

British Standard

Testing concrete

Part 119. Method for determination of compressive strength using portions of beams broken in flexure (equivalent cube method)

Essais du béton

Partie 119. Méthode de détermination de la résistance à la compression du béton à partir de portions de poutres brisées en flexion (méthode équivalente à la méthode des cubes)

Prüfverfahren für Beton

Teil 119. Bestimmung der Druckfestigkeit an backenförmigen Probekörpern (Äquivalent zum Würfelversuch)

Foreword

This Part of this standard, prepared under the direction of the Cement, Gypsum, Aggregates and Quarry Products Standards Committee, is a revision of clause 6 of BS 1881 : Part 4 : 1970. Together with Parts 115, 116, 117, 118 and 120, this Part of BS 1881 supersedes BS 1881 : Part 4 : 1970, which is withdrawn.

In this compressive strength test on portions of broken beams the application of the test load is the same method and to the same precision as for the cube compression test.

A suitable jig with auxiliary platens which give a more positive location of the specimen is illustrated.

No estimate is given for repeatability or reproducibility in this Part of this British Standard. Reference should be made to BS 5497 : Part 1 for further information on the determination of repeatability and reproducibility.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

1. Scope

This Part of this British Standard describes the equivalent cube method for determining the compressive strength of hardened concrete using portions of beams broken in flexure.

NOTE. The titles of the publications referred to in this Part of this standard are listed on the inside back cover.

2. Definitions

For the purposes of this Part of this British Standard the definitions given in BS 5328 apply.

3. Apparatus

3.1 Compression testing machine. The testing machine shall comply with BS 1881 : Part 115.

3.2 Auxiliary platens. Two square steel auxiliary platens equating to the nominal cross-section dimension of the beams, complying with BS 1881 : Part 115 shall be provided, which may form part of a jig to hold the specimen (see figure 1).

4. Test specimens

4.1 General. Test specimens shall be the broken portions of the beams that have been tested in accordance with BS 1881 : Part 118.

Test specimens shall be free from cracks, chipped surfaces and other obvious defects within the length to be tested.

4.2 Dimensions. Test specimens shall have a minimum length of not less than the nominal width of the beam plus 50 mm.

4.3 Storage of specimens. During the interval between testing the specimens as beams in accordance with BS 1881 : Part 118 and testing the portions as cubes, the specimens shall be stored in water at a temperature of 20 ± 2 °C and shall be tested immediately on removal from the water, whilst still wet.

5. Procedure

5.1 Placing the specimen in the machine. Wipe clean the bearing surfaces of the machine and the auxiliary platens and remove any surface water or loose grit or other material from the surfaces of the specimens that are to be in contact with the auxiliary platens. Place the specimen between the auxiliary platens in such a manner that the load is applied to the two sides adjacent to the uppermost surface as cast. The upper auxiliary platen shall be directly over the lower platen in such a manner that the specimen extends at least 25 mm from each of the two

opposite edges. Carefully mark the specimen or preferably use a suitable jig such as that shown in figure 1 to ensure that the specimen and auxiliary platens are located correctly. Centre the specimen carefully on the lower platen of the machine so that it does not touch the jig supports.

Do not use any packing between the surfaces of the specimen and the auxiliary platens or between the auxiliary platens and the platens of the machine.

5.2 Loading. Without shock, apply and increase the load continuously at a rate within the range 0.2 N/(mm².s) to 0.4 N/(mm².s) until no greater load can be sustained. On manually controlled machines as failure is approached the loading will decrease; at this stage operate the controls rapidly to maintain as far as possible the specified load. Record the maximum load applied to the specimen and note the appearance of the concrete and any unusual features in the type of failure.

6. Calculation and expression of results

The equivalent cube compressive strength of each specimen shall be calculated by dividing the maximum load by the area of contact of the auxiliary platens and shall be expressed to the nearest 0.5 N/mm².

7. Test report

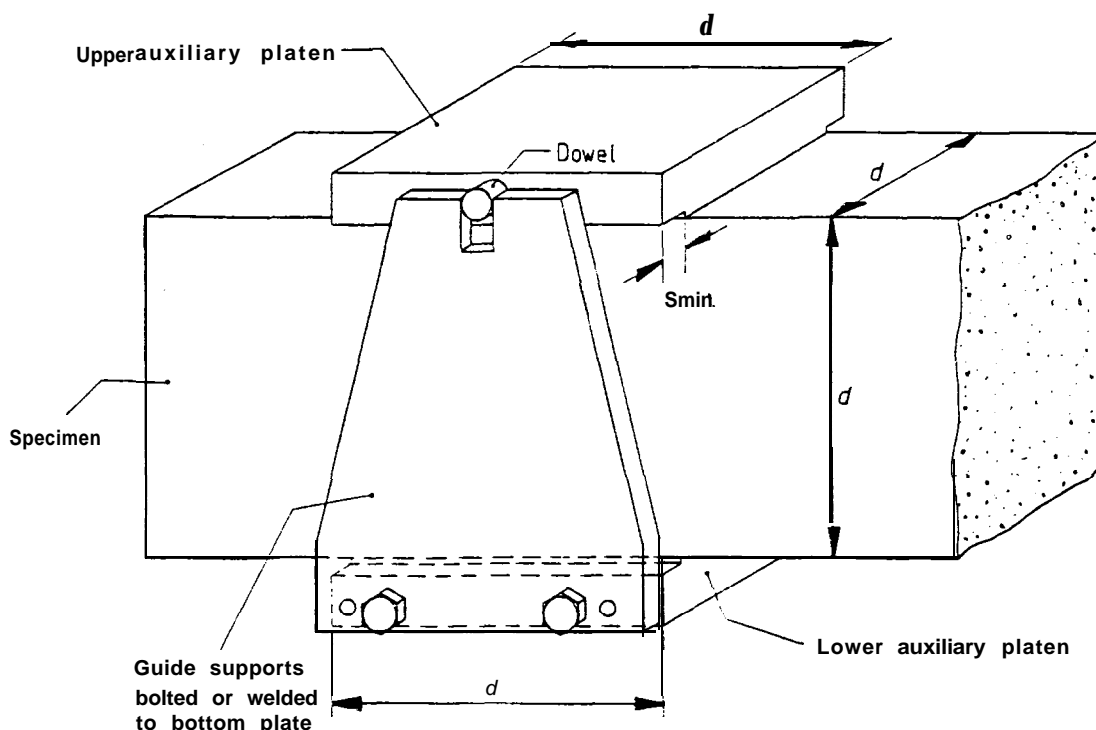
7.1 General. The report shall affirm that the tests were carried out in accordance with this Part of this standard. The report shall also state whether or not certificates of sampling, specimen preparation and curing are available. If available, a copy of each certificate shall be provided.

7.2 information to be provided by the producer of the test specimens. The information to be provided by the

producer of the test specimens shall be as given in 7.2 of BS 1881 : Part 118.

7.3 information to be provided by the test laboratory. The following information shall be provided by the test laboratory for inclusion in the test report:

- (a) identification of the specimen;
- (b) condition of specimen when received (include poor compaction, honeycombing or bad dimensions);
- (c) date of receipt of the specimen;
- (d) type and checked nominal or measured dimensions of the specimen;
- (e) any surface preparation;
- (f) conditions of curing or storage at the laboratory;
- (g) moisture condition at testing (saturated or moist);
- (h) date of test;
- (i) age of the specimen at time of testing;
- (j) mass of the specimen (as-received or saturated);
- (k) density of the specimen (as-received or saturated, and the method of determining the volume);
- (l) maximum load at failure;
- (m) equivalent cube compressive strength;
- (n) appearance of concrete and type of fracture if these are unusual;
- (o) certificate that the test has been carried out in accordance with this Part of this standard;
- (p) other remarks.



Dimension in millimetres.

Figure 1. A typical jig locating specimens for the compression test on beams broken in flexure

Publications referred to

- 0s 1881 Testing concrete
Part 115 Specification for compression testing machines for concrete
Part 118 Method for determination of flexural strength
- BS 5328 Methods for specifying concrete, including ready-mixed concrete
- 0s 5497' Precision of test methods
Pan 1 Guide for the determination of repeatability and reproducibility for a standard test method

'Referred to in the foreword only.

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The following BSI references relate to the work on this standard: Committee reference CAB/4 Draft for comment 80114205 DC

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- *British Precast Concrete Federation Ltd.
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- British Civil Engineering Test Equipment Manufacturers' Association
- Electricity Supply Industry in England and Wales
- Greater London Council
- Institute of Concrete Technology
- Coopted member

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