



Designation: C 957 – 05a

Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Integral Wearing Surface¹

This standard is issued under the fixed designation C 957; 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 describes the required properties and test methods for a cold liquid-applied elastomeric membrane for waterproofing building decks not subject to hydrostatic pressure. The specification applies only to a membrane system that has an integral wearing surface. This specification does not include specific requirements for skid resistance or fire retardance, although both may be important in specific uses.

1.2 The type of membrane system described in this specification is used for pedestrian and vehicular traffic and in high-abrasion applications. The membrane may be single- or multi-component, and may consist of one or more coats (for example base coat, top coat, etc.). The coat(s) may be built to the desired thickness in one or more applications. One coat (base coat) provides the primary waterproofing function and normally comprises the major amount of organic material in the membrane. The function of the top coat(s) is to resist wear and weather. Aggregate may be used as a component of the membrane system, as all or part of a course, to increase wear and skid resistance.

1.3 The committee with jurisdiction over this standard is not aware of any comparable standards published by other organizations.

1.4 Test methods in this specification require a minimum 0.5-mm (0.020-in.) base coat dry film thickness. Actual thickness required for a particular application and the use of aggregate in topcoats shall be established by the membrane manufacturer.

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

1.6 The following safety hazards caveat pertains only to the test method portion, Section 5, of this specification: *This standard does not purport to address all of the safety problems, 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:²

- C 501 Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser
- C 717 Terminology of Building Seals and Sealants
- C 719 Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
- C 794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
- C 836 Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D 471 Test Method for Rubber Property—Effect of Liquids
- D 609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings, and Related Coating Products
- D 822 Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
- D 1133 Test Method for Kauri-Butanol Value of Hydrocarbon Solvents
- D 2370 Test Method for Tensile Properties of Organic Coatings
- G 151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
- G 152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
- G 153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

¹ This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.22 on Waterproofing and Dampproofing Systems.

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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.

2.2 *U.S. Department of Commerce Standard: Product Standard PS-1, Construction and Industrial Plywood*³

3. Terminology

3.1 *Definitions*—Refer to Terminology **C 717** for definitions of terms used in this guide.

4. Physical Requirements

4.1 *Material*—Membrane materials shall cure, after application by spreading or spraying, to form an elastomeric film system composed of one or more layers and capable of maintaining a seal against water despite the existence or development of small (1.6 mm (1/16 in.) maximum) cracks in the substrate. It must maintain complete integrity under pedestrian or vehicular traffic.

4.2 *Package Stability*—The membrane material shall be capable of meeting the requirements of this specification if aged for 6 months from the date of manufacture in sealed containers at a temperature of $27 \pm 1^\circ\text{C}$ ($80 \pm 2^\circ\text{F}$).

4.3 *Weight Loss*—The base coat shall have an average weight loss not exceeding 40 % when tested as specified in the Test Method section of Specification **C 836**. A separate top coat or primer, or both, if required by manufacturer, shall comply with the manufacturer's specifications.

4.4 *Low-Temperature Flexibility and Crack Bridging*—When tested as specified in **5.5**, the base coat shall exhibit no cracking. A separate top coat may crack provided that the base coat beneath maintains its integrity.

4.5 *Adhesion-in-Peel After Water Immersion*—The average peel strength of the base coat shall be not less than 875 N/m (5 lbf/in.) on concrete and not less than 525 N/m (3 lbf/in.) on plywood when tested as specified in **5.6**.

4.6 *Chemical Resistance*—The separate membrane components, excluding primer and aggregate, shall have a minimum average tensile retention of 70 % in water, 70 % in ethylene glycol, and 45 % in mineral spirits when tested as specified in **5.7**.

4.7 *Weathering Resistance and Recovery from Elongation*—The average recovery from elongation shall be no less than 90 %, the average tensile retention shall be no less than 80 %, and the average elongation retention shall be no less than 90 % when tested as specified in **5.8**.

4.8 *Abrasion Resistance*—The weight loss shall be no greater than 50 mg when tested as specified in **5.9**.

5. Test Methods

5.1 *Standard Conditions*—Standard conditions for all tests shall be $23 \pm 2^\circ\text{C}$ (70 to 77°F) and $50 \pm 5\%$ relative humidity:

5.2 *Conditioning and Mixing:*

5.2.1 Store all membrane materials to be tested in an unopened container at standard conditions for at least 24 h before preparing any test specimens.

5.2.2 Follow the manufacturer's instructions for all mixing and preparation of membrane materials.

5.3 *Substrates*—In addition to the substrates specified herein, conduct tests on such other substrates as may be required by the specifier.

5.4 *Primer*—When required by the manufacturer, use a primer, as directed by the manufacturer, on all substrate materials in all test assemblies.

5.5 *Low-Temperature Flexibility and Crack Bridging*—Perform the test as specified in the Test Method section of Specification **C 836**, and conform to specified requirements. Make the following changes in the test method of Specification **C 836**.

5.5.1 Use equipment similar to that in Test Method **C 719**. Other equipment, such as an automatic tension-compression test machine fitted with an environmental chamber, is permissible, provided it can give the required strain rates and environment.

5.5.2 Use 25.4 by 25.4 by 50.8 mm (1 by 1 by 2 in.) mortar blocks.

5.5.3 Cement aluminum angles 75 by 50 by 25 mm (3 by 2 by 1 in.), positioned with the 50-mm legs pointed down, to the bottom of the mortar blocks with an epoxy adhesive for insertion into an automatic compression and extension machine.

5.5.4 Test the total membrane system (primers, base coat(s) and top coat(s)) including any aggregate specified. Total thickness of the cured membrane, excluding aggregate, shall be a minimum of 0.5 mm (0.020 in.).

5.5.5 Extend the blocks until the space between each is 1.6 mm (1/16 in.) rather than 3.2 mm (1/8 in.).

5.6 *Adhesion-in-Peel after Water Immersion*—Perform the test as specified in Test Method **C 794** with the following qualifications: 8377-83645145ba53/astm-c957-05a

5.6.1 Cement mortar shall be used as the test substrate. Additional substrates, such as plywood, shall be used when specified.

5.6.2 Test only the base coat and any primer.

5.6.3 Cast the base coat in the thickness specified by the manufacturer for one coat of the base coat, or the wet-film thickness necessary to attain a dry-film thickness of 0.5 mm (0.020 in.), whichever is greater. Follow the instructions of the manufacturer regarding the time of placement of the airplane cloth or aluminum screen.

5.6.4 For testing on plywood, use the A side of Exterior Type Marine Grade AA, AB, or AC plywood conforming to U.S. Department of Commerce, Plywood Standard PS-1 as the substrate.

5.6.5 The sample shall be cured 2 weeks at standard conditions followed by 1 week at 70°C (158°F).

5.7 *Chemical Resistance*—Perform the test for change in tensile strength as specified in Test Method **D 471**, with the following qualifications:

5.7.1 Cast test samples of the base coat to a minimum cured thickness of 0.5 mm (0.020 in.) in accordance with the directions of the manufacturer. Test any required top coats separately from the base coat. Cast the top coat test samples

³ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.