Standard Method of Test for

Making and Curing Concrete Test Specimens in the Laboratory

AASHTO Designation: T 126-01
ASTM Designation: C 192/C 192M-95

1. SCOPE

1.1. This method covers procedures for making and curing test specimens of concrete in the laboratory under accurate control of materials and test conditions using concrete that can be consolidated by rodding or vibration as described herein.

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

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. *AASHTO Standards*:

- M 6, Fine Aggregate for Portland Cement Concrete
- M 43, Sizes of Aggregate for Road and Bridge Construction
- M 80, Coarse Aggregate for Portland Cement Concrete
- M 195, Lightweight Aggregates for Structural Concrete
- M 201, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes
- M 205, Molds for Forming Concrete Test Cylinders Vertically
- T 23, Making and Curing Concrete Test Specimens in the Field
- T 84, Specific Gravity and Absorption of Fine Aggregate
- T 85, Specific Gravity and Absorption of Coarse Aggregate
- T 119, Slump of Hydraulic Cement Concrete
- T 121, Mass per Cubic Meter (Cubic Foot), Yield, and Air Content (Gravimetric) of Concrete
- T 141, Sampling Freshly Mixed Concrete
- T 152, Air Content of Freshly Mixed Concrete by the Pressure Method
- T 196, Air Content of Freshly Mixed Concrete by the Volumetric Method
- T 231, Capping Cylindrical Concrete Specimens
- T 255, Total Evaporable Moisture Content of Aggregate by Drying

2.2. *ASTM Standards*:

- C 125, Terminology Relating to Concrete and Concrete Aggregates
- C 567, Test Method for Unit Weight of Structural Lightweight Concrete[1]
- C 1064, Test Methods for Temperature of Freshly Mixed Portland-Cement Concrete
- C 1077, Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratories Evaluation[1]
- E 171, Specification for Standard Atmospheres for Conditioning and Testing Materials

2.3. *NIST Standard*:

- Handbook 44, Specifications, Tolerances, and other Technical Requirements for Commercial Weighing and Measuring Devices.[2]

3. SIGNIFICANCE AND USE

3.1. This practice provides standardized requirements for preparation of materials, mixing concrete, and making and curing concrete test specimens under laboratory conditions.

3.2. If specimen preparation is controlled as stipulated herein, the specimens may be used to develop information for the following purposes:

3.2.1. Mixture proportioning for project concrete.

3.2.2. Evaluation of different mixtures and materials.

3.2.3. Correlation with nondestructive tests, and

3.2.4. Providing specimens for research purposes.

Note 1—The concrete test results for concrete specimens made and cured using this practice are widely used. They may be the basis for acceptance testing for project concrete, research evaluation, and other studies. Careful and knowledgeable handling of materials, mixing concrete, molding test specimens, and curing test specimens is necessary. Many laboratories performing this important work are independently inspected or accredited. Practice C 1077 identifies and defines duties, responsibilities, including minimum responsibilities of the laboratory personnel and minimum technical requirements for laboratory equipment used. Many laboratories ensure qualified technicians by participating in national certification programs such as the American Concrete Institute Laboratory program or equivalent program.

4. APPARATUS

4.1. *Molds, General*—Molds for specimens or fastenings thereto in contact with the concrete shall be made of steel, cast iron, or other nonabsorbent material, nonreactive with concrete containing portland or other hydraulic cements. Molds shall conform to the dimensions and tolerances specified in the method for which the specimens are required. Molds shall hold their dimensions and shape under conditions of severe use. Watertightness of molds during use shall be judged by their ability to hold water poured into them. Test procedures for watertightness are given in the section on Test Methods for Elongation, Absorption, and Watertightness of Specification C 470. A suitable sealant such as heavy grease, modeling clay, or microscrystalline wax, shall be used where necessary to prevent leakage through the joints. Positive means shall be provided to hold base plates firmly to the molds. Reusable molds shall be lightly coated with mineral oil or a suitable nonreactive release material before use.

4.2. *Cylinder Molds*:

4.2.1. Molds for Casting Specimens Vertically shall conform to the requirements of Section 4.1 and M 205.

4.2.2. Horizontal Molds for Creep Test Cylinders shall conform to the requirements of Section 4.1 and to the requirements for symmetry and dimensional tolerance in Section 3.1.2 of M 205. The use of horizontal molds is intended only for creep specimens that contain axially embedded strain gages. Molds for creep cylinders to be filled while supported in a horizontal position shall have a filling slot parallel to the axis of the mold which extends the full length to receive the concrete. The width of the slot shall be one-half the diameter of the specimen. If necessary, the edges of the slot shall be reinforced to maintain dimensional stability. Unless specimens are to be capped or ground to produce plane ends, the molds shall be provided with two machined metal end plates at least 1 in. (25 mm) thick and the working surfaces shall comply with the requirements for planeness and surface roughness of Section 3.1 of T 231. Provision shall be made for fixing both end plates firmly to the mold. The inside surface of each end plate shall be provided with at least three lugs or studs approximately 1 in. (25 mm) long, firmly fastened to the plate for embedment in the concrete. One base plate shall be drilled from the inside at an angle to permit the lead wire from the strain gage to exit the specimen through the edge of the plate. Provision shall be made for accurately positioning the strain gage. All necessary holes shall be as small as possible to minimize disturbance to subsequent strain measurements and shall be sealed to prevent leakage.

4.3. *Beam and Prism Molds*—Beam and prism molds shall be rectangular in shape (unless otherwise specified) and of the dimensions required to produce the desired specimen size. The inside surfaces of the molds shall be smooth and free from indentations. The sides, bottom, and ends shall be at right angles to each other and shall be straight and true and free of warpage. Maximum variation from the nominal cross section shall not exceed $^1/_8$ in. (3 mm) for molds with depth or breadth of 6 in. (150 mm) or more, or $^1/_{16}$ in. (1.6 mm) for molds of smaller depth or breadth. Except for flexure specimens, molds shall not vary from the nominal length by more than $^1/_{16}$ in. (1.6 mm). Flexure molds shall not be shorter than $^1/_{16}$ in. (1.6 mm) of the required length, but may exceed it by more than that amount.

4.4. *Tamping Rods*—Two sizes are specified in AASHTO Methods. Each shall be a round, straight steel rod with at least the tamping end rounded to a hemispherical tip of the same diameter as the rod. Both ends may be rounded, if preferred.

4.4.1. *Larger Rod*—$^5/_8$ in. (16 mm) in diameter and approximately 24 in. (600 mm) long.

4.4.2. *Small Rod*—$^3/_8$ in. (10 mm) in diameter and approximately 12 in. (300 mm) long.

4.5. *Mallets*—A mallet with a rubber or rawhide head weighing 1.25 ± 0.50 lb (0.6 ± 0.20 kg) shall be used.

4.6. *Vibrators*—Internal vibrators may have rigid or flexible shafts, preferably powered by electric motors. The frequency of vibration shall be 7000 vibrations or cycles per minute (120 Hz) or greater while in use. The outside diameter or side dimension of the vibrating elements shall be at least 0.75 in. (20 mm) and not greater than 1.50 in. (40 mm). The combined length of the shaft and vibrating element shall exceed the maximum depth of the section being vibrated by at least 3 in. (75 mm). External vibrators may be of two types: table or plank. The frequency for external vibrators shall be not less than 3600 vibrations per minute (60 Hz) and preferably higher. For both table and plank, provision shall be made for clamping the mold securely to the apparatus.
A vibrating-reed tachometer should be used to check the frequency of vibration.