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Standard Practice for Capping Concrete Masonry Units, Related Units and Masonry Prisms for Compression Testing[1]

This standard is issued under the fixed designation C 1552; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This practice covers apparatus, materials, and procedures for capping concrete masonry units, related units, including coupons or other specimens obtained from such units, and masonry prisms for compression testing.

NOTE 1—The testing laboratory performing these test methods should be evaluated in accordance with Practice C 1093.

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

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.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

C 140~~Methods for Sampling and Testing Concrete Masonry Units and Related Units~~

~~C472Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete~~ Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

C 617 Practice for Capping Cylindrical Concrete Specimens

C 1093 Practice for Accreditation of Testing Agencies for ~~Unit~~ Masonry

C 1209 Terminology of Concrete Masonry Units and Related Units

C 1232 Terminology of Masonry

C 1314 Test Method for Compressive Strength of Masonry Prisms

3. Terminology

3.1 Terminology defined in Terminology C 1209 ~~and C1232~~ and Terminology C 1232 shall apply for this practice.

4. Significance and Use

4.1 This practice describes procedures for providing plane surfaces on the two bearing surfaces of units and prisms. The purpose of this standard is to provide consistent and standardized procedures for capping units and prisms for compression testing. The procedures are based on those contained (or previously contained) in Test Methods C 140, Practice C 617, and Test Method C 1314.

NOTE 2—Specimens capped using this practice will vary significantly in size and weight. Appropriate care and handling may differ based on specimen size and weight. Provide care and handling as needed to provide for proper capping based on the physical characteristics of the specimen being capped.

5. Apparatus

5.1 *Capping Plate*—If used, the capping plate shall be of steel and have a thickness of not less than 1 in. (25.4 mm). The capping surface shall be plane within 0.003 in. in 16 in. (0.075 mm in 400 mm) and shall be free of gouges, grooves, and indentations greater than 0.010 in. (0.25 mm) deep or greater than 0.05 in.^{2} (32 mm ^{2}) in surface area. At the time of capping, the capping surface shall be level within 1⁄16 in. (1.6 mm) over the length of the plate.

5.1.1 *Capping Wear Plate*—If used, the capping wear plate is placed directly on top of the capping plate and shall meet the

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard.**

requirements of 5.2. Do not use a capping wear plate with sulfur capping materials.

NOTE3—When using gypsum cement capping materials, the placement of a single glass plate directly on top of the capping plate has been found to reduce the potential of damage to the capping plate. The glass plate is typically more resistant to scratches and can be replaced at less cost than that required to resurface the capping plate. The requirements for the casting plate in 5.2 have demonstrated to be sufficient for this purpose. 3—A capping wear plate has been found to reduce the potential of damage to the capping plate. The capping wear plate is typically more resistant to scratches and can be replaced at less cost than that required to resurface the capping plate.

5.2 *Casting Plate*—If used, the casting plate shall be of transparent glass with a thickness of not less than ½ in. (13 mm). The casting plate shall be plane within 0.003 in. in 16 in. (0.075 mm in 400 mm).

6. Materials

6.1 *Capping Materials*:

6.1.1 *High Strength Gypsum Cement Capping Materials*:

6.1.1.1 In addition to the compressive strength testing required in 6.2, qualification tests shall be made to determine the effects of water-cement ratio and age on compressive strength. Procedures used for preparing the high strength gypsum cement capping materials shall ensure that water-cement ratios used for each batch provide the required strength.

NOTE 4—The water-gypsum cement ratio should typically be between 0.26 and 0.30. Use of low water-gypsum cement ratios and vigorous mixing will usually permit development of 3500 psi (24.1 MPa) at ages of one or two hours. Higher water-gypsum cement ratios extend working time, but reduce strength.

6.1.1.2 Do not add fillers or extenders to the high strength gypsum cement.

NOTE 5—Retarders extend working time for capping materials but their effects on required water-cement ratio should be determined prior to use.

NOTE 6—The following two gypsum cements have successfully been used for this purpose: Hydrostone™ (trademarked) and ~~Hydrocal™~~ Hydrocal (trademarked) white gypsum cement. Both are available from U.S. Gypsum Company.

6.1.2 *Sulfur Capping Materials*:

6.1.2.1 Proprietary or laboratory prepared sulfur mixtures shall contain 40 to 60 % sulfur by weight, the remainder being ground fire clay or other suitable inert material passing a No. 100 (150-µm) sieve with or without a plasticizer.

6.1.3 Use only capping materials identified in 6.1.1 and 6.1.2. Do not use other capping materials.

NOTE 7—Examples of materials that have been found to be unsuitable for capping purposes include, but are not limited to: low-strength molding plaster, plaster of paris, mixtures of plaster of paris and portland cement, and other cement-based materials.

6.2 *Compressive Strength of Capping Materials*—The compressive strength of the capping material shall be at least 3500 psi (24.1 MPa) at an age of 2 h. The cube molds and methods of preparing and testing the cubes shall be in accordance with ~~Method~~Practice C 617. The capping material shall be placed in the cube at capping consistency. Store the filled molds in laboratory air. Remove cubes of sulfur material after solidification is complete and remove cubes of gypsum cement material from the molds not more than 15 ~~minutes~~min prior to testing. Test cubes at an age of 2 ~~hours~~h ± 10 ~~minutes~~min after completing the filling of the molds.

6.2.1 The strength of the capping material shall be determined on receipt of a new lot and at intervals not exceeding three months. If a given test of the capping material fails to conform to the strength requirements, the package from which the material was sampled shall not be used unless two additional subsequent samples are taken from the same package and both of these subsequent samples conform to the strength requirements. If the strength tests from an individual package are inadequate, randomly obtain and test three additional samples from the lot. These additional samples shall be taken from separate packages, if available. Unless these three samples conform to the strength requirements, no part of the lot shall be used.

7. Procedure

7.1 *Preparation of Specimens for Capping*—Use an abrasive stone to remove loose protrusions from the surfaces of the specimens to be capped. Refer to the appropriate compression test method (Test Methods C 140 or Test Method C 1314) for other specimen preparation requirements.

7.2 *Capping Test Specimens*—Cap top and bottom bearing surfaces of specimens by one of the methods in 7.2.1 or 7.2.2. Use alignment devices as needed to make sure the caps meet the requirements of 7.4.

NOTE 8—Various alignment devices have been demonstrated to be effective. For capping with sulfur materials, which sets quickly, alignment jigs make sure that the specimen is placed on the capping plate correctly in the first motion. For capping with gypsum cement materials, levels placed across the top of specimen have proven to work well. Bullseye levels work particularly well with smaller specimens.

7.2.1 *Capping Using Gypsum Cement Materials*—Spread the gypsum cement capping material evenly on the capping plate ~~(or casting plate if used)~~or capping wear plate that has been lightly coated with oil or sprayed with a TFE-fluorocarbon coating (Note 9). Bring the surface of the specimen to be capped into contact with the capping material; firmly press down the specimen with a single motion, holding it so that its axis is at right angles to the capping surface to comply with the requirements of 7.4. Do not disturb the specimen until the capping material has solidified.

7.2.1.1 *Alternative Capping Method Using Gypsum Cement Materials*—Spread the gypsum cement capping material evenly on the top surface of the specimen. Bring the casting plate, which has been lightly coated with oil or sprayed with TFE-fluorocarbon