



Standard Test Method for Air Content of Hydraulic Cement Mortar¹

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

1. Scope

1.1 This test method covers the determination of the air content of hydraulic cement mortar under the conditions hereinafter specified.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 Values in SI shall be obtained by measurement in SI units or by appropriate conversion, using the Rules for Conversion and Rounding in IEEE/ASTM SI 10, of measurements made in other units.

1.4 *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:

- C 91 Specification for Masonry Cement²
- C 109 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)²
- C 183 Practice for Sampling and the Amount of Testing of Hydraulic Cement²
- C 230 Specification for Flow Table for Use in Tests of Hydraulic Cement²
- C 305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency²
- C 511 Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes²
- C 778 Specification for Standard Sand²
- C 1005 Specification for Weights and Weighing Devices for Use in the Physical Testing of Hydraulic Cements²
- E 438 Specification for Glasses in Laboratory Apparatus³
- E 694 Specification for Laboratory Glass Volumetric Apparatus³

¹ This test method is under the jurisdiction of ASTM Committee C-1 on Cement and is the direct responsibility of Subcommittee C01.21 on Air Entrainment.

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² Annual Book of ASTM Standards, Vol 04.01.

³ Annual Book of ASTM Standards, Vol 14.02.

IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System³

3. Summary of Test Method

3.1 Prepare a mortar with standard sand and the cement to be tested, using a water content sufficient to give a required flow. Compact the mortar into a measure of known volume and determine mass. Calculate the air content from the measured density of the mortar, the known densities of the constituents, and the mixture proportions.

4. Significance and Use

4.1 The purpose of this test method is to determine whether or not the hydraulic cement under test meets the air-entraining or non-air-entraining requirements of the applicable hydraulic cement specification for which the test is being made. The air content of concrete is influenced by many factors other than the potential of the cement for air entrainment.

5. Apparatus

5.1 *Flow Table, Flow Mold, and Caliper*, shall conform to Specification C 230.

5.2 *Measure*—A cylindrical measure having an inside diameter of 76 ± 2 mm and a depth (approximately 88 mm) adjusted by standardization with water to contain 400 ± 1 mL at $23.0 \pm 2.0^\circ\text{C}$ (Note 1). For the purposes of this test, the capacity of the measure in millilitres is the mass of the water content of the measure, in grams, divided by 0.9976, no correction in mass being made for the buoyant effect of air. The measure shall have a uniform wall thickness. The thickness of the wall and bottom shall not be less than 2.9 mm. The total mass of the empty measure shall not be more than 900 g. The measure shall be made of a metal not attacked by the cement mortar.

NOTE 1—Calibrate the 400-mL measure by filling with distilled water at $23.0 \pm 2.0^\circ\text{C}$ to a point where the meniscus extends appreciably above the top of the measure, placing a clean piece of plate glass on the top of the measure, and allowing the excess water to be squeezed out. The absence of air bubbles as seen through the glass ensures that the measure is completely full. Care shall be taken that the excess water is wiped from the sides of the container before weighing.

5.3 *Mixer, Bowl, and Paddle*, shall conform to the apparatus section of Practice C 305.

5.4 *Straightedge*—A steel straightedge not less than 200