Designation: C1107/C1107M – 17

Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)[1]

This standard is issued under the fixed designation C1107/C1107M; 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 packaged dry, hydraulic cement grout (nonshrink) intended for use under applied load (such as to support a structure, a machine, and the like) where a change in height below initial placement height is to be avoided.

1.2 Grouts covered are composed of hydraulic cement, fine aggregate, and other ingredients. They require only the addition of mixing water for use.

1.3 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.

1.4 The following safety hazards caveat pertains only to the test method portion of this specification: *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 and health practices and determine the applicability of regulatory limitations prior to use.*

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:*[2]

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

C125 Terminology Relating to Concrete and Concrete Aggregates

C138/C138M Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

C157/C157M Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

C185 Test Method for Air Content of Hydraulic Cement Mortar

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

C702/C702M Practice for Reducing Samples of Aggregate to Testing Size

C827/C827M Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures

C939/C939M Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)

C1090/C1090M Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout

C1437 Test Method for Flow of Hydraulic Cement Mortar

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology C125.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *consistency, flowable, n*—a grout consistency having a flow of 125 to 145 by the flow test in accordance with the applicable provisions of Test Method C1437; the flow after 5 drops of the flow table in 3 s.

3.2.2 *consistency, fluid, n*—a grout consistency having a time of efflux of 10 to 30 s when tested by the flow cone procedure of Test Method C939/C939M.

3.2.3 *consistency, plastic, n*—a grout consistency having a flow of 100 to 125 by the flow test in accordance with the applicable provisions of Test Method C1437; the flow after 5 drops of the flow table in 3 s.

4. Ordering Information

4.1 When the purchaser specifies that properties of the packaged, dry grout meet the requirements of this specification, also specify which, if any, of the optional requirements apply.

4.2 When the grout is to be used in contact with stressed tendons or other corrosion-sensitive, load-bearing structural

[1] This specification is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregatesand is the direct responsibility of Subcommittee C09.43 on Packaged Dry Combined Materials.

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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

members, the purchaser shall supply this information to the manufacturer and obtain assurances that the material meets relevant chloride, nitrite, nitrate, sulfide, and sulfate requirements, and any other material limitations imposed by the applicable codes and standards (see Note 1).

4.3 When the grout is to be used in abnormal or aggressive environments, the purchaser shall supply this information to the manufacturer and obtain assurance that the grout has a successful history of performance in the same or similar exposures.

NOTE 1—Since all conditions of use cannot be anticipated, this specification requires nonshrink grout to exhibit no shrinkage when tested in a laboratory-controlled, moist-cured environment, and requires only the reporting of the observed height change, usually shrinkage, when test specimens are subjected to some degree of drying. It is suggested that users consult with manufacturers on specific applications to determine the applicability of specific test results.

5. Materials

5.1 The materials used as ingredients in packaged, dry, grout include hydraulic cement, fine aggregate, and other ingredients.

6. Performance Requirements

6.1 All test specimens for performance evaluation shall be prepared using the highest water-to-solids ratio, maximum flow, or most fluid consistency stated on the package.

6.2 Specimens shall be made at 23.0 ± 2.0°C [73.5 ± 3.5°F] from freshly mixed grout and from grout that has been retained in the mixer for the maximum usable working time allowed by the manufacturer. The results of tests performed on specimens made from both conditions shall meet the requirements prescribed in Table 1.

6.3 Additional specimens shall be prepared from freshly mixed grout and from grout that has been retained in the mixer for the maximum usable working time allowed by the manufacturer using materials and equipment conditioned to temperatures representing the maximum and minimum usable temperatures specified by the manufacturer. The results of tests performed on specimens stored at the temperature extremes shall meet the requirements prescribed in Table 1, except that the compressive-strength requirements do not have to be met at minimum usable temperature.

6.4 Specimens for testing shall be stored continuously at the three required temperatures (23.0 ± 2.0°C [73.5 ± 3.5°F], maximum usable temperature specified by the manufacturer, and minimum usable temperature specified by the manufacturer).

7. Sampling

7.1 Use whole packages of grout selected at random from the lot of grout to be examined.

7.2 Where lesser quantities of grout will serve the purpose, select 3000 g [7 lb] of dry grout from a whole package in accordance with the mechanical-splitter method in Practice C702/C702M. For high-density grouts, adjust the mass to provide an equivalent volume.

TABLE 1 Performance Requirements

	Tests at Standard Conditions		Tests at Minimum Temperature		Tests at Maximum Temperature	
	Fresh Mix	Retained Grout at Maximum Working Time	Fresh Mix	Retained Grout at Maximum Working Time	Fresh Mix	Retained Grout at Maximum Working Time
Highest water to solids ratio, maximum flow, or most fluid consistency	Report Consistency	Report Consistency	Report Consistency	Report Consistency	Report Consistency	Report Consistency
Temperature, °C [°F]	Report	Report	Report	Report	Report	Report
Yield, m^3 [ft^3]	Report	Report	Report	Report	Report	Report
Minimum compressive strength, MPa [psi] at:						
1-day[A]	7.0 [1000]	7.0 [1000]	Report	Report	7.0 [1000]	7.0 [1000]
3-day	17.0 [2500]	17.0 [2500]	Report	Report	17.0 [2500]	17.0 [2500]
7-day	24.0 [3500]	24.0 [3500]	Report	Report	24.0 [3500]	24.0 [3500]
28-day	34.0 [5000]	34.0 [5000]	Report	Report	34.0 [5000]	34.0 [5000]
Early height change (maximum % at time of final setting)	+4.0 %	+4.0 %	+4.0 %	+4.0 %	+4.0 %	+4.0 %
Height change of moist cured hardened grout:						
1-day	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %
3-day	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %
14-day	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %
28-day	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %	0.0 to +0.3 %

[A] When required, the purchaser shall specify in the purchase contract.