



Standard Specification for Liquid-Applied Silicone Coating Used in Spray Polyurethane Foam Roofing¹

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1. Scope

1.1 This specification covers a liquid-applied solvent dispersed elastomeric coating used as a roofing membrane for spray polyurethane foam (SPF) insulation whose principal polymer in the dispersion contains more than 95 % silicone.

1.2 This specification does not provide guidance for application.

1.3 The following precautionary caveat pertains only to the test method portions, Sections 5 and 6.

1.4 SI units are used throughout this document. Inch-pound units are in parentheses.

1.5 *This standard may involve hazardous materials, operations, and equipment. 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 requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- C 794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants²
- D 16 Terminology for Paint and Related Coatings, Materials, and Applications³
- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension⁴
- D 522 Test Methods for Mandrel Bend Test of Attached Organic Coatings³
- D 624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers⁴
- D 903 Test Method for Peel or Stripping Strength of Adhesive Bonds⁵
- D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials⁶
- D 1644 Test Method for Nonvolatile Content of Varnishes³

¹ This specification is under the jurisdiction of ASTM Committee D08 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.06 on Spray Polyurethane Foam Roof Systems.

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² *Annual Book of ASTM Standards*, Vol 04.07.

³ *Annual Book of ASTM Standards*, Vol 06.01.

⁴ *Annual Book of ASTM Standards*, Vol 09.01.

⁵ *Annual Book of ASTM Standards*, Vol 15.06.

⁶ *Annual Book of ASTM Standards*, Vol 04.04.

D 2196 Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer³

D 2370 Test Method for Tensile Properties of Organic Coatings³

D 2697 Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings³

E 96 Test Methods for Water Vapor Transmission of Materials⁷

G 151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources⁷

G 154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials⁸

3. Terminology

3.1 Definitions in Terminologies D 16 and D 1079 shall apply to this specification.

4. Materials and Manufacture

4.1 *Composition*—The product, as manufactured, shall be in liquid form for application to SPF surfaces by brushing, squeegeeing, rolling, or spraying. The product shall be composed of dispersion containing as the principal polymer more than 95 % silicone polymers to which various pigments and other additives have been added to give the required physical properties.

5. Liquid and Physical Properties

5.1 Although the product is supplied as a liquid, its performance is based on the functional properties of the cured material in film form. The coating is formed into a film fully adhered to the substrate.

5.2 *Liquid Property Requirements*—The liquid coating shall comply with the property requirements in Table 1.

5.3 *Cured Film Physical Property Requirements:*

5.3.1 *Specimen Preparation (Dry Time) (Table 2)*—Films are prepared by applying two coats, with a minimum of an 8-h drying period between coats, to a polyethylene sheet substrate (from Test Method D 2370, 8.2.2) to give a total dry film thickness of 0.50 ± 0.5 mm (20 ± 2 mils). The film is allowed to thoroughly dry at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) and 50 ± 10 %

⁷ *Annual Book of ASTM Standards*, Vol 04.06.

⁸ *Annual Book of ASTM Standards*, Vol 14.04.

TABLE 1 Liquid Property Requirements

Physical Properties	ASTM Standard	Requirements
Viscosity	D 2196	3500 to 50 000 CPS
Volume solids	D 2697	57 % min
Weight solids	D 1644	As listed by manufacturer

TABLE 2 Film Physical Property Requirements for Cured Silicone Coating for Use on Spray Polyurethane Foam

Physical Property	ASTM Standard	Requirement
Initial percent elongation (break)	D 412	min 100 %
Initial tensile strength (maximum stress)	D 412	min 1.03 MPa (150 psi)
Final percent elongation (break) after accelerated weathering after 1000 h	D 412	min 100 %
Permeance	E 96 Procedure B	min 14.3×10^{-8} g/Pa·s·m ² (2.5 U.S. Perms)
Accelerated weathering 5000 h	G 151 G 154	No cracking or checking; maintain at least 50 % of initial elongation
Adhesion to SPF	C 794 D 903	Min 350 N/m (2.0 pli) wet
Tear resistance	D 624	Min 3.5 kN.m (20 lb ft/in.)
Low-temperature flexibility	D 522	Min pass 1.27 cm (½ in.) mandrel -26°C (-15°F)

relative humidity for 336 ± 12 h. The film shall be removed from the release paper and turned over after the first 168 h to allow for complete drying.

6. Test Methods

6.1 *Viscosity (Test Methods D 2196):*

6.1.1 Viscometer: Brookfield LVT viscometer #4 spindle, 6 rpm.

6.2 *Elongation and Tensile Strength (Test Methods D 412):*

6.2.1 Test methods: $23 \pm 2^\circ\text{C}$ at $50 \pm 10\%$ ($73 \pm 3.6^\circ\text{F}$)/relative humidity and $-18 \pm 2^\circ\text{C}$ ($0 \pm 2^\circ\text{F}$).

6.2.2 Cut specimen measuring 75 mm (3 in.) long by 13 mm $\pm 10\%$ (½ in.) wide.

6.2.3 *Test Type or Functional Equivalent:*

Crosshead speed	25 mm/min (1.0 in./min)
Gage length	25 mm (1.0 in.)

6.3 *Accelerated Weathering Method (Practices G 151, G 154):*

Cycle used	4-h UV, 4-h condensation
Temperature	60°C UV, 50°C condensation
Duration (minimum)	5000 h
Lamp	UVA 340

6.4 *Permeance Method (Test Method E 96, Procedure B)—A 0.5-mm (20 mils) $\pm 10\%$ film shall be used.*

6.4.1 Test conditions: $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$)

6.4.2 Test is run in the inverted position with water in contact with the film.

6.4.3 Value is reported in inch-pound and SI units.

6.5 *Adhesion to Specified Substrate Method (Test Methods C 794 or D 903):*

6.5.1 Crosshead speed 50 mm (2 in.)/min.

6.5.2 Specimens are prepared by brush applying two coats to the specified substrate with the cloth strip (as described in Test Methods C 794 and D 903) embedded between the coats to give a total dry film thickness of 0.5 mm (20 mils) $\pm 10\%$. The panels are allowed to dry for 336 ± 12 h at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) $50 \pm 10\%$ relative humidity before testing for wet adhesion. If a primer is specified, it shall be applied per the manufacturer's or supplier's direction.

6.6 *Tear Resistance Method (Test Method D 624):*

6.6.1 Die C.

6.7 *Low-Temperature Flexibility Method (Test Method D 522):*

6.7.1 Directly cast films to aluminum substrate to result in a dry film thickness of 0.35 mm (14 mil $\pm 10\%$) and allow to dry 72 h at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) and $50 \pm 10\%$ relative humidity followed by 120 h at 50°C before testing.

7. Product Marking

7.1 Shipping containers shall be marked with the name of the material, the stock number, lot number, ASTM designation number and year of issue, quantity therein, shelf-life date, and the name of the manufacturer or supplier, unless otherwise agreed upon between supplier and purchaser.

8. Inspection

8.1 Inspection of the material shall be as agreed upon by involved parties.

9. Rejection and Resubmittal

9.1 Failure to conform to any one of the requirements prescribed in this specification shall constitute grounds for rejection. The seller shall have the right to reinspect the rejected shipment and resubmit the lot after removal of those packages not conforming to the specified requirements.

10. Precision and Bias

10.1 The precision statements for the test methods included in this specification are under development.

11. Keywords

11.1 elastomeric coating; roof; silicone; spray polyurethane foam

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