

## INTRODUCTION

The principle mechanical properties required in the road stones are:

- Satisfactory resistance to crushing under the roller during construction
- Adequate resistance to surface abrasion under traffic.

Aggregates used in the road construction should be strong enough to resist crushing under traffic wheel loads. If the aggregates are weak, the stability of the pavement structure is likely to be adversely affected. The strength of the coarse aggregate is assessed by aggregate crushing test. The aggregate crushing value provides a relative measure of resistance to crushing under a gradually applied compressive load. To achieve high quality of pavement aggregate possessing low crushing value should be preferred.

## OBJECTIVE

Determination of aggregate crushing value of coarse aggregate, which passes 12.5 mm. IS sieve and retained on 10 mm. International Standard (IS) sieve.

## REFERENCE STANDARD

IS: 2386 (Part IV)-1963 Methods of test for aggregate for concrete Part IV Mechanical Properties.

## EQUIPMENT & APPARATUS

- Steel Cylinder
- Sieves (12.5mm,10mm)
- Cylindrical metal measure
- Tamping Rod
- Balance (0-10kg)
- Oven (300 c)
- Compression testing Machine (2000KN)

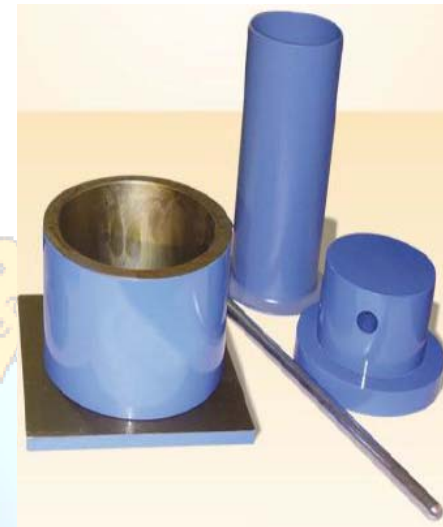


Figure 1.1: Aggregate Crushing Value Test Apparatus

## PREPARATION OF SAMPLE

Test sample consist of aggregate passing a 12.5mm IS sieve and retained on a 10mm IS sieve. The aggregate shall be tested is dried in oven for a period of not less than 4 hours.

## PROCEDURE

- The cylindrical steel cup is filled with **3 equal layers of aggregate** and each layer is tamped **25 strokes** by the rounded end of tamping rod and the surplus aggregate struck off, using the tamping rod as a straight edge.
- The net weight of aggregate in the cylindrical steel cup is determined to the nearest gram and **this weight of aggregate is used for the duplicate test on the same material.**
- The cup is fixed firmly in position on the base of the machine and the whole of the test sample is added **in thirds**, each third being subjected to **25 strokes by tamping rod.**
- The surface is levelled, and the plunger is inserted so that it rests horizontally on the surface. The whole assembly is then placed between the plates of testing machine and loaded at a uniform rate so as to reach a load of **400 kN in 10 minutes.**
- The load is then released, and all aggregate is removed from the cup and sieved on **2.36 mm.** IS sieve until no further significant amount passes in one minute.
- The fraction passing the sieve is weighed to an accuracy of 0.1 g (WB)
- Repeat the whole procedure, starting from the number i), using a second sample of the same mass as the first sample.

**CALCULATION**

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

Let the original weight of the oven dry sample be  $W_A$  and the weight of fraction passing 2.36 mm IS sieve be  $W_B$

Aggregate crushing value =  $W_B/W_A \times 100\%$

This is recorded correct to the first decimal place.

**OBSERVATION TABLE FOR AGGREGATE IMPACT VALUE TEST:**

Name of the Student: \_\_\_\_\_ Student No. \_\_\_\_\_

Type of Material : Brick Chips/Stone chips/Gravels/Boulder/Rock

Sample Size : \_\_\_\_\_ mm to \_\_\_\_\_ mm

Test Method :

Details	Test 1	Test 2
Weight of surface-dry sample, $W_A$ (gm)		
Wt. of materials retained on 2.36 mm sieve, $W_C$ (gm)		
Wt. of materials passing 2.36 mm sieve, $W_B$ (gm)		
Aggregate Crushing Value (%) = $W_B/W_A \times 100\%$ (to the first decimal place)		
Average Aggregate Crushing Value (ACV) = (to the nearest whole number)		

**REPORTING OF RESULTS**

The mean of the two results shall be reported to the nearest whole number as the aggregate crushing value.



**SAFETY & PRECAUTIONS:**

- Use hand gloves while removing containers from oven after switching off the oven.
- To wear safety shoes & helmet during the time of test.
- Before testing, machine should be checked.
- After test electric supply should be off.
- After test clean the sieve by brush.
- Keep all the exposed metal parts greased.
- Keep the guide rods firmly fixed to the base & top plate.
- Equipment should be cleaned thoroughly before testing & after testing.

**DISCUSSION:**

Institute for Research in Construction (IRC) recommend that course aggregates having crushing value less than 30% can be used at the surface for pavement.

