



~~Designation: C10/C10M-09~~ Designation: C10/C10M - 10

Standard Specification for Natural Cement¹

This standard is issued under the fixed designation C10/C10M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

~~1.1 This specification covers natural cement.~~

1.1 This specification covers natural cement and quick-setting natural cement.

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

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~~ 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

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

C150 Specification for Portland Cement

C151 Test Method for Autoclave Expansion of Hydraulic Cement

C183 Practice for Sampling and the Amount of Testing of Hydraulic Cement

C185 Test Method for Air Content of Hydraulic Cement Mortar

C187 Test Method for Normal Consistency of Hydraulic Cement

C188 Test Method for Density of Hydraulic Cement

C191 Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle

C204 Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus

C219 Terminology Relating to Hydraulic Cement

C305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency

C465 Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements

C778 Specification for Standard Sand

C786 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 C219.

4. Ordering Information

4.1 Orders for material under this specification shall include the following:

4.1.1 This specification number and date, and

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.

4.1.2 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 C465 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 and quick-setting natural cements shall conform to the respective standard physical requirements prescribed in Table 1.

NOTE 2—Time of setting requirements for natural cements have changed over time. Requirements of previous editions of this standard are as follows:

<u>1904-1937: Minimum 10 min initial setting, minimum 30 min final setting</u>
<u>1937-1954: Minimum 10 min initial setting (Vicat) or 20 min (Gillmore) and maximum 10 h final setting</u>
<u>1954-1962: Minimum 10 min and maximum 6 h initial setting (Test Method C191)</u>
<u>1962-1970: Minimum 60 min initial setting and maximum 12 h final setting (Gillmore)</u>
<u>1970-1976 and 2006-2008: Minimum 30 min initial setting (Vicat)</u>
<u>2009: Minimum 30 min initial setting—Natural Cement; Minimum 10 min initial setting, maximum 30 min initial setting, and minimum 30 min final setting—Quick Setting Natural Cement</u>

7.2 In order to match historic cements, at the option of the purchaser, the required values for % retention on the 300- μ m (No. 50), 150- μ m (No. 100), and 75- μ m (No. 200) sieves, or of air permeability fineness shall be agreed at time of placing the order.

NOTE 2—If 3—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:

TABLE 1 Standard Requirements

	Applicable Test Methods	Requirements: Natural Cement	Requirements: Quick-Setting Natural Cement
Chemical Requirements			
Loss on ignition, max, %:	C114	12	
Loss on ignition, max, %:	C114	12	12
Insoluble residue, min, %:	C114	2	
Insoluble residue, min, %:	C114	2	2
Sulfur trioxide (SO ₃), max, %:	C114	3.0	
Sulfur trioxide (SO ₃), max, %:	C114	3.0	3.0
Physical Requirements			
Autoclave length change, max, %:	C151, as modified in 10.1.4	0.80	
Autoclave length change, max, %:	C151, as modified in 10.1.4	0.80	0.80
Fineness, m ² /kg or % retained:	C204 or C786	A	
Time of setting, Vicat test ^B :			
Time of setting, Vicat test ^A :			
Time of setting, Vicat test:	C191		
—Time in minutes, not less than		30	
—Initial Setting Time in minutes, not less than		30	10
—Initial Setting Time in minutes, not more than		∞	30
—Final Setting Time in minutes, not less than		∞	30
Air content of mortar ^C , volume %:	C185		
Air content of mortar ^B , volume %:	C185		
—max		12	
—max		12	12
Compressive strength, min, MPa [psi]:	C109/C109M, as modified in 10.1.7		
—7 days		3.5 [510]	
—7 days		3.5 [510]	3.5 [510]
—28 days		7.0 [1020]	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 C191.

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