



Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate¹

This standard is issued under the fixed designation C452; 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 either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard. Values in SI units [or inch-pound units] shall be obtained by measurement in SI units [or inch pound units] or by appropriate conversion, using the Rules for Conversion and Rounding given in [IEEE/ASTM SI 10](#), of measurements made in other units (or SI units). Values are stated in only SI units when inch-pound units are not used in practice.

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:³

[C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars \(Using 2-in. or \[50-mm\] Cube Specimens\)](#)

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 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.

[C150 Specification for Portland Cement](#)

[C219 Terminology Relating to Hydraulic Cement](#)

[C230/C230M Specification for Flow Table for Use in Tests of Hydraulic Cement](#)

[C305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency](#)

[C471M Test Methods for Chemical Analysis of Gypsum and Gypsum Products \(Metric\)](#)

[C490 Practice for Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete](#)

[C511 Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes](#)

[C778 Specification for Sand](#)

[C1005 Specification for Reference Masses and Devices for Determining Mass and Volume for Use in the Physical Testing of Hydraulic Cements](#)

[D1193 Specification for Reagent Water](#)

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

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology [C219](#).

4. Interferences

4.1 This test method is not suitable for establishing the sulfate resistance of blended hydraulic cements nor for combinations of portland cement and pozzolans or slag cement ([Note 1](#)).

NOTE 1—The main increase in sulfate resistance provided by blended hydraulic cements, pozzolans and slag cement occurs when concrete is exposed after the pozzolans or slag cement have had time to react.

5. Significance and Use

5.1 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 [C150](#).

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