



Designation: ~~C10-07~~ Designation: **C 10/C 10M – 09**

Standard Specification for Natural Cement¹

This standard is issued under the fixed designation C 10/C 10M; 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 natural cement.

NOTE 1—Examples of typical past uses of natural cement include unit masonry mortar, cement plaster, grout, whitewash, and concrete.

~~1.2 For properties where values are given in both SI and non-SI units, the values in SI units are to be regarded as the standard. 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 IEEE/ASTM SI 10, of measurements made in other units.~~

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 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 the standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

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

C 114 Test Methods for Chemical Analysis of Hydraulic Cement

C 150 Specification for Portland Cement

C 151 Test Method for Autoclave Expansion of Hydraulic Cement

C 183 Practice for Sampling and the Amount of Testing of Hydraulic Cement

C 185 Test Method for Air Content of Hydraulic Cement Mortar

C 187 Test Method for Normal Consistency of Hydraulic Cement

C 188 Test Method for Density of Hydraulic Cement

C 191 Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle

C 204 Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus

C 219 Terminology Relating to Hydraulic Cement

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

C 465 Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements

C 778 Specification for Standard Sand

C 786 Test Method for Fineness of Hydraulic Cement and Raw Materials by the 300- μ m (No. 50), 150- μ m (No. 100), and 75- μ m (No. 200) Sieves by Wet Methods

IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System

3. Terminology

3.1 For definitions of terms related to this specification, see Terminology C 219.

¹ This test method is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.10 on Hydraulic Cements for General Concrete Construction.

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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.

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

4. Ordering Information

- 4.1 Orders for material under this specification shall include the following:
- 4.1.1 This specification number and date, and
- 4.1.2 Optional physical requirements as given in 7.2.

5. Additions

- 5.1 The cement covered by this specification shall contain no addition except as follows:
- 5.1.1 Water, or calcium sulfate, or both.
- 5.1.2 Processing additions used in the manufacture of the cement shall have been shown to meet the requirements of Specification C 465 in the amounts used or greater.

6. Chemical Requirements

- 6.1 Natural cements shall conform to the standard chemical requirements in Table 1.

7. Physical Requirements

- 7.1 Natural cements shall conform to the respective standard physical requirements prescribed in Table 1.
- 7.2 In order to match historic cements, at the option of the purchaser, the required values for % retention on the 300- μm (No. 50), 150- μm (No. 100), and 75- μm (No. 200) sieves, or of air permeability fineness shall be agreed at time of placing the order.

NOTE 2—If no data on historic cement fineness are available, the purchaser may wish to consider that previous editions of this specification from 1904 to 1976 required minimum values as follows:

- 1954-1976: Minimum 550 m^2/kg fineness (air-permeability method)
- 1937-1954: Maximum 15% retained on a 75- μm (No. 200) sieve
- 1904-1937: Maximum 10% retained on a 150- μm (No. 100) sieve, maximum 30 % retained on a 75- μm (No. 200) sieve

8. Acceptance and Rejection

8.1 Natural cement meets the strength requirements of this standard if the 7-day strength exceeds the minimum in Table 1. The cement also meets the strength requirements of this standard if the cement fails the 7-day strength minimum, but exceeds the 28-day strength minimum in Table 1.

8.2 If the cement fails an initial test for autoclave expansion, it meets the requirements of this standard if it passes on a second and third series of test specimens.

8.3 The cement shall be rejected if it fails to meet any of the requirements of this specification, subject to the provisions of 8.1 and 8.2.

8.4 Re-test cement remaining in storage for a period longer than six months after initial test. Reject it if it fails to meet any of the requirements of this specification at that time.

TABLE 1 Standard Requirements

	Applicable Test Methods	Requirements
Chemical Requirements		
Loss on ignition, max, %:	C 114	12
Insoluble residue, min, %:	C 114	2
Sulfur trioxide (SO ₃), max, %:	C 114	3.0
Physical Requirements		
Autoclave length change, max, %:	C 151, as modified in 10.1.4	0.80
Fineness, m^2/kg or % retained:	C 204 or C 786	^A
Time of setting, Vicat test ^B :	C 191	
Time in minutes, not less than		30
Air content of mortar ^C , volume %:	C 185	
max		12
Compressive strength, min, MPa (psi):	C 109/C 109M, as modified in 10.1.7	
Compressive strength, min, MPa [psi]:	C 109/C 109M, as modified in 10.1.7	
— 7 days		3.5 (510)
— 7 days		3.5 [510]
— 28 days		7.0 (1020)
— 28 days		7.0 [1020]

^AThe fineness shall be chosen at the option of the purchaser as per 7.2.

^BThe time of setting is that described as initial setting time in Test Method C 191.

^CCompliance with the requirements of this specification does not necessarily ensure that the desired air content will be obtained in concrete.