



Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars¹

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1. Scope

1.1 This test method covers the determination of the flexural strength of hydraulic-cement mortars.

1.2 The values stated in SI units are to be regarded as the standard. The values shown in parentheses are for information only.

1.3 Values in SI units shall be obtained by measurement in SI units or by appropriate conversion, using the Rules for Conversion and rounding given in Standard 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. (Warning—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.²)*

2. Referenced Documents

2.1 ASTM Standards:

C 109/C 109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)³

C 230 Specification for Flow Table for Use in Tests of Hydraulic Cement³

C 305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency³

C 349 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using Portions of Prisms Broken in Flexure)³

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials⁴

C 778 Specification for Standard Sand³

IEEE/ASTM SI 10 Standard for Use of the International

System of Units (SI): The Modern Metric System⁵

3. Summary of Test Method

3.1 The test mortar used consists of 1 part cement and 2.75 parts of sand proportion by mass. Portland or air-entraining portland cements are mixed at specified water-cement ratios. Water content of other cements is that sufficient to obtain a flow of $110 \pm 5\%$ with 25 drops of the flow table. Test prisms, 40 by 40 by 160-mm are molded by tamping in two layers. Prisms are cured one day in the molds and stripped until tested by center point loading.

4. Significance and Use

4.1 This test method provides a means for determining the flexural strength of hydraulic cement mortars. Portions of the mortar prisms tested in flexure according to this test method may be used for the determination of compressive strength in accordance with Test Method C 349.

4.2 The values are determined from this test method for research or reference purposes only and are not used for determining compliance with specification requirements.

5. Apparatus

5.1 *Weights, Weighing Devices and Glass Graduates*, shall conform to the Apparatus Section of Test Method C 109/C 109M.

5.2 *Mixer, Bowl and Paddle*, an electrically driven mechanical mixer of the type equipped with paddle and mixing bowl, as specified in the Apparatus Section of Practice C 305.

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

5.4 *Specimen Molds*—Molds for the 40 by 40 by 160-mm prism specimens shall be triple-gang molds and shall be so designed that the specimens will be molded with their longitudinal axes in a horizontal position. The molds shall be made of a hard metal, not attacked by cement mortar, and with a Rockwell hardness of not less than HRB 55. The parts of the molds shall be matchmarked and, when assembled, shall be tight-fitting and positively held together. The sides of the molds shall be sufficiently rigid to prevent spreading or warping. The interior faces of the molds shall be plane surfaces with a permissible variation, in any 50-mm line on a surface, of 0.03

¹ This test method is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.27 on Strength.

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² See the section on Safety, Manual of Cement Testing, *Annual Book of ASTM Standards*, Vol 04.01.

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

⁴ *Annual Book of ASTM Standards*, Vol 04.02.

⁵ *Annual Book of ASTM Standards*, Vol 14.04.