IS : 1126 - 1974
(Reaffirmed 1990)
(Reaffirmed 1998)

Indian Standard

METHOD OF TEST FOR DETERMINATION OF DURABILITY OF NATURAL BUILDING STONES

(First Revision)

Third Reprint JANUARY 1993
(Incorporating Amendment No. 1)

UDC 691.21:620.169.2

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

Gr 2

May 1975

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Indian Standard

METHOD OF TEST FOR DETERMINATION OF DURABILITY OF NATURAL BUILDING STONES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 8 October 1974, after the draft finalized by the Stones Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Building stones are available in large quantity in various parts of the country and to choose and utilize them for their satisfactory performance it is necessary to know the various strength properties determined according to standard procedure. This standard had, therefore, been formulated to cover the standard method for determining the durability (soundness) of various stones. This standard was published in 1957 and has been revised based on the actual use of the standard in the past 17 years and the experience gained in testing of building stones for these properties in the various research laboratories of this country. This method of test is prescribed so as to find out the capacity of stone to resist disintegration and decomposition.

0.3 In reporting the results 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 the procedure for testing the durability (soundness) of natural building stones used for constructional purposes.

2. SELECTION OF SAMPLE

2.1 The sample shall be selected to represent a true average of the type or grade of stone under consideration.

*Rules for rounding off numerical values (*revised*).

2.2 The sample shall be selected from the quarried stone or taken from natural rock, as described in **2.2.1** and **2.2.2** and shall be of adequate size to permit the preparation of the requisite number of test pieces.

2.2.1 *Stones from Ledges or Quarries* — The ledge or quarry face of the stone shall be inspected to determine any variation in different strata. Differences in colour, texture and structure shall be observed. Separate samples of stone weighing at least 25 kg each of the unweathered specimens shall be obtained from all strata that appear to vary in colour, texture and structure. Pieces that have been damaged by blasting, driving wedges, heating, etc, shall not be included in the sample.

2.2.2 *Field Stone and Boulders* — A detailed inspection of the stone and boulders over the area shall be made where the supply is to be obtained. The different kinds of stones and their conditions at various quarry sites shall be recorded. Separate samples for each class of stone that would be considered for use in construction as indicated by visual inspection shall be selected.

2.3 When perceptible variations occur in the quality of rock, as many samples as are necessary for determining the range in properties shall be selected.

3. TEST PIECES

3.1 The test pieces shall be cylinders, 50 mm in diameter and am high cylinders.

3.2 Three test pieces shall be used for conducting the test.

4. PROCEDURE

4.1 The test pieces shall be dried for 24 h and weighed. They shall then be suspended in super saturated solution of sodium sulphate decahydrate for 16 to 18 h at room temperature 20 to 30°C. These shall then be air dried for half an hour and then be dried in an oven at 105 ± 5°C for 4 hours. These shall then be cooled to room temperature (20 to 30°C) and the cycle of operation shall be repeated for 30 cycles.

4.2 The test shall be continued to complete 30 cycles. After the completio of the final cycle and after the test pieces have been cooled to room temperature (20 to 30°C), the test pieces shall be thoroughly freed of the sodium sulphate solution by repeated washing, if necessary, as determined by the reaction of the wash water with barium chloride ($BaCl_2$). The test pieces shall be weighed after every five cycles and the change in weight due to disintegration noted.

4.3 The test pieces shall be examined during the course of the test for development of cracks or spalling.

5. EVALUATION AND REPORT OF TEST RESULTS

5.1 If W_1 is the original weight of the specimen and W_2 is the weight of the specimen after completion of 30 cycles of the test (*see* **4.2**), the change in weight shall be reported as equal to

$$\frac{W_1 \sim W_2}{W_1} \times 100$$

5.2 The average of the three results shall be calculated and taken as the durability value of the specimen.

5.3 The durability of the stone shall be expressed in percentage as change in the weight.

5.4 Identification of the sample, date, when sample was taken and type of stone shall be reported.

5.5 Size and shape of test pieces used in the tests shall be indicated.

5.6 A description of the way in which the test pieces were prepared shall be included.

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