Central Power Research Institute, Bengaluru	Representative
Central Public Works Department, New Delhi	Chief Engineer (CSQ) Shri Mathura Prasad (*Alternate*)
Central Soil and Materials Research Station, New Delhi	Shri U. S. Vidyarthi Shri Raj Kumar (*Alternate*)
CSIR-Advanced Materials & Processes Research Institute, Bhopal	Dr R. K. Morchhale Dr Manish Mudgal (*Alternate*)
CSIR-Central Building Research Institute, Roorkee	Shri A. K. Minocha Shri L. P. Singh (*Alternate*)
CSIR-Central Glass & Ceramic Research Institute, Kolkata	Dr Parvesh Agrawal Shrimati Asha T. Anil (*Alternate*)
CSIR-North-East Institute of Science and Technology, Jorhat	Dr Pinaki Sengupta
Delhi Development Authority, New Delhi	Chief Engineer (Design) Shri Lachhman Singh (*Alternate*)
Delhi Metro Rail Corporation, Delhi	Shrimati Papiya Sarkar
Development Alternatives, New Delhi	Dr Soumen Maity Shri Palas Kumar Haldar (*Alternate*)
Gujarat Engineering Research Institute, Vadodara	Shri B. M. Rao Shri Kamalanayan L. Dave (*Alternate*)
Hindustan Construction Company Ltd, Mumbai	Shri Satish Kumar Sharma Shri Rajiv Surekha (*Alternate*)
Housing and Urban Development Corporation Limited, New Delhi	Shri Akhilesh Kumar Shri Surendra Kumar (*Alternate*)
Indian Institute of Science, Bengaluru	Prof B. V. Venkatarama Reddy Dr K. S. Nanjunda Rao (*Alternate*)
Int Nirmata Parishad, Varanasi	Representative
Military Engineer Services, Engineer-in-Chief's Branch, Integrated HQ of MoD (Army), New Delhi	Shrimati Upinder Kaur Shri M. A. Ruperee (*Alternate*)
Ministry of Science & Technology, New Delhi	Shri Raj Kumar Joshi Shri Pawan Kumar (*Alternate*)
National Building Construction Corporation, New Delhi	Shri Anil Malla Shri M. K. Chawla (*Alternate*)

Organization	*Representative(s)*
National Test House, Kolkata	Shri D. V. S. Prasad Shri Naresh Gupta (*Alternate*)
NTPC Ltd, Noida	Shri Jitendra Kumar Shri Mohit Jhalani (*Alternate*)
Public Works Department, Chennai	Superintending Engineer Executive Engineer (*Alternate*)
Punjab State Council for Science and Technology, Chandigarh	Shri Pritpal Singh Shri Maganbir Singh (*Alternate*)
Shriram Institute of Industrial Research, Delhi	Dr Mukesh Garg Shri Rabindra Kumar Jena (*Alternate*)
The Energy and Resources Institute, New Delhi	Shri Sachin Kumar Shrimati Sudipta Singh (*Alternate*)
Unique Engineering Testing & Advisory Services, Surat	Shri Hitesh Desai Shri Nehal H. Desai (*Alternate*)
Wienerberger India Private Ltd, Bengaluru	Shri Kundan B. Dighe Shri D. J. Jagadeesha (*Alternate*)
In personal capacity (*651/37 Ganga Envlave, Sainik Colony, Roorkee 247667*)	Dr J. M. Bhatnagar
BIS Directorate General	Shri Sanjay Pant, Scientist 'F' and Head (Civil Engineering) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri Milind Gupta
Scientist 'C' (Civil Engineering), BIS

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