Designation: C 452 – 02

Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate[1]

This standard is issued under the fixed designation C 452; 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 test method, which is applicable only to portland cements, covers the determination of the expansion of mortar bars made from a mixture of portland cement and gypsum in such proportions that the mixture has a sulfur trioxide (SO_3) content of 7.0 mass %.

1.2 The values stated in SI units (IEEE/ASTM SI-10) are to be regarded as 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.*

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 150 Specification for Portland Cement[3]

C 230/C 230M Specification for Flow Table for Use in Tests of Hydraulic Cement[3]

C 305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency[3]

C 471M Test Methods for Chemical Analysis of Gypsum and Gypsum Products [Metric][3]

C 490 Practice for Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete[3]

C 511 Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes[3]

C 778 Specification for Standard Sand[3]

C 1005 Specification for Reference Masses and Devices for Determining Mass and Volume for Use in the Physical Testing of Hydraulic Cements[3]

D 1193 Specification for Reagent Water[4]

IEEE/ASTM SI-10 Practice for Use of the International System of Units (SI): The Modern Metric System[5]

3. Significance and Use

3.1 This test method is used primarily by those interested in research on methods for determining the potential sulfate resistance of portland cement. This test method is also used to establish that a sulfate-resisting portland cement meets the performance requirements of Specification C 150.

4. Apparatus

4.1 *Weights and Weighing Devices*, conforming to the requirements of Specification C 1005.

4.2 *Flow Table*, conforming to the requirements of Specification C 230/C 230M.

4.3 *Mixer, Bowl, and Paddle*, conforming to the requirements of Practice C 305.

4.4 *Trowel and Tamper*, conforming to the requirements of Test Method C 109/C 109M.

4.5 *Glass Graduates, Molds, and Length Comparator*, conforming to the requirements of Practice C 490.

5. Temperature and Humidity

5.1 *Molding Room, Dry Materials, and Mixing Water*—Maintain the temperature of the molding room, dry materials, and mixing water at 23.0 ± 4.0°C (73.5 ± 7°F) and the relative humidity of the molding room at not less than 50 %.

5.2 *Moist Cabinet or Room*, conforming to the requirements of Specification C 511.

6. Materials

6.1 Use sand that conforms to Specification C 778 for making the test mortar.

[1] This test method is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.29 on Sulfate Resistance.

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[2] 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 11.01.

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