Designation: C1328/C1328M – 23

Standard Specification for Plastic (Stucco) Cement[1]

This standard is issued under the fixed designation C1328/C1328M; 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 two types of plastic cement for use in portland cement-based plasters for exterior (stucco) and interior application.

1.2 *Units*—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 shall be obtained by measurement in SI units or by appropriate conversion, using the Rules for Conversion and Rounding given in Standard IEEE/ASTM SI 10, of measurements made in other units. Values are stated in only SI units when inch-pound units are not used in practice.

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

1.4 The following safety hazards caveat pertains only to Sections 13 and 14. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* (**Warning—**Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.)[2]

1.5 *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:*[3]

C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens)

C183/C183M 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 Amount of Water Required for Normal Consistency of Hydraulic Cement Paste

C188 Test Method for Density of Hydraulic Cement

C219 Terminology Relating to Hydraulic and Other Inorganic Cements

C266 Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles

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

C430 Test Method for Fineness of Hydraulic Cement by the 45-µm (No. 325) Sieve

C511 Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes

C778 Specification for Standard Sand

C926 Specification for Application of Portland Cement-Based Plaster

C1506 Test Method for Water Retention of Hydraulic Cement-Based Mortars and Plasters

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

3. Terminology

3.1 *Definitions*—Terms used in this specification are defined in Terminology C219 and Specification C926.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *plastic cement, n*—a hydraulic cement, primarily used in portland cement-based plastering construction, consisting of a mixture of portland or blended hydraulic cement and plasticizing materials (such as limestone or hydrated or hydraulic

[1] This specification is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.11 on Masonry Cement.

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[2] *Annual Book of ASTM Standards*, Vol 04.01. See the section on Safety Precautions in the Manual of Cement Testing.

[3] 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

lime), together with other materials introduced to enhance one or more properties such as setting time, workability, water retention, and durability.

3.2.1.1 *Discussion*—The term "plastic" does not refer to the inclusion of one or more organic components in the cement. The cement is predominantly inorganic in chemical composition. The term "plastic" refers to the ability of the cement to impart to the plaster a high degree of workability, and for the plaster to remain workable or plastic for a period of time so that, after initial application and floating on the wall, it can be reworked to obtain both densification and desired texture.

4. Physical Properties

4.1 Plastic cement shall conform to the applicable requirements prescribed in Table 1.

5. Sampling

5.1 At the option of the purchaser, the cement shall be sampled and tested to verify compliance with this specification, sampling and testing shall be performed in accordance with Practice C183/C183M.

5.2 Practice C183/C183M is not designed for manufacturing quality control and is not required for manufacturer's certification.

6. Temperature and Humidity

6.1 The temperature and relative humidity of the air in the vicinity of the mixing slab and dry materials, molds, base plates, and mixing bowl shall conform to the requirements of Test Method C109/C109M.

6.2 The moist cabinet or moist room shall conform to the requirements of Specification C511.

7. Fineness

7.1 Determine the residue on the 45 µm (No. 325) sieve in accordance with Test Method C430.

8. Normal Consistency

8.1 Determine normal consistency by the Vicat apparatus in accordance with Test Method C187.

9. Time of Setting

9.1 Determine the time of setting by the Gillmore needle method in accordance with Test Method C266.

10. Density

10.1 Determine the density of the plastic cement in accordance with Test Method C188, using kerosine as the liquid. Use the density so determined in the calculation of the air content of the plaster.

11. Blended Sand

11.1 The sand shall be a blend of equal parts by weight of graded standard sand and standard 20–30 sand conforming to Specification C778.

12. Preparation of Plaster

12.1 *Proportions for Plaster*—Plaster for air entrainment, compressive strength, and water retention tests shall be proportioned to contain 1620 g of sand and a mass of plastic (stucco) cement, in grams, as indicated in Table 2. The sand shall consist of 810 g of graded standard sand and 810 g of 20–30 standard sand. The quantity of water, measured in millilitres, shall be such as to produce a flow of 110 ± 5, as determined by Test Method C109/C109M.

12.2 *Mixing of Plasters*—Mix the plaster in accordance with Practice C305.

12.3 *Determination of Flow*—Determine the flow in accordance with Test Method C109/C109M.

13. Air Entrainment

13.1 *Procedure*—If the plaster has the correct flow, use a separate portion of the plaster for the determination of entrained air. Determine the mass of 400 mL of plaster in accordance with Test Method C185.

13.2 *Calculation*—Calculate the air content of the plaster, and report it to the nearest 1 % as follows:

$$D = (W_1 + W_2 + V_w)/[(W_1/S_1) + (W_2/S_2) + V_w] \quad (1)$$

$$A = 100 - (W_m/4D)$$

TABLE 1 Physical Requirements

Plastic Cement Type	S	M
Fineness, residue on a 45 µm (No. 325) sieve, max,%	24	24
Time of setting, Gillmore method:		
Initial set, minutes, not less than	90	90
Initial set, minutes, not more than	1000	1000
Compressive strength (average of three cubes):		
The compressive strength of mortar cubes, composed of 1 part cement and 3 parts blended sand (half graded standard sand and half standard 20–30 sand) by volume, prepared and tested in accordance with this specification, shall be equal to or higher than the values specified for the ages indicated below:		
7 days, MPa [psi]	9.0 [1300]	12.4 [1800]
28 days, MPa [psi]	14.5 [2100]	20.0 [2900]
Air content of mortar:		
Min, volume%	8	8
Max, volume %	20	20
Water retention value, min, %, of original flow	70	70

TABLE 2 Cement in Laboratory Batch of Plaster

Plastic (Stucco) Cement Type	Mass of Cement, g
S	510
M	540

where:

D = density of air-free plaster, g/cm^3,
W_1 = mass of cement, g,
W_2 = mass of sand, g,
V_w = mL-g of water used,
S_1 = density of cement, g/cm^3,
S_2 = density of standard sand, 2.65 g/cm^3,
A = volume percent of entrained air, and
W_m = mass of 400 mL of plaster, g.

14. Compressive Strength

14.1 *Test Specimens:*

14.1.1 *Molding*—Immediately after determining the flow and mass of 400 mL of plaster, return all of the plaster to the mixing bowl and remix for 15 s at the medium speed. Then mold the test specimens in accordance with Test Method C109/C109M, except that the elapsed time for mixing plaster, determining flow, determining air entrainment, and starting the molding of cubes shall be within 8 min.

14.1.2 *Storage*—Immediately after molding, store all test specimens in the molds on plane plates in a moist cabinet or moist room for 48 to 52 h in such a manner that the upper surfaces shall be exposed to the moist air. Then remove the cubes from the molds, and place them in the moist cabinet or moist room for 5 days in such a manner as to allow free circulation of air around at least five faces of the specimens. At the age of 7 days, immerse the cubes for the 28-day tests in saturated lime water in storage tanks of noncorrodible materials.

14.2 *Procedure:*

14.2.1 Test the cube specimens immediately after their removal from the moist cabinet or moist room for 7-day specimens, and immediately after their removal from storage water for all other specimens. If more than one specimen at a time is removed from the moist cabinet or moist room for 7-day tests, cover these cubes with a damp cloth until the time of testing.

14.2.2 The remainder of the testing procedure shall conform to Test Method C109/C109M.

15. Water Retention

15.1 Water retention shall be determined in accordance with the procedures in Test Method C1506, except wherever the term “mortar” is used, read “plaster.”

16. Storage

16.1 The cement shall be stored in such a manner as to permit easy access for the proper inspection and identification of each shipment, and in a suitable weathertight building that will protect the cement from dampness and minimize warehouse set.

17. Inspection

17.1 Adequate facilities shall be provided to the purchaser for the necessary inspection and sampling.

17.2 All packages shall be in good condition at the time of inspection.

18. Rejection

18.1 At the option of the purchaser, the cement shall be rejected if it fails to meet any of the requirements of this specification.

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

18.3 At the option of the purchaser, cement remaining in storage prior to shipment for a period greater than six months after testing shall be retested and, at the option of the purchaser, shall be rejected if it fails to meet any of the requirements of this specification.

19. Manufacturer’s Certification

19.1 Upon request of the purchaser in the contract or order, a manufacturer’s report shall be furnished at the time of shipment stating the results of the tests made on samples of the material taken during production or transfer and certifying that the applicable requirements of this specification have been met.

20. Packaging and Package Marking

20.1 When plastic cement is delivered in packages, the brand, name of the manufacturer, and net mass of the package in kilograms shall be indicated plainly thereon. Similar information shall be provided in the shipping documents accompanying the shipment of plastic cement in bulk.

21. Keywords

21.1 plaster; plastic cement; portland cement-based plaster; stucco