



Designation: C 1315 – 03

## Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete<sup>1</sup>

This standard is issued under the fixed designation C 1315; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification provides requirements for membrane-forming liquids suitable for use as curing compounds and sealers on freshly placed concrete and as sealers on hardened concrete. These membranes have special properties, such as, alkali resistance, acid resistance, adhesion-promoting qualities, and resistance to degradation by UV light.

1.2 The values stated in SI units are to be regarded as the standard. (Inch pound units are shown in parentheses).

1.3 The following precautionary caveat pertains only to the test methods portion, Section 8, 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.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- C 156 Test Method for Water Retention by Concrete Curing Materials<sup>2</sup>
- D 56 Test Method for Flash Point by Tag Closed Tester<sup>3</sup>
- D 869 Test Method for Evaluating Degree of Settling of Paint<sup>4</sup>
- D 1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes<sup>4</sup>
- D 1309 Test Method for Settling Properties of Traffic Paints During Storage<sup>4</sup>
- D 1544 Test Method for Color of Transparent Liquids (Gardner Color Scale)<sup>5</sup>
- D 1734 Practice for Making Cementitious Panels for Testing Coatings<sup>4</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.22 on Materials Applied to New Concrete Surfaces.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.02.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 05.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 06.02.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 06.01.

- D 2369 Test Method for Volatile Content of Coatings<sup>5</sup>
- D 2371 Test Method for Pigment Content of Solvent Reducible Paints<sup>5</sup>
- D 3723 Test Method for Pigment Content of Water-Emulsion Paints by Low-Temperature Ashing<sup>5</sup>
- D 4541 Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers<sup>4</sup>
- E 1347 Test Method for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry<sup>5</sup>
- G 53 Practice for Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials<sup>6</sup>

#### 2.2 Other Standard:

- ANSI A136.1–1992 Type I Organic Adhesives for Installation of Ceramic Tile<sup>7</sup>

### 3. Classification

3.1 The following types of liquid membrane-forming compounds are included:

- 3.1.1 *Type I*—Clear or translucent, and
- 3.1.2 *Type II*—White pigmented.

3.2 The curing compound shall conform to one of the following classes:

- 3.2.1 *Class A* curing compounds conform to the requirements of 6.4.1, and are essentially non-yellowing,
- 3.2.2 *Class B* curing compounds conform to the requirements of 6.4.2, where moderate yellowing is not prohibited, and
- 3.2.3 *Class C* curing compounds are not restricted with regard to yellowing or darkening, and are for use where the color changes are acceptable.

NOTE 1—Polymer materials known to satisfy the durability requirements of this document include, but are not limited to, chlorinated rubbers, styrene-acrylate and styrene-butadiene copolymers. These polymers have demonstrated their durability by their ability to adhere to concrete and not be affected by the alkalis from cement.

NOTE 2—Pigmented colors other than white, or other special attributes, are beyond the scope of this specification and are subject to negotiation

<sup>6</sup> Discontinued; see 1999 *Annual Book of ASTM Standards*, Vol 14.02.

<sup>7</sup> American National Standard Specifications for the Installation of Ceramic Tile, 1992, Tile Council of America, P.O. Box 1787, Clemson, SC 29633-1787.

between the purchaser and the supplier.

#### 4. Ordering Information

4.1 The purchaser shall include the following information in the purchase order when applicable:

4.1.1 Type and class of liquid membrane-forming compound to be furnished,

4.1.2 Rate of application to be used to determine conformance to this specification,

4.1.2.1 For Type I compounds if not specified, the liquid membrane-forming material shall be applied by uniform spraying at a rate of 7.4 m<sup>2</sup>/L (300 ft<sup>2</sup>/gal) for testing purposes.

4.1.2.2 For Type II compounds, if not specified, the liquid membrane-forming material shall be applied by uniform spraying at a rate of 5.0 m<sup>2</sup>/L (200 ft<sup>2</sup>/gal) for testing purposes.

NOTE 3—The application rate used for testing may or may not be the same as the rate used for field application. Many agencies use the same rate for field application on relatively smooth surfaces as the rate used for testing, while requiring a substantially greater application rate on deeply textured surfaces.

4.1.3 The intended method of application (for example: spraying, brushing, or by roller). If not specified, materials shall be of a sprayable consistency.

#### 5. General Requirements

5.1 Type I liquid membrane-forming compound shall be clear or translucent and have a minimum of 25 % solids by mass when tested in accordance with 8.5.

5.2 Type II liquid membrane-forming compound shall consist of finely divided white pigment and vehicle integrally ready mixed for immediate use as is and have a minimum of 25 % vehicle solids by mass when tested in accordance with 8.6. The membrane-forming compound shall present a uniform white appearance when applied uniformly to a new concrete surface at the specified rate of application.

NOTE 4—Although this is a performance specification, a minimum vehicle solids content is specified in order to provide an approximately 0.025 mm (1 mil) thick dry film at the specified rate of application. This film thickness is considered necessary to achieve the desired characteristics.

5.3 Liquid membrane-forming compounds shall be of such a consistency that they can be readily applied by spraying, or by brushing or rolling, to form a uniform coating at temperatures above 4°C (40°F).

NOTE 5—For uniform application in the field on vertical concrete surfaces, the specified rate of application may be achieved by two coats, each applied at one half the normal rate with approximately 1 h drying time between coats or in accordance with manufacturer's recommendations.

5.4 Liquid membrane-forming compounds shall adhere to freshly-placed concrete that has stiffened or set sufficiently to resist marring during application. Liquid membrane-forming compounds shall also adhere to damp or dry, hardened concrete surfaces. In every case, the compound shall form a continuous film after application at the specified rate.

5.5 Liquid membrane-forming compounds shall not react deleteriously with concrete. Deleterious reactions are detected by scratching the surface of a mortar specimen used for the

water-retention test with a knife or screwdriver, not less than 72 h after application, and comparing with the surface hardness similarly determined on a similar specimen that has been moist cured for one half the time. Any softening of the treated surface shall be considered sufficient cause for rejection of the compound.

5.5.1 Testing for deleterious reactions is not needed on a routine basis. However, it must be done when testing compounds of a new or unknown composition.

5.6 Liquid membrane-forming compounds shall be storable for at least 6 months without deterioration. Compounds of the water emulsion type shall not be exposed to freezing. Type II liquid membrane-forming compounds shall be capable of being mixed to a uniform consistency by stirring or agitation. When tested for long term settling, as is stated in 8.4, the compound shall have a rating of not less than 4.

5.7 The volatile portion of liquid membrane-forming compounds shall be of materials that are neither toxic<sup>8</sup> nor have flash points of less than 38°C (100°F) when tested in accordance with 8.7. In all cases the volatile material shall meet applicable air-pollution control requirements.

#### 6. Specific Characteristics

6.1 Liquid membrane-forming compounds, when tested in accordance with 8.1 shall restrict the loss of water to not more than 0.40 kg/m<sup>2</sup> in 72 h.

6.2 *Reflectance Properties*—Type II liquid membrane-forming compounds, when tested in accordance with 8.2 shall exhibit a daylight reflectance of not less than 65 %. Reflectance properties are only for white pigmented materials.

6.3 *Drying Time*—Liquid membrane-forming compounds, when tested in accordance with 8.3 shall dry to touch in not more than 4 h.

6.4 *Ultraviolet Light (UV) Degradation-Yellowing*—When tested in accordance with 8.8.6, compounds shall be durable and remain as a complete film, free of blisters, peeling, or flaking on the surface of the mortar panel.

6.4.1 Class A Type I or Type II compounds shall have a color equal to or lighter than Gardner Color Standard No. 1 when tested in accordance with 8.8.6.

6.4.2 Class B Type I or Type II compounds shall have a color equal to or lighter than Gardner Color Standard No. 3 when tested in accordance with 8.8.6.

6.4.3 Class C shall not be tested for yellowing.

6.5 *Acid and Alkali Resistance:*

6.5.1 The cured membrane, when tested in accordance with 8.8.7 for 48 h, shall not pin-hole, blister or disintegrate.

<sup>8</sup> Toxicity is dependent on the type of material, duration of exposure, and concentrations. Concentrations will depend on conditions under which the membrane-forming compound is used, that is, in an enclosed space, outside without wind, or outside with wind. Relative toxicity of some materials may be determined from the current edition of "Threshold Limit Values of Airborne Contaminants Adopted by ACGIH" available from the American Conference of Governmental Industrial Hygienists, P.O. Box 1937, Cincinnati, OH 45201. OSHA standards should be consulted.