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## Standard Test Method for Compressive Strength of Concrete Using Portions of Beams Broken in Flexure<sup>1</sup>

This standard is issued under the fixed designation C 116; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers determination of the compressive strength of concrete, using portions of beams broken in flexure for the test specimens.

NOTE 1—This test method was originally developed to cover testing portions of beams having a square cross section as “modified cubes” and former versions of this procedure were subtitled “Modified Cube Method.” This terminology no longer applies because beams of rectangular cross section may be tested as provided under 6.1.

NOTE 2—For methods of making flexural test specimens from which the specimens for this method may be obtained, refer to Practice C 31, Test Method C 42, and Practice C 192.

NOTE 3—For methods of making the flexural strength test, refer to Test Method C 78, and Test Method C 293.

1.2 The values stated in inch-pound units are to be regarded as the standard.

1.3 *This standard does not purport to address the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

- 2.1 *ASTM Standards:*
- C 31 Practice for Making and Curing Concrete Test Specimens in the Field<sup>2</sup>
  - C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens<sup>2</sup>
  - C 42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete<sup>2</sup>
  - C 78 Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)<sup>2</sup>
  - C 192 Practice for Making and Curing Concrete Test Specimens in the Laboratory<sup>2</sup>
  - C 293 Test Method for Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)<sup>2</sup>
  - C 617 Practice for Capping Cylindrical Concrete Specimens<sup>2</sup>
  - E 4 Practices for Load Verification of Testing Machines<sup>2</sup>

### 3. Significance and Use

3.1 This test method is intended for use in the laboratory

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee C-9 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.03.01 on Methods of Testing Concrete for Strength.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.02.

and as a research tool for determining relative compressive strength values for various concrete mixtures. It is not intended as an alternative for Test Method C 39, and the test values obtained by these two test methods are not interchangeable and not necessarily comparable.

### 4. Apparatus

4.1 The testing machine may be of any type of sufficient capacity which will provide the rate of loading prescribed in 6.3. It shall conform to the requirements of the sections on Basis of Verification, Corrections, and Time Interval Between Verifications of Practices E 4. The testing machine shall be equipped with two steel bearing blocks with hardened faces (Note 4), one of which is a spherically seated block that will bear on the top bearing plate described in 4.2; and the other a plain rigid block that will support the bottom bearing plate described in 4.2. The diameter of the spherical bearing block shall be at least 75 % of the width ( $B$ , Fig. 1) of the specimen. The bearing faces shall not depart from a plane by more than 0.001 in. (0.025 mm) in any 6 in. (152 mm) for a block 6 in. (152 mm) in diameter or larger, or by more than 0.001 in. in the diameter of any smaller block; new blocks shall be manufactured within one half of this tolerance.

NOTE 4—It is desirable that the bearing faces of blocks used for compression testing of concrete have a Rockwell hardness of not less than HRC 60.

4.2 Machined or ground metal bearing plates not less than  $\frac{3}{4}$  in. (19 mm) in thickness, that meet the planeness requirements for the bearing faces of specimens specified in 5.2.1 and the hardness requirements for bearing blocks specified in 4.1, shall be mounted on the bearing surfaces of the specimen. The bearing plates shall be of such dimensions that the contact faces shall be substantially square and shall have the same dimensions as the nominal width of the beam tested. The upper bearing plate shall be placed directly over the lower plate. A drawing of a satisfactory device designed to ensure the proper location of the upper plate with reference to the lower plate is shown in Fig. 1. The bearing faces shall not depart from a plane by more than 0.001 in. (0.025 mm) in 6 in. (152 mm), and new bearing plates shall be manufactured within one half of this tolerance.

### 5. Test Specimens

5.1 The length of broken portions of beams selected for the compression test shall be at least 2 in. (50 mm) greater than the width. The selected compression test section shall be free of cracks, chipped surfaces, and other obvious defects.

#### 5.2 Preparation of Test Specimens: