



Designation: C 39/C 39M – 99

## Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens<sup>1</sup>

This standard is issued under the fixed designation C 39/C 39M; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This test method covers determination of compressive strength of cylindrical concrete specimens such as molded cylinders and drilled cores. It is limited to concrete having a unit weight in excess of 50 lb/ft<sup>3</sup> [800 kg/m<sup>3</sup>].

1.2 The values stated in either inch-pound or SI units are to be regarded separately as standard. The SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.3 *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.*

1.4 The text of this standard references notes which provide explanatory material. These notes shall not be considered as requirements of the standard.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- C 31 Practice for Making and Curing Concrete Test Specimens in the Field<sup>2</sup>
- C 42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete<sup>2</sup>
- C 192 Practice for Making and Curing Concrete Test Specimens in the Laboratory<sup>2</sup>
- C 617 Practice for Capping Cylindrical Concrete Specimens<sup>2</sup>
- C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials<sup>2</sup>
- C 873 Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds<sup>2</sup>
- C 1077 Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation<sup>2</sup>
- C 1231 Practice for Use of Unbonded Caps in Determina-

tion of Compressive Strength of Hardened Concrete Cylinders<sup>2</sup>

E 4 Practices for Force Verification of Testing Machines<sup>3</sup>

E 74 Practice for Calibration of Force-Measuring Instruments for Verifying the Load Indication of Testing Machines<sup>3</sup>

Manual of Aggregate and Concrete Testing<sup>2</sup>

2.2 *American Concrete Institute:*

CP-16 Concrete Laboratory Testing Technician, Grade I<sup>4</sup>

### 3. Summary of Test Method

3.1 This test method consists of applying a compressive axial load to molded cylinders or cores at a rate which is within a prescribed range until failure occurs. The compressive strength of the specimen is calculated by dividing the maximum load attained during the test by the cross-sectional area of the specimen.

### 4. Significance and Use

4.1 Care must be exercised in the interpretation of the significance of compressive strength determinations by this test method since strength is not a fundamental or intrinsic property of concrete made from given materials. Values obtained will depend on the size and shape of the specimen, batching, mixing procedures, the methods of sampling, molding, and fabrication and the age, temperature, and moisture conditions during curing.

4.2 This test method is used to determine compressive strength of cylindrical specimens prepared and cured in accordance with Practices C 31, C 192, C 617 and C 1231 and Test Methods C 42 and C 873.

4.3 The results of this test method are used as a basis for quality control of concrete proportioning, mixing, and placing operations; determination of compliance with specifications; control for evaluating effectiveness of admixtures and similar uses.

4.4 The individual who tests concrete cylinders for acceptance testing shall have demonstrated a knowledge and ability to perform the test procedure equivalent to the minimum guidelines for certification of Concrete Laboratory Technician, Level I, in accordance with ACI CP-16.

<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 C09.61 on Testing Concrete for Strength.

Current edition approved July 10, 1999. Published September 1999. Originally published as C 39 – 21 T. Last previous edition C 39 – 96.

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

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 03.01.

<sup>4</sup> Available from American Concrete Institute, P.O. Box 9094, Farmington Hills, MI 48333-9094.