



Standard Test Method for Compressive Strength of Architectural Cast Stone¹

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1. Scope

1.1 This test method covers the sampling, preparation of specimens, and determination of the compressive strength of architectural cast stone.

1.2 *This standard does not purport to address all of the safety concerns, if any, 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.*

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

C 42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete²

C 109 Test Method for Compressive Strength of Hydraulic Cement Mortars³

C 617 Practice for Capping Cylindrical Concrete Specimens²

3. Terminology

3.1 Definitions:

3.1.1 *cast stone, n*—an architectural precast concrete building unit intended to simulate natural cut stone.

4. Significance and Use

4.1 This test method is to be used in determining the compressive strength of cast stone. Compressive strength is one measure of resistance of cast stone to weathering and structural stress.

5. Apparatus

5.1 *Testing Machine*—The testing machine shall conform to the requirements prescribed in Test Method C 109 unless otherwise indicated therein.

6. Sampling

6.1 Select the sample to represent the cast stone under consideration. The sample may be selected by the purchaser or his authorized representative from each 500 ft³ (14 m³) of cast stone. Select a sample of adequate size to permit the preparation of three compression test specimens.

7. Test Specimens

7.1 For compression tests, take three specimens from each sample. Cut specimens from the finished surface of the sample to consist of one surface intended to be exposed to view and five saw-cut surfaces, except for faced cast stone, cut specimens through the faced surface to consist of approximately equal parts of the facing material and the backup material.

7.2 Cut test specimens from the sample with saws. The test specimens shall be 2-in. (50.8-mm) or 50-mm cubes. The allowable size tolerance of the cubes shall be $\pm 1/8$ in. (3.2 mm).

7.3 Measure the top and bottom of the bearing surfaces of the test specimens to 0.01 in. (0.25 mm) and average the two bearing areas to obtain the compression area.

8. Conditioning

8.1 For this test, oven dry specimens at a temperature of 100 to 110°C (212 to 230°F) until the loss in mass is not more than 0.1 % in 24 h of drying. Remove from the oven and allow to cool in room temperature for 4 to 6 h before capping.

9. Specimen Preparation

9.1 Cap each specimen, after drying, using equipment, materials, and procedures that conform to those specified in Practice C 617. Capping material is required that will exceed the compressive strength of the tested cubes. Form the cap by spreading the capping material upon a capping plate and pressing the specimen firmly on it. Make the cap as thin as possible but not to exceed $3/32$ in. (2.4 mm). Caps must be allowed to harden a minimum of 16 hours prior to testing.

10. Procedure

10.1 Apply load through a spherical bearing block placed on top of the specimen in a vertical testing machine. The loading of homogenous specimens shall be parallel to the casting direction and of faced specimens shall be normal to the position in which the cast stone is laid in the wall (Fig. 1). The

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² *Annual Book of ASTM Standards*, Vol 04.02.

³ *Annual Book of ASTM Standards*, Vol 04.01.

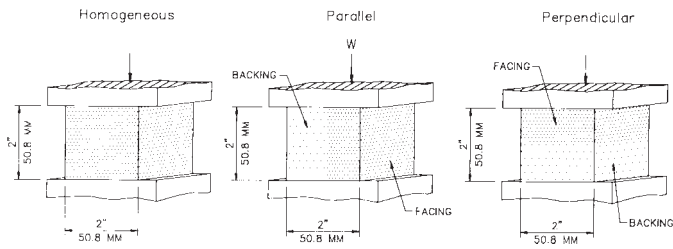


FIG. 1 Loading Position

$$C = W/A \tag{1}$$

where:

- C = compressive strength of the specimen, psi (MPa),
- W = maximum load, lbf (N), on the specimen at failure, and
- A = calculated area of the uncapped bearing surface in in.² (mm²).

12. Report

12.1 Report the following information.

12.1.1 The average compressive strength of three specimens taken from a single sample with the psi results rounded off to the nearest 10 psi.

12.1.2 The following information shall be reported as applicable: identification of the sample, mixture proportions, compressive strength, name of the project, date of casting, and age of sample when tested.

13. Precision and Bias

13.1 *Precision*—The precision of this test is similar to Test Method C 42 for which data are not yet available. The precision of this test method will be stated when data become available.

13.2 *Bias*—Since there is no accepted reference material suitable for determining the bias of results of this test method, no statement on bias is being made.

14. Keywords

14.1 cast stone; compressive strength

area of the bearing block shall be the same, or slightly larger, than that of the test specimen.

10.2 Center the specimen in the testing machine and apply the initial load at a rate which will permit hand adjustment of the contact plate on the specimen.

10.3 Apply load uniformly and without shock. Loading shall be at a rate of 200 to 350 psi/s (1380 to 2415 kPa/s) or for testing machines of screw type, the moving head shall travel at a rate of approximately 0.05 in./min (1.3 mm/min) when the machine is running idle.

10.4 The compression testing machine shall have a low-range dial or a digital reading scale that shall have an accuracy of ±1.0 % of the maximum load applied to the cast stone specimens.

10.5 Load specimens to failure.

11. Calculations

11.1 Calculate the compressive strength of each specimen as follows:

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