



Designation: C845/C845M – 18

Standard Specification for Expansive Hydraulic Cement¹

This standard is issued under the fixed designation C845/C845M; 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 specification covers hydraulic cements that expand during the early hardening period after setting.

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.

1.3 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of this standard.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- C33/C33M Specification for Concrete Aggregates
- C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
- C114 Test Methods for Chemical Analysis of Hydraulic Cement
- C183/C183M Practice for Sampling and the Amount of Testing of Hydraulic Cement
- C185 Test Method for Air Content of Hydraulic Cement Mortar
- C188 Test Method for Density of Hydraulic Cement

¹ This specification is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.13 on Special Cements.

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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.

- C465 Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements
- C688 Specification for Functional Additions for Use in Hydraulic Cements
- C806 Test Method for Restrained Expansion of Expansive Cement Mortar
- C807 Test Method for Time of Setting of Hydraulic Cement Mortar by Modified Vicat Needle

3. Terminology

3.1 *Definitions:*

3.1.1 *expansive cement (K)*—an expansive cement containing anhydrous calcium aluminosulfate ($4\text{CaO}\cdot 3\text{Al}_2\text{O}_3\cdot \text{SO}_3$), calcium sulfate, and uncombined calcium oxide.

3.1.2 *expansive cement (M)*—an expansive cement containing calcium aluminate cement and calcium sulfate.

3.1.3 *expansive cement (S)*—an expansive cement containing tricalcium aluminate (C_3A) and calcium sulfate.

3.1.4 *expansive hydraulic cement*—a cement composed essentially of hydraulic calcium silicates, calcium aluminates and calcium sulfates, which, upon being mixed with water, forms a paste that increases significantly in volume during the early hardening period occurring after setting. This volume increase is due principally to the reaction of the calcium aluminates and calcium sulfates.

3.1.5 *shrinkage-compensating concrete*—concrete that is internally restrained with resilient reinforcing and made with expansive cement which induces both compressive stress in the concrete and positive steel strain that approximately off-sets tensile stresses and negative strains induced by drying shrinkage.

4. Classification

4.1 The cement covered by this specification is suitable for use in shrinkage-compensating concrete and shall be designated as Type E-1.

NOTE 1—Three kinds of expansive cement are identified in Section 3 by the letters K, M, and S. The appropriate letter should be used as a suffix to the type designation when one of these kinds is desired. Expansive cement may also be prepared in other ways.