

*Indian Standard*

METHOD OF TEST FOR DETERMINING  
AGGREGATES IMPACT VALUE OF SOFT  
COARSE AGGREGATES

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

# Indian Standard

## METHOD OF TEST FOR DETERMINING AGGREGATES IMPACT VALUE OF SOFT COARSE AGGREGATES

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### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 15 May 1970, after the draft finalized by the Stones Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** The road system in the country is developing at a fast rate in order to meet the needs of expanding economy. In view of large scale construction programme and for effecting economy in the cost of construction, soft aggregates having adequate mechanical strength in terms of impact value may be made use of in the bases and sub-bases of road pavements. As majority of soft aggregates, such as laterite, kankar, shale, etc, lose their strength on wetting, the standard procedure [ see IS : 2386 ( Part IV )-1963\* ] has been modified by the Central Road Research Institute, New Delhi, so as to determine the impact value of such aggregates under saturated condition.

NOTE — This method of test for aggregate impact value may also be equally applied to brick aggregates.

**0.3** In the formulation of this standard assistance has been derived from Road Research Monograph No: 5 issued by Central Road Research Institute, New Delhi.

**0.4** 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 covers the procedure for determining the aggregates impact value of soft coarse aggregate used for bases and sub-bases of road pavements.

### 2. APPARATUS

**2.0** The apparatus shall consist of the following:

\*Methods of test for aggregates for concrete: Part IV Mechanical properties.

†Rules for rounding off numerical values ( revised ).

**2.1** The impact testing machine of the general form shown in Fig. 1 and complying with the following:

- a) Total weight not more than 60 kg nor less than 45 kg.
- b) The machine shall have a metal base weighing between 22 and 30 kg with a plane lower surface of not less than 30 cm diameter, and shall be supported on a level and plane concrete or stone block or floor at least 45 cm thick. The machine shall be prevented from rocking either by fixing it to the block or floor or by supporting it on a level and plane metal plate cast into the surface of the block or floor.
- c) A cylindrical steel cup of the following internal dimensions and not less than 6.3 mm thick with its inner surface case-hardened, that can be rigidly fastened at the centre of the base and easily removed for emptying:

Diameter	102 mm
Depth	50 mm

- d) A metal tup or hammer weighing 13.5 to 14.0 kg, the lower end of which shall be cylindrical in shape, 100 mm in diameter and 50 mm long, with a 2-mm chamfer at the lower edge, and case-hardened. The hammer shall slide freely between vertical guides so arranged that the lower (cylindrical) part of the hammer is above and concentric with the cup.
- e) Means for raising the hammer and allowing it to fall freely between the vertical guides from a height of  $380 \pm 5.0$  mm on to the test sample in the cup, and means for adjusting the height of fall within 5 mm.
- f) Means for supporting the hammer whilst fastening or removing the cup.

NOTE — Some means for automatically recording the number of blows is desirable.

**2.2 Sieves** — IS Sieves of sizes 12.5 mm, 10 mm and 2.36 mm.

**2.3 Measure** — a cylindrical metal measure, tared to the nearest gram, of sufficient rigidity to retain its form under rough usage, and of the following internal dimensions:

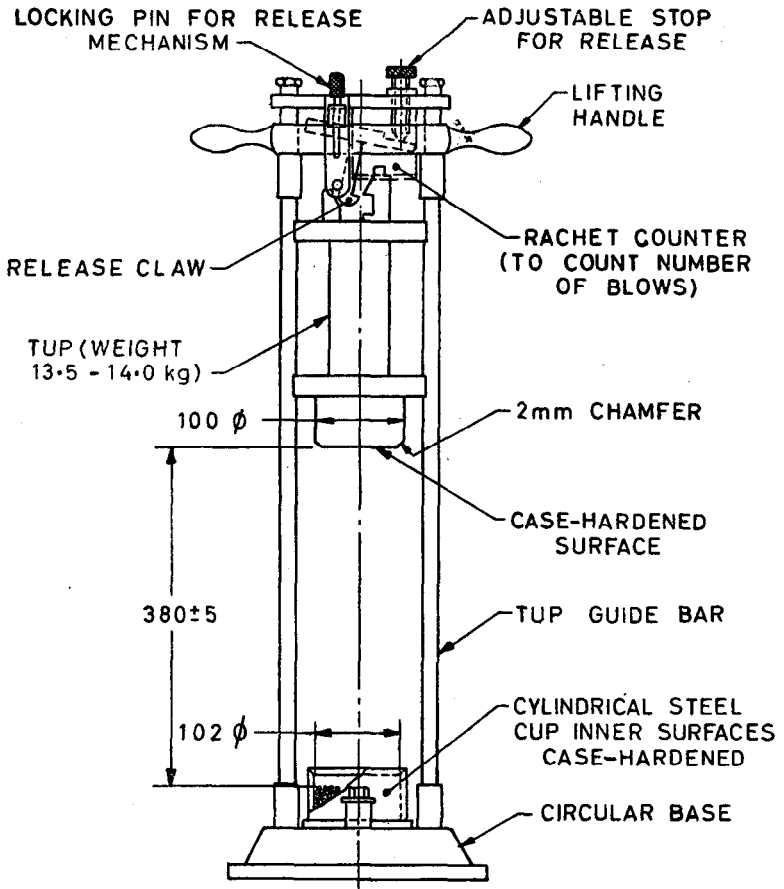
Diameter	75 mm
Depth	50 mm

**2.4 Tamping Rod** — a straight metal tamping rod of circular cross-section 10 mm in diameter and 230 mm long, rounded at one end.

**IS: 5640 - 1970**

**2.5 Balance**— capacity not less than 500 g, readable and accurate to 0.1 g.

**2.6 Oven**— a well-ventilated oven, thermostatically controlled to maintain a temperature of 100 to 110°C.



All dimensions in millimetres

**FIG. 1 IMPACT TESTING MACHINE**

### 3. PREPARATION OF TEST SAMPLE

**3.1** The test sample shall consist of aggregate the whole of which passes a 12.5-mm IS Sieve and is retained on a 10-mm IS Sieve. The aggregate comprising the test sample shall be dried in an oven for a period of four hours till the time, the weight becomes constant at a temperature of 105 to 110°C and cooled.

**3.2** The measure shall be filled about one-third full with the aggregate and tamped with 25 strokes of the rounded end of the tamping rod. A further similar quantity of aggregate shall be added and a further tamping of 25 strokes given. The measure shall finally be filled to overflowing, tamped 25 times and the surplus aggregate struck off, using the tamping rod as a straight-edge. The net weight of aggregate in the measure shall be determined to the nearest gram (weight *A*) and this weight of aggregate shall be used for the duplicate test on the same material.

**3.3** This oven-dried sample is immersed in water for three days.

**3.4** Wet sample after the immersion period is surface dried by suitable cloth.

### 4. TEST PROCEDURE

**4.1** The impact machine shall rest without wedging or packing upon the level plate, block or floor, so that it is rigid and the hammer guide columns are vertical.

**4.2** The cup shall be fixed firmly in position on the base of the machine and the whole of the test sample placed in it and compacted by a single tamping of 25 strokes of the tamping rod.

**4.3** The hammer shall be raised until its lower face is 380 mm above the upper surface of the aggregate in the cup, and allowed to fall freely on to the aggregate. The test sample shall be subjected to a total of 15 such blows each being delivered at an interval of not less than one second.

**4.4** The crushed aggregate shall then be removed from the cup and the whole of it sieved on the 2.36-mm IS Sieve and washed with water till no further significant amount passes in one minute. The fraction retained on the sieve shall be dried in an oven to the constant weight at 105 to 110°C and weighed to an accuracy of 0.1 g (weight *B*). The fraction retained on the sieve (weight *B*) shall be subtracted from the weight of the original oven-dried sample (weight *A*). The resultant weight (weight *A* - weight *B*) shall represent the fraction passing 2.36-mm IS Sieve (weight *C*). Two tests shall be made.

## 5. CALCULATIONS

5.1 The ratio of the weights of the fines formed to the total sample in each test shall be expressed as percentage of the oven dried, the result being recorded to the first decimal place:

$$\text{Aggregate impact value} = \frac{C}{A} \times 100$$

where

$C$  = weight of the fines formed, and

$A$  = weight of the oven-dried sample.

## 6. REPORTING OF RESULTS

6.1 The mean of the two results shall be reported as aggregate impact value (wet) of the tested material.

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AMENDMENT NO. 1    APRIL 1982

TO

IS:5640-1970 METHOD OF TEST FOR DETERMINING AGGREGATES  
IMPACT VALUE OF SOFT COARSE AGGREGATES

Alteration

(Page 5, clause 3.1, second sentence) - Substitute the following for the existing sentence:

'The aggregate comprising the test sample shall be dried in an oven at a temperature of 105 to 110°C for a period of four hours and cooled, until the weight becomes' constant.'

(BDC 6)

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Reprography Unit, BIS, New Delhi, India