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## Standard Specification for Liquid-Applied Silicone Coating Used in Spray Polyurethane Foam Roofing Systems<sup>1</sup>

This standard is issued under the fixed designation D 6694; 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 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:<sup>2</sup> E794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants~~

D 16 ~~Terminology for Paint, Related Coatings, Materials, and Applications~~ ~~D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension~~

D 522 ~~Test Methods for Mandrel Bend Test of Attached Organic Coatings~~

D 624 ~~Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers~~

D 903 ~~Test Method for Peel or Stripping Strength of Adhesive Bonds~~

D 1079 ~~Terminology Relating to Roofing and Waterproofing~~

D 1644 ~~Test Methods for Nonvolatile Content of Varnishes~~

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

D 2370 ~~Test Method for Tensile Properties of Organic Coatings~~

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

D 4798 ~~Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method)~~

E 96/E 96M ~~Test Methods for Water Vapor Transmission of Materials~~

G151 ~~Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources~~

G154 ~~Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials~~ ~~Test Methods for Water Vapor Transmission of Materials~~

### 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.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.06 on Spray Polyurethane Foam Roof Systems.

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<sup>2</sup> 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.

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 ± 2°C (73.4 ± 3.6°F) and 50 ± 10 % 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 Method D 2370)*:

6.2.1 Test methods: 23 ± 2°C at 50 ± 10 % (73 ± 3.6°F)/relative humidity and -18 ± 2°C (0 ± 2°F).

6.2.2 Cut specimen measuring 75 mm (3 in.) long by 13 mm ± 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 G151, G154~~

6.3 *Accelerated Weathering (Practice D 4798)*:

Cycle used	4-h UV, 4-h condensation
Cycle employed	A
Temperature	60°C UV, 50°C condensation 63 ± 3°C
Uninsulated black panel temperature	63 ± 3°C
Filter	Daylight
Duration (minimum)	5000-h
Radiant exposure (minimum)	5000-h
Lamp	UVA-340
Lamp	UVA 3406300 KJ/(m <sup>2</sup> · nm) at 340 nm
	756 MJ/m <sup>2</sup> at 300 to 400 nm

NOTE 1—In Practice D 4798, the water temperature used for the specimen spray during exposure to light is specified as 7.2 ± 3°C (45 ± 5°F) to provide a thermal shock to the specimens. If thermal shock is not required for D 6694 specimens, the water temperature can be 21 ± 5°C (70 ± 9 °F), the typical temperature of water used for specimen spray. However, if ambient temperature is low and a holding tank is not used to store purified water, the temperature of water can be below the typical range.

NOTE 2—Based on the irradiance level of 0.35 W/(m<sup>2</sup>· nm) at 340 nm specified in Practice D 4798, the exposure time required to accumulate the radiant energy specified in 6.3 is 5000 h.

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

6.4.1 Test conditions: 23 ± 2°C (73.4 ± 3.6°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 C794 or Method 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 C794 and Method D 903) embedded between the coats to give a total dry film thickness of 0.5 mm (20 mils) ± 10 %. The panels are allowed to dry for 336 ± 12 h at 23 ± 2°C (73.4 ± 3.6°F) 50 ± 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 ± 10 %) and allow to dry 72 h at 23 ± 2°C (73.4 ± 3.6°F) and 50 ± 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.

**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