

## Concrete Cubes - Determination of Compressive Strength

Lab Test Reference: 305  
British Standard Reference BS 1881 : Part 116 : 1983

### Principal Apparatus

Compression Testing Machine - Lab Inventory No.xxx (BS1881 Part 115)  
Vernier Callipers - Lab Inventory No.xxx (BS3123)  
Balance (Lab Inventory No.xxx)

- 1 Preliminaries
  - 1.1 The test shall be carried out in the Concrete Laboratory.
  - 1.2 Check the calibration certificates for the compression testing machine and callipers are valid and that the equipment is clean and serviceable.
  - 1.3 Check the sample number written on the cube matches the test schedule and that the date is correct by consulting the cube register.
  - 1.4 Check the balance is clean, operational and that the calibration certificate is valid.
- 2 Standard Test Method
  - 2.1 The computer generated day list shall be obtained, and checked against the register to ensure all cubes are available for crushing.
  - 2.2 The cube is first removed from the curing tank, if it has been stored in the laboratory tanks, and allowed to drain to a saturated surface dry condition.
  - 2.3 Any fins which project from the edge shall be removed and this fact noted on the form in the cube description file.
  - 2.4 The cube is weighed and recorded in the register and the day list to the nearest gram.
  - 2.5 The dimensions are measured with the steel callipers by firstly placing the cube on the bench in such a way that the floated edge is pointing away from the body and the numbered face is the top face. The width is now measured from the left to right edge across the numbered face, and the length from the right edge to bottom right edge in contact with the bench. The depth of the cube is that dimension from the floated face to the face which would have been next to the base of the cube mould. (Measurements are taken on four faces and the average recorded). The measurements are recorded in the cube book and computer day list as L, W and D.
  - 2.6 If measurements for depth, length and width are within the 1% tolerance permitted then the nominal dimensions are recorded and the volume is calculated from these. If any dimension is in excess of 1% of the nominal dimensions, the average of the four measurements across each pair of opposite faces is used to calculate the volume (nominal dimensions are 150x150x150 or 100x100x100).
  - 2.7 The density of each cube is determined by dividing the mass by the volume and expressing this to the nearest 10 kg/m<sup>3</sup>. This value is entered in the register.
  - 2.8 Cubes which have become dried out shall be immersed in the cube tank for a minimum of 5 minutes before testing.
  - 2.9 The correct platens are assembled on the compression testing machine and any loose material brushed clean from both the cubes and the platens.

- 2.10 The cube is placed centrally on the lower platen ensuring the trowelled top face of the cube is facing left and the numbered face is in contact with the top platen.
- 2.11 The compression testing machine is set to the appropriate pace rate and switched on in the automatic mode (pace rate 0.2-0.4 MN/m<sup>2</sup>/sec.)
- 2.12 Loading is deemed to have been completed when the machine stops, records the maximum load on the digital display and prints out from the printer on the console.
- 2.13 This load is recorded in the cube day sheet and register to the nearest 1N., and the print out stapled to the day list.
- 2.14 The type of failure should be observed by consulting the wall chart, anything abnormal recorded in the register, and all details entered on the related form in the cube description file.
- 2.15 The cross sectional area shall be calculated from the depth and width dimensions and the compressive strength obtained by dividing the maximum load by the cross sectional area. The results are expressed to the nearest 0.5 MN/m<sup>2</sup>. (Note that the nominal dimensions are used if the measured dimensions are within 1%, and the actual measured dimensions if they are greater than 1%.)
- 2.16 Reporting of results shall state that tests were made in accordance with Part 116 of BS1881 and whether certificates of sampling, specimen preparation and curing are available. If they are, they should be appended to the report.
- 2.17 Information to be provided on the test report is described in Clause 8.2.1 of Part 116 of BS1881.

Note: Precision data is given in Table 1.