



Designation: C1933/C1933M – 24

Standard Test Methods for Floor Patching and Skim Coating Compounds Containing Hydraulic Cements¹

This standard is issued under the fixed designation C1933/C1933M; 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 These test methods are appropriate to evaluate the performance of floor patching compounds containing hydraulic cements that are used to improve the levelness, smoothness, and flatness of existing floors. These materials may be used as an underlayment to receive floor finishes. The compounds covered by these test methods consist of proprietary blends of hydraulic cements, along with fine aggregate, polymers, fillers, and other additives. This standard does not apply to testing self-leveling mortars as defined in Test Methods C1708/C1708M.

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 are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.2.1 If required results obtained from another standard are not reported in the same system of units as used by this standard, it is permitted to convert those results using the conversion factors found in the SI Quick Reference Guide.

1.3 The text of these test methods 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 this standard.

1.4 *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—Hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.)²

¹ These test methods are under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.43 on Packaged Dry Combined Materials.

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² Section on Safety Precautions, Manual of Aggregate and Concrete Testing, *Annual Book of ASTM Standards*, Vol 04.02.

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 50 mm [2 in.] Cube Specimens)

C125 Terminology Relating to Concrete and Concrete Aggregates

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

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

C348 Test Method for Flexural Strength of Hydraulic-Cement Mortars

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

C1005 Specification for Reference Masses and Devices for Determining Mass and Volume for Use in Physical Testing of Hydraulic Cements

C1107/C1107M Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

C1708/C1708M Test Methods for Self-leveling Mortars Containing Hydraulic Cements

C1857/C1857M Test Method for Evaluating the Adhesion (Pull-Off) Strength of Concrete Repair and Overlay Mortar

F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring

3. Terminology

3.1 *Definitions*—For definitions of terms used in these test methods, refer to Terminology C125.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *floor patching and skim coating compound, n*—trowelable material typically used in thickness less than 12 mm [0.5 in.] and down to a feather edge usually with a filler with particle sizes not greater than 0.2 mm [0.008 in.]

3.2.2 *time, starting, n*—of floor patching compounds, the time when water is brought into contact with the dry ingredients of a floor patching compound.

3.2.3 *underlayment, n*—in flooring, a layer of material usually placed upon the sub-floor that provides an acceptable base for floor covering.

3.2.4 *moisture resistance, n*—of floor patching compound, the ability of a compound to retain its properties after storage under tap water.

4. Significance and Use

4.1 The test methods in this standard are used to evaluate freshly mixed properties such as trowelability as well as hardened properties such as setting time, compressive strength, flexural strength, moisture resistance and bonding strength of floor patching compounds.

4.2 Tests are conducted under standardized conditions for comparative purposes and results are not intended to be representative of performance under field conditions.

5. Standard Laboratory Conditions

5.1 Unless otherwise specified, curing and testing of specimens shall be conducted at Standard laboratory conditions defined in Specification C511 as a cement mixing room. Water storage should be in tanks with a temperature defined in Specification C511 as a water storage tank.

6. Sampling

6.1 Sample according to the Sampling section of Specification C1107/C1107M.

7. Mixing

7.1 Apparatus:

7.1.1 Use the mixer and scraper as specified in Practice C305. The standard batch size when using a 4.73 L [5 qt.] capacity double planetary mixer is approximately 1750 ml [1.8 qt.] of freshly mixed compound (See Note 1). The batch size is about 35 % of volume of the 4.73 L [5 qt.] mixing bowl. Batch sizes less than 30 % or more than 40 % of mixing bowl volume can change the measured properties of the floor patching compound.

NOTE 1—To determine the mass of solid material and water required to make the required volume of freshly mixed compound, a typical freshly mixed density of 1650 kg/m³ [100 lb/ft³] may be assumed for the patching compound. If the compound has a freshly mixed density less than 1540 kg/m³ [95 lb/ft³], the actual density should be used to determine the masses of liquid and dry materials to obtain the required batch volume.

7.1.2 Weighing devices used in determining the mass of materials shall conform to Specification C1005.

7.1.3 A timer accurate to 1 s with a range of at least 60 min.

7.2 Procedure:

7.2.1 Mix the floor patching compound with liquid as prescribed by the manufacturer. In the absence of manufacturer's instructions, the liquid content shall be adjusted to provide a creamy, trowelable compound that does not deform after troweling.

NOTE 2—Water is the most common mixing liquid although latex admixtures or other liquids may be recommended by some manufacturers.

7.2.2 Add the entire quantity of mixing liquid to the bowl. Start the mixer on speed 1 and start the timer. Mix times are to be within ± 5 s of the specified times.

7.2.3 Add the dry floor patching compound to the mixer while mixing at speed 1 during the first 30 s.

7.2.4 Mix for an additional 30 s period, at speed 1.

7.2.5 Stop the mixer and scrape down into the batch any compound that may have collected on the side of the bowl or blade. Complete the task within 30 s.

7.2.6 Mix at speed 1 for 30 s.

7.2.7 Batch mixing is complete when the total time is 100 s to 140 s.

7.2.8 If mortar accumulates on the sides of the bowl during mold filling, scrape down any compound adhering to the side of the bowl before remixing.

8. Physical Properties

8.1 The following test methods are used to characterize the time of setting and strength of the floor patching compound and will require several batches to complete the testing. For valid comparisons, all tests shall be conducted with patching compound at the same liquid content using the amount and type of liquid prescribed by the manufacturer (See Note 2). In the absence of manufacturer's instructions the correct liquid content shall be established by using an initial trial batch to achieve the consistency described in 7.2.1. The trial batch shall not be used for specimen preparation. Mix additional batches of patching compound using the same amount of liquid as was established by the trial batch. Use freshly mixed material for each test.

8.2 Setting Time:

8.2.1 *Scope*—This method covers the determination of the time of initial setting and time of final setting of floor patching compounds using the Vicat apparatus. Either procedure A or B as defined in Test Method C191 is acceptable.

8.2.2 *Significance and Use*—This test method determines the setting time of floor patching compounds mixed to the normal placement consistency as defined in 7.2.1. Special precautions are taken to ensure a proper seal around the Vicat ring.

8.2.3 *Apparatus*—Vicat Apparatus, in accordance with Test Method C191.

8.2.4 *Test Specimen*—The test specimen shall consist of at least 300 mL of floor patching compound taken from a freshly-mixed batch prepared in accordance with 7.2.

8.2.5 Procedure:

8.2.5.1 Seal the Vicat ring to the base plate in one of the following ways:

(1) *Sealing wax method*: Warm the Vicat conical ring and base plate to approximately 100 °C [212 °F]. Apply a thin film of paraffin wax to the base of the conical ring and the