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NEW DELHI 110002

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Indian Standard

METHODS FOR SAMPLING OF CLAY BUILDING BRICKS

(First Revision)

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**AMENDMENT NO. 1 MARCH 2008
TO
IS 5454 : 1978 METHODS FOR SAMPLING OF CLAY
BUILDING BRICKS**

(First Revision)

(Page 7, clause 5.2.1.1, last line) — Substitute ‘15 percent’ for
‘20 percent’.

(CED 30)

Reprography Unit, BIS, New Delhi, India

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Indian Standard

METHODS FOR SAMPLING OF CLAY BUILDING BRICKS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 10 July 1978, after the draft finalized by the Building Materials and Components Sampling Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 The clay building brick is the most extensively used building material in the construction work. Its quality is of fundamental importance in ensuring the soundness of the buildings and structures. It is, therefore, imperative that due consideration is given to the sampling procedures which would help in proper and objective evaluation of the quality of the bricks.

0.3 This standard was originally issued in 1969. However, in view of the experience gained in the course of years and the introduction of new and revised quality characteristics and methods of test in Indian Standards pertaining to various types of clay building bricks, it was felt necessary to revise this standard. In this revision, sampling procedures for breaking load, transverse strength and bulk density have been included. The criteria for conformity for efflorescence and compressive strength have been modified to bring them in line with the latest Indian Standards on specifications and methods of testing of clay building bricks.

0.4 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*.

1. SCOPE

1.1 This standard lays down methods for sampling and criteria for ascertaining conformity of solid, hollow and perforated burnt clay building bricks to the relevant specifications.

*Rules for rounding off numerical values (revised).

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2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Lot — A collection of bricks of the same class and size, manufactured under relatively similar conditions of production. For the purpose of sampling, a lot shall contain a maximum of 50 000 bricks. In case a consignment has bricks more than 50 000 of the same classification and size, and manufactured under relatively similar conditions of production, it shall be divided into lots of 50 000 bricks or part thereof.

2.2 Sample — A collection of bricks selected for inspection and/or testing from a lot to reach the decision regarding the acceptance or rejection of the lot.

2.3 Defective — A brick failing to meet one or more of the specified requirements.

2.4 Average — The sum of the observations divided by the number of observations.

3. METHODS OF SAMPLING

3.1 The sample may be drawn either by: (a) random sampling, or (b) stratified sampling method in accordance with IS:4905-1968*.

3.2 The sample shall be taken by one of the methods given in 3.2.1, 3.2.2 or 3.2.3 so as to yield the number of bricks required.

3.2.1 Sampling in Motion — Whenever practicable the sample shall be taken while the bricks are being moved, for example, during loading or unloading. The lot shall be divided into a number of convenient portions (not less than ten). Approximately equal number of bricks shall be drawn from each of these portions at regular intervals, such that the requisite number of bricks for inspection and testing is provided.

3.2.2 Sampling from a Stack — When it is necessary to take a sample from a stack, the stack shall be divided into a number of real or imaginary sections and the required number of bricks drawn from each section. For this purpose bricks in the upper layers of the stack shall be removed to enable units to be sampled from places within the stack.

3.2.3 Sampling from Lorries or Trucks — When it is necessary to take a sample from bricks loaded in lorries or trucks, the sample bricks shall be taken from a number of lorries/trucks (not less than ten, if possible) such that when equal number of bricks are drawn from each of the lorries/trucks the number of bricks required for the inspection and testing is provided.

*Methods for random sampling.

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4. SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY FOR VISUAL AND DIMENSIONAL CHARACTERISTICS

4.1 The bricks shall be selected and inspected for each lot separately for ascertaining their conformity to the requirements of the relevant specification.

4.1.1 The number of bricks to be selected from a lot shall depend on the size of the lot and shall be in accordance with col 1 and 2 of Table 1 for visual characteristics in all cases and dimensional characteristics if specified for individual brick. In case dimensions are specified for a group of 20 bricks, the scale of sampling for dimensional characteristics shall be in accordance with col 1 and 4 of Table 1. All these bricks shall be selected following the methods detailed in 3.

4.2 Visual Characteristics—All the bricks selected as in 4.1.1 in accordance with col 1 and 2 of Table 1 shall be examined for visual characteristics. If the number of defective bricks found in the sample is less than or equal to the corresponding number as specified in col 3 of Table 1, the lot shall be considered as satisfying the requirements of the visual characteristics. However, if the number of defective bricks in the sample is greater than the corresponding permissible number of defectives, the lot shall be deemed as not having met the visual requirements.

TABLE 1 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES FOR VISUAL AND DIMENSIONAL CHARACTERISTICS

(Clauses 4.1.1, 4.2 and 4.3.2)

No. of BRICKS IN THE LOT	FOR CHARACTERISTICS SPECIFIED FOR INDIVIDUAL BRICK		FOR DIMENSIONAL CHAR- ACTERISTICS SPECIFIED FOR GROUP OF 20 BRICKS—No. of BRICKS TO BE SELECTED
	No. of Bricks to be Selected	Permissible No. of Defectives in the Sample	
(1)	(2)	(3)	(4)
2 001 to 10 000	20	1	40
10 001 to 35 000	32	2	60
35 001 to 50 000	50	3	80

NOTE — In case the lot contains 2 000 or less bricks, the sampling shall be subject to agreement between the purchaser and the supplier.

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4.3 Dimensional Characteristics— The dimensions and tolerances have been specified in various standards for clay building bricks. In some standards the dimensions and tolerances have been specified for individual brick. In some other standards the dimensions and tolerances have been specified for a group of 20 bricks.

4.3.1 In case the dimensions and tolerances have been specified for individual brick, the scale of sampling and criteria for conformity shall be the same as laid down in 4.2 for visual characteristics.

4.3.2 In case the dimensions and tolerances for bricks are specified as overall on a group of 20 bricks, the number of bricks to be selected for inspecting the dimensions and tolerances shall be in accordance with col 1 and 4 of Table 1. These bricks will be divided into groups of 20 bricks at random and each of the groups thus formed tested for all the dimensions and tolerances. A lot shall be considered having found meeting the requirements of dimensions and tolerances if none of the groups of bricks inspected fails to meet the specified requirements.

5. SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY FOR PHYSICAL CHARACTERISTICS

5.1 The lot which has been found satisfactory in respect of visual and dimensional requirements (*see* 4.2 and 4.3) shall next be tested for physical characteristics like compressive strength, breaking load, transverse strength, bulk density, water absorption, efflorescence and warpage as specified in relevant material specification. The bricks for this purpose shall be taken at random from those already selected in 4.1.1. The number of bricks to be selected and tested for each of these characteristics shall be in accordance with relevant columns of Table 2.

TABLE 2 SCALE OF SAMPLING FOR PHYSICAL CHARACTERISTICS

(*Clauses 5.1, 5.2.3 and 5.2.4*)

LOT SIZE	SAMPLE SIZE FOR COMPRES- SIVE STRENGTH, BREAKING LOAD, TRANSVERSE STR- ENGTH, BULK DENSITY, WATER ABSORPTION AND EFFLORESCENCE	PERMISSIBLE NO. OF DEFECTIVES FOR EFFLO- RESCENCE	WARPAGE	
			Sample Size	Permissible No. of Defectives
(1)	(2)	(3)	(4)	(5)
2 001 to 10 000	5	0	10	0
10 001 to 35 000	10	0	20	1
35 001 to 50 000	15	1	30	2

NOTE — In case the lot contains 2 000 or less bricks, the sampling shall be subject to agreement between the purchaser and the supplier.

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5.2 A lot shall be considered having satisfied the requirements of physical characteristics if the conditions stipulated in **5.2.1**, **5.2.2**, **5.2.3** and **5.2.4** are all satisfied.

5.2.1 From the test results for compressive strength, breaking load, and transverse strength (whichever applicable), the average shall be calculated and shall satisfy the requirements specified in the relevant material specification.

NOTE — In case any of the test results for compressive strength exceeds the upper limit for the class of brick, the same shall be limited to the upper limit of the class for the purpose of averaging.

5.2.1.1 Wherever specified in the material specification the compressive strength of any individual brick tested in the sample shall not fall below the minimum average compressive strength specified for the corresponding class of brick by more than 20 percent.

5.2.2 From the test results for water absorption and bulk density the average for the bricks in the sample shall be calculated and shall satisfy the relevant requirements specified in the material specification.

5.2.3 The number of bricks failing to satisfy the requirements of the efflorescence specified in the relevant specification shall not be more than the permissible number of defectives given in col 3 of Table 2.

5.2.4 The number of bricks failing to satisfy the requirements of warpage wherever specified in the relevant specifications shall not be more than the permissible number of defectives given in col 5 of Table 2.

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