Standard Method of Test for

Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete

AASHTO Designation: T 155-13 (2021)

Technically Revised: 2013 **Reviewed but Not Updated: 2021** **Editorially Revised: 2021**

Technical Subcommittee: 3b, Fresh Concrete

ASTM Designation: C156-11

AASHTO

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1. SCOPE

1.1. This test method covers laboratory determination of the efficiency of liquid membrane-forming compounds for curing concrete, as measured by their ability to reduce moisture loss from mortar specimens during the early hardening period.

1.2. The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information purposes only.

1.3. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns 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.*

Warning—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.

1.4. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of R 18 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with R 18 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of R 18 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 85, Portland Cement
- R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
- T 71, Effect of Organic Impurities in Fine Aggregate on Strength of Mortar

2.2. *ASTM Standards*:

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

- C778, Standard Specification for Standard Sand
- D1475, Standard Test Method for Density of Liquid Coatings, Inks, and Related Products
- D1644, Standard Test Methods for Nonvolatile Content of Varnishes
- D1653, Standard Test Methods for Water Vapor Transmission of Organic Coating Films
- E178, Standard Practice for Dealing with Outlying Observations

3. SIGNIFICANCE AND USE

3.1. The moisture retaining ability of a product as determined by this test method is used to assess the suitability of materials for contributing to an appropriate curing environment for concrete. The laboratory test method is used both in formulating and in specifying or qualifying curing products. This test method gives the user a measure of the ability of tested curing materials to impede the escape of moisture from a hydraulic cement mortar. Since it is desirable to retain moisture in fresh concrete to promote the hydration process, failure of the product to minimize the escape of moisture may lead to loss of strength, cracking, shrinkage, or low abrasion resistance of the hardened concrete, or a combination thereof.

3.2. Many factors affect the laboratory test results. Test results obtained may be highly variable as indicated by the precision statement. Critical factors include the precision of the control of the temperature, humidity, and air circulation in the curing cabinet; preparation and sealing of the mortar specimens; the age and surface condition of the mortar specimen when the curing product is applied; and the uniformity and quantity of application of the curing membrane.

4. APPARATUS

4.1. *Mechanical Mortar Mixer*—as described in ASTM C305, or a larger size mixer operating on the same principle.

4.2. *Molds*—Molds shall be made of metal, glass, hard rubber, or plastic and shall be watertight and rigidly constructed to prevent distortion during molding of the specimens or handling the mold containing fresh mortar. They shall have a minimum surface area of 12 000 mm^2 (18.6 $in.^2$) and a minimum depth of 19 mm ($^3/_4$ in.). The top surface shall be round, square, or rectangular with length not more than twice the width. The top of the mold shall have a rim to provide a firm level surface to support the wood float and to facilitate the grooving and sealing steps of the procedure. The rim shall be parallel with the bottom surface of the mold.

Note 1—Take care to avoid use of an excessive amount of oil, grease, or mold release compound on molds, particularly along the top rim where sealing compound will be applied. Use of masking tape on the top rim during application of release compound to prevent contamination has been found to be expedient.

4.3. *Gloves*—of rubber or plastic to be worn while molding the specimens.

4.4. *Tamper*—of a nonabsorptive, nonabrasive material such as medium-hard rubber or seasoned oak rendered nonabsorptive by immersion for 15 min in paraffin at approximately 200°C. The tamper shall be rectangular with a 25-by-50-mm (1-by-2-in.) cross section and it shall be a convenient length (150 to 300 mm (6 to 12 in.)).

4.5. *Wood Float*—approximately 75 by 280 by 20 mm thick (3 by 11 by $^3/_4$ in.).

Note 2—A commercial wood float equipped with a substantial handle can be readily reduced to these dimensions. The float shall be resurfaced or replaced when there is noticeable wear to the floating surface.