



Standard Specification for Natural Cement¹

This standard is issued under the fixed designation C 10; 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.

1.3 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- μm (No. 50), 150- μm (No. 100), and 75- μm (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](#).

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.

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.

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	
7 days		3.5 (510)
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.

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 m²/kg fineness (air-permeability method)

1937-1954: Maximum 15% retained on a 75- μ m (No. 200) sieve

1904-1937: Maximum 10% retained on a 150- μ m (No. 100) sieve, maximum 30 % retained on a 75- μ m (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.

8.5 Tentative or provisional acceptance of the cement shall not deprive the purchaser of the right of rejection in the event final tests or retests fail to meet applicable requirements.

8.6 At the option of the purchaser, packages more than 2 % below the mass marked thereon shall be rejected and if the average mass of packages in any shipment, as shown by determining the mass of 50 packages selected at random, is less than that marked on the packages, the entire shipment shall be rejected.

9. Packaging and Package Marking

9.1 When the cement is delivered in packages, the words "Natural Cement," the name and brand of the manufacturer,

and the mass of the cement contained therein, shall be plainly indicated on each package. Similar information shall be provided in the shipping documents accompanying the shipment of packaged or bulk cement. All packages shall be in good condition at the time of inspection.

10. Test Methods

10.1 Sample the cement and determine the properties enumerated in this specification in accordance with the following ASTM methods:

10.1.1 *Sampling*—Practice **C 183**.

10.1.2 *Chemical Analysis*—Test Methods **C 114**.

10.1.3 *Fineness*—One of the following test methods shall be used:

10.1.3.1 Test Method **C 204**. In this fineness determination, the specific gravity of natural cement shall be considered to be 2.90. Tests shall be made at a porosity of 0.530 ± 0.005 . In case of dispute, the true specific gravity used shall be as determined in accordance with Test Method **C 188**.

10.1.3.2 Test Method **C 786**.

10.1.4 *Autoclave Expansion*—Test Method **C 151** with the following modification:

10.1.4.1 The cement used in preparing the test specimens shall be a blend of 75 weight percent of the natural cement to be tested with 25 weight percent of portland cement conforming to the requirements of Type II cement in Specification **C 150**.

10.1.4.2 The natural cement and the portland cement shall be dry mixed to a uniform blend before water is added.

10.1.5 *Time of Setting*—Test Method **C 191**.

10.1.6 *Air Content of Mortar*—Test Method **C 185**. In this air content determination, the specific gravity of natural cement shall be considered to be 2.90. In case of dispute, the true specific gravity used shall be as determined in accordance with Test Method **C 188**.

10.1.7 *Compressive Strength*—The compressive strength shall be determined for mortar cubes prepared as follows:

10.1.7.1 The proportions shall be one part of cement to one part of standard sand by mass. The amount of mixing water is based on the amount of water required to produce a neat cement paste of normal consistency from the same sample of cement according to Test Method **C 187**. Calculate the percentage of water required as follows:

$$y = \frac{P}{3} + 6.5$$

where:

y = water required for the mortar as a percentage of the combined mass of cement and sand, and

P = water needed for normal consistency, percent by mass of cement.

10.1.7.2 The standard sand shall be 20-30 sand conforming to Specification **C 778**.

10.1.7.3 The mortar shall be mixed in accordance with Practice **C 305**. The quantities of materials to be mixed at one time in the batch of mortar for making six and nine test specimens shall be as follows:

	Number of Specimens	
	6	9
Cement, g	900	1335
Sand, g	900	1335
Water, mL	18y	26.7y

10.1.7.4 The 2-in. (50-mm) cube specimens shall be molded and tested in accordance with Test Method **C 109/C 109M**.

11. Keywords

11.1 hydraulic cement; natural cement; specification

SUMMARY OF CHANGES

Committee C01 has identified the location of selected changes to this specification since the last issue, C 10 – 06, that may impact the use of this specification. (Approved December 1, 2007)

(1) Revised **Note 1**.

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