

1.AGGREGATE IMPACT VALUE TEST.

(IS : 2386 – PART – 4)

INTRODUCTION:

Toughness is the property of a material to resist impact. Due to traffic loads, the road stones are subjected to the pounding action or impact and there is possibility of stones breaking into smaller pieces. The road stones should therefore be tough enough to resist fracture under impact. A test designed to evaluate the toughness of stones i.e., the resistance of the fracture under repeated impacts may be called an impact test for road stones.

Object:

To determine the toughness of road stone materials by Impact test.

Apparatus:

- a) **Impact testing machine:** The machine consists of a metal base with a plane lower surface supported well on a firm floor, without rocking. A detachable cylindrical steel cup of internal diameter 102mm and depth 50mm is rigidly fastened centrally to the base plate. A metal hammer of weight between 13.5 and 14.0 kg having the lower end cylindrical in shape, 100mm in diameter and 50mm long, with 2mm chamfer at the lower edge is capable of sliding freely between vertical guides, and fall concentric over the cup. There is an arrangement for raising the hammer and allowing it to fall freely between vertical guides from a height of 380mm on the test sample in the cup, the height of fall being adjustable up to 5mm. A key is provided for supporting the hammer while fastening or removing the cup.
- b) **Measure:** A cylindrical metal measure having internal diameter 75mm and depth 50mm for measuring aggregates.
- c) **Tamping rod:** A straight metal tamping rod of circular cross section, 10mm in diameter and 230mm long, rounded at one end.
- d) **Sieve:** IS sieve of sizes 12.5mm, 10mm, and 2.36mm for sieving the aggregates.
- e) **Balance:** A balance of capacity not less than 500 gm to weigh accurate up to 0.1 gm.
- f) **Oven:** A thermostatically controlled drying oven capable of maintaining constant temperature between 100⁰C to 110⁰C.

Procedure:

The test sample consists of aggregates passing 12.5mm sieve and retained on 10mm sieve and dried in an oven for four hours at a temperature 100⁰C to 110⁰C and cooled. Test aggregates are filled up to about one-third full in the cylindrical measure and tamped 25 times with rounded end of the tamping rod. Further quantity of aggregates is then added up to two-third full in the cylinder and 25 stocks of the tamping rod are given. The measure is now filled with the aggregates to over flow, tamped 25 times. The surplus



Sample subjecting to hammer blows

aggregates are struck off using the tamping rod as straight edge. The net weight of the aggregates in the measure is determined to the nearest gram and this weight of the aggregates is used for carrying out duplicate test on the same material. The impact machine is placed with its bottom plate flat on the floor so that the hammer guide columns are vertical. The cup is fixed firmly in position on the base of the machine and the whole of the test sample from the cylindrical measure is transferred to the cup and compacted by tamping with 25 strokes.

The hammer is raised until its lower face is 380mm above the upper surface of the aggregates in the cup, and allowed to fall freely on the aggregates. The test sample is subjected to a total 15 such blows, each being delivered at an interval of not less than one second. The crushed aggregate is then removed from the cup and the whole of it sieved on the 2.36mm sieve until no further significant amount passes. The fraction passing the sieve is weighed accurate to 0.1gm. The fraction retained on the sieve is also weighed and if the total weight of the fractions passing and retained on the sieve is added it should not be less the original weight of the specimen by more than one gram, if the total weight is less than the original by over one gram the results should be discarded and a fresh test made.

Calculations:

The aggregate impact value is expressed as the percentage of the fines formed in terms of the total weight of the sample.

$$\text{Aggregate Impact Value} = \frac{100 W_2}{W_1}$$

Where, W1 = Original weight of the sample.
 W2 = Weight of fraction passing 2.36mm IS sieve.

Results:

The mean of the three results is reported as the AIV(Aggregate Impact Value) of the specimen to the nearest whole number.

Limits:

< 10%	Exceptionally strong.
10 – 20%	Strong.
20 – 30%	Satisfactory for road surfacing.
> 35%	Weak for road surfacing.

Format for recording next page

FORM 14

Punjab State Road Sector Project
PWD B&R Branch, Govt. of Punjab
 Punjab Roads & Bridges Development Board

AGGREGATE IMPACT VALUE
 (IS 2386 Part 4)

Location	Tested by:
Material	Date:

Quarry:	Range of Sieve: 10.0mm to 12.5 mm
Date Sampled:	No. of Blows: 15
Location:	Height of Fall: 380 mm
Method of Sampling: By means of scoop	Method of Crushing: Sudden

Sample No.	Wt. of Container (g)	Wt. of Container + Aggregate (g)	Wt. of Aggregate Before Compaction (g)	Wt. of Aggregate Retained on 2.36 mm sieve (g)	Wt. of Aggregate Passing on 2.36 mm sieve (g)	Aggregate Impact Value (%)
Average					:	

Remarks : _____

Approved/Not Approved:

Contractor's Representative

Materials Engineer
Consultant

Resident Engineer
Consultant