



Standard Specification for Functional Additions for Use in Hydraulic Cements¹

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1. Scope*

1.1 This specification covers methods to investigate the effectiveness of a material to beneficially change the properties of hydraulic cements when the material is incorporated during manufacture of the cement.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 The effect of additions in cement may markedly change properties other than those they are intended to modify. This specification is designed to test for such changes. [Table 1](#) sets forth values for those properties of cement pastes and mortars that would permit a judgment of the changes effected by an addition. Likewise, [Table 2](#) sets forth similar criteria for concrete. Certain additions may be found effective for more than one purpose as indicated in [3.1.4](#) and [3.1.5](#).

2. Referenced Documents

2.1 ASTM Standards:²

- [C10/C10M](#) Specification for Natural Cement
- [C39/C39M](#) Test Method for Compressive Strength of Cylindrical Concrete Specimens
- [C78](#) Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
- [C109/C109M](#) Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
- [C143/C143M](#) Test Method for Slump of Hydraulic-Cement Concrete
- [C150](#) Specification for Portland Cement
- [C151](#) Test Method for Autoclave Expansion of Hydraulic Cement
- [C157/C157M](#) Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

- [C187](#) Test Method for Amount of Water Required for Normal Consistency of Hydraulic Cement Paste
- [C219](#) Terminology Relating to Hydraulic Cement
- [C226](#) Specification for Air-Entraining Additions for Use in the Manufacture of Air-Entraining Hydraulic Cement
- [C232](#) Test Methods for Bleeding of Concrete
- [C234](#) Test Method for Comparing Concretes on the Basis of the Bond Developed with Reinforcing Steel (Discontinued 2000) (Withdrawn 2000)³
- [C266](#) Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles
- [C403/C403M](#) Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
- [C451](#) Test Method for Early Stiffening of Hydraulic Cement (Paste Method)
- [C465](#) Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements
- [C595](#) Specification for Blended Hydraulic Cements
- [C596](#) Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement
- [C666/C666M](#) Test Method for Resistance of Concrete to Rapid Freezing and Thawing
- [C845](#) Specification for Expansive Hydraulic Cement
- [C1157](#) Performance Specification for Hydraulic Cement

3. Terminology

3.1 Definitions:

3.1.1 *accelerating addition*—a functional addition that accelerates the setting or early strength, or both, of concrete and mortar.

3.1.2 *retarding addition*—a functional addition that retards the setting of concrete and mortar.

3.1.3 *set-control addition*—a functional addition composed essentially of calcium sulfate in any hydration state from CaSO_4 to $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

3.1.4 *water-reducing addition*—a functional addition used to reduce the quantity of mixing water required to produce concrete and mortar of a given consistency.

3.1.5 *water-reducing and accelerating addition*—a functional addition that reduces the quantity of mixing water

¹ This specification is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.20 on Additions.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.