

Test Method

Aggregate Impact Value

RC 371.03

1. Scope

This test is used to determine the relative resistance to impact of coarse aggregates (passing 13.2mm retained 9.5mm) using an impact testing machine and is based on BS812:Part 3:1975.

2. Apparatus

- (a) An impact testing machine of the general form shown in Figure 1 and complying with the following:

Total mass not more than 60kg nor less than 45kg.

A circular metal base weighing between 22kg and 30kg, with a plane lower surface of not less than 300mm diameter, and shall be supported on a level and plane concrete or stone block or floor at least 450mm 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.

The impact machine must be placed, without wedging or packing, upon the level plate block or floor so that it is rigid and the hammer guide columns are vertical.

A cylindrical steel cup of internal diameter 102mm and internal depth 50mm. The walls shall not less than 6mm thick and the inner surfaces shall be case hardened. The cup shall be rigidly secured at the centre of the base and be easily removed for emptying.

A metal hammer weighing 13.5kg to 14.0 kg the lower end of which shall be cylindrical 100.00 mm diameter and 50mm long, with a 1.5mm chamfer at the lower edge, and case hardened. The hammer shall slide freely between vertical guides so arranged that the lower end of the hammer is above and concentric with the cup.

Means for raising the hammer and allowing it to fall freely between the vertical guides on to the test sample in the cup, and means for adjusting the height of fall to 380 ± 5 mm.

Means for supporting the hammer whilst fastening or removing the cup.

Note: Automatic recording of the number of blows is desirable.

- (b) Sieves - 300mm diameter AS sizes 13.2mm, 9.5mm and 2.36mm.
- (c) Cylindrical metal measure of sufficient rigidity to retain its form under rough usage, internal diameter of 75 ± 1 mm and internal depth of 50 ± 1 mm.
- (d) Straight metal tamping rod of circular cross section, 10 mm diameter, 230 mm long, rounded at one end
- (e) Balance with a limit of performance not exceeding ± 0.5 g.
- (f) Oven - thermostatically controlled to operate at a temperature of 105-110°C, preferably with mechanical ventilation.
- (g) Sieve shaker.
- (h) Sieve brushes, scoop, dishes and trays.

3. Preparation

- (a) Prepare the required amount of material passing the 13.5mm sieve and retained on the 9.5mm sieve. An amount of 1.3 kg of unwashed material is usually sufficient for two test portions.
- (b) The material shall be tested in a surface dry condition. If oven drying is considered necessary, the period of drying shall not exceed 4 hours, the temperature shall not exceed 110°C and the material shall be cooled to room temperature before testing.

4. Procedure

- (a) Fill the cylindrical test measure to about one third by discharging the aggregate from a scoop at a height not exceeding 50mm above the top of the container. Tamp the material with 25 blows of the rounded end of the tamping rod by allowing the rod to fall freely from a height of about 50mm above the surface of the material and evenly distributing the blows over the surface. Add a similar quantity of aggregate and tamp in the same manner. Fill the measure to overflowing, tamp with 25 blows and remove surplus material by rolling the tamping rod across, and in contact with, the top of the container. Remove by hand any material which impedes the rod and add material to fill any depressions.
- (b) Weigh the measured material and record (M_t). This mass (M_t) is used as the test portion in the following procedures.
- (c) Place the whole of the test portion in the cylindrical steel cup and compact with a single tamping of 25 blows of the tamping rod. Fix the cup firmly in position on the base of the machine.
- (d) Adjust the height of the hammer so that its lower face is 380 ± 5 mm above the upper surface of the aggregate in the cup and then allow it to fall freely on the aggregate.
- (e) Subject the test portion to a total of 15 blows, each being delivered at an interval of not less than 1 second. No adjustment of hammer height is required after the first blow.
- (f) Remove the material by holding the cup over a tray and hammering on the outside with a suitable mallet (rubber or fibreglass head) until the material falls on to the tray. Transfer fine particles adhering to the inside of the cup and the underside of the hammer to the tray by means of a stiff bristle brush.

- (g) Sieve the whole of the portion over the AS 2.36mm sieve.
- (h) Weigh the fraction passing to the nearest 0.1 g and record (M_p).
- (i) Weigh the fraction retained to the nearest 0.1 g and record (M_r).
- (j) Add (M_p) and (M_r) and compare with the mass before testing (M_t). If ($M_p + M_r$) differs from M_t by more than 1 g, discard the result and repeat the procedure from (c) with another test portion of the same mass as the first portion.
- (k) Repeat procedure (c) to (j) with another test portion of the same mass as the first portion.

5. Calculations

- (a) For each test portion, the total mass of fines passing the 2.36 mm sieve (M_f) to the nearest 0.1 g from:

$$M_f = M_t - M_r$$

where:

M_t = mass of test portion before testing (g)

M_r = mass retained on 2.36mm sieve after testing (g)

- (b) For each test portion, the aggregate impact value (AIV) to the nearest 0.1 from:
$$AIV = (M_f/M_t) * 100$$
- (c) The mean of the values obtained in (b) for each of the two test samples to the nearest 0.1.

6. Reporting

Report the mean of the two results to the nearest whole number as the aggregate impact value (AIV).

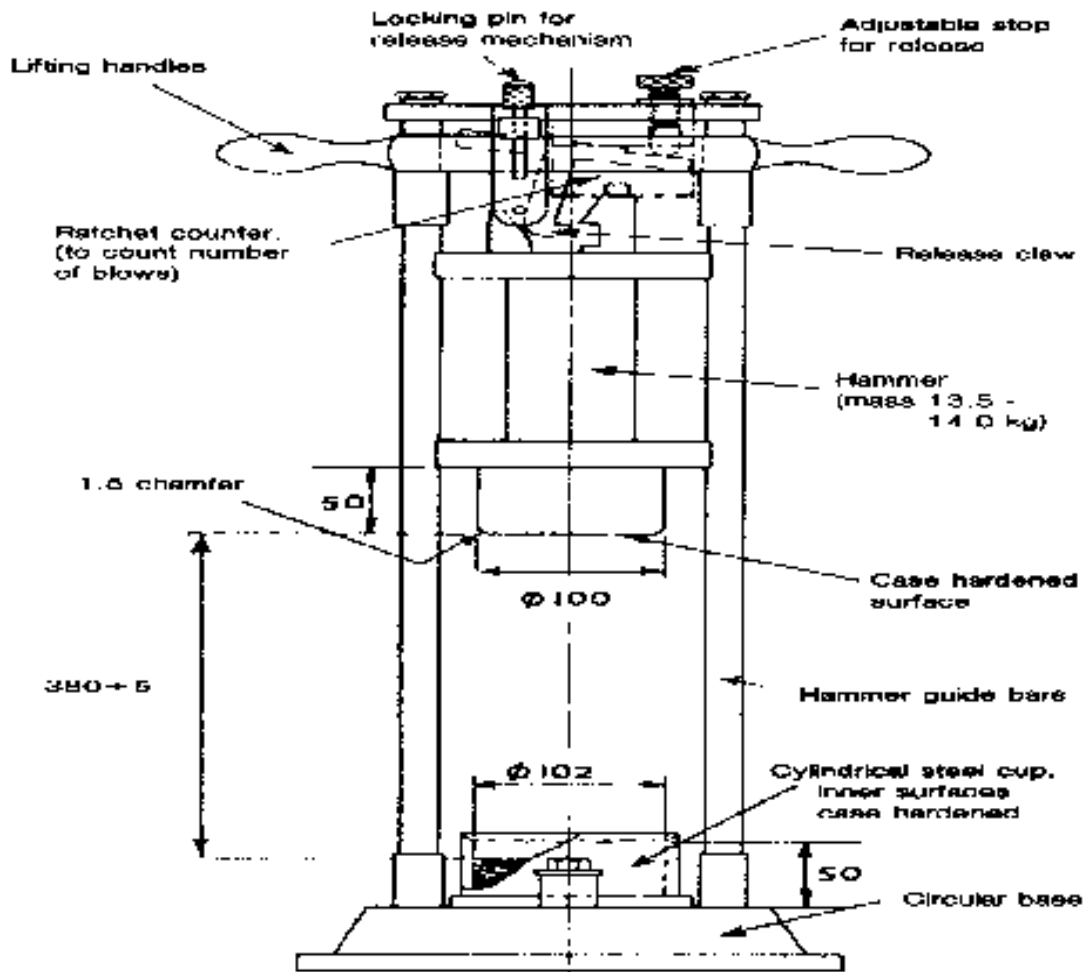


Figure 1 Aggregate Impact Test Machine

Test Method - Revision Summary
RC 371.03 Aggregate Impact Value

Date	Clause Number	Description of Revision	Authorised by
June 2013	Full document	Re-issued with minor corrections	Manager – Construction Materials