



Designation: D6694/D6694M – 15 (Reapproved 2023)

Standard Specification for Liquid-Applied Silicone Coating Used in Spray Polyurethane Foam Roofing Systems¹

This standard is issued under the fixed designation D6694/D6694M; 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 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 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D16 Terminology for Paint, Related Coatings, Materials, and Applications

¹ This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.09 on Liquid Applied Coatings for Roofing and Asphaltic Concrete Pavement.

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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.

D522/D522M Test Methods for Mandrel Bend Test of Attached Organic Coatings

D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

D903 Test Method for Peel or Stripping Strength of Adhesive Bonds

D1079 Terminology Relating to Roofing and Waterproofing

D1644 Test Methods for Nonvolatile Content of Varnishes

D2196 Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational Viscometer

D2370 Test Method for Tensile Properties of Organic Coatings

D2697 Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings

D4798/D4798M Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method)

E96/E96M Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials

E1953 Practice for Description of Thermal Analysis and Rheology Apparatus

3. Terminology

3.1 Definitions in Terminologies **D16** and **D1079** 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**.

TABLE 1 Liquid Property Requirements

Physical Properties	ASTM Standard	Requirements
Viscosity	D2196	3500 to 50 000 CPS
Volume solids	D2697	57 % min
Weight solids	D1644	As listed by manufacturer

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 D2370, 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 D2196):

6.1.1 Rotational Viscometer (see Practice E1953) with 60 to 70 μ N-m torque full scale equipped with a spindle of the type shown in Fig. 1 (with an active element nominally 3.2 mm in diameter and 31.0 mm in length) at rotational speed of 6 r/min.

6.2 Elongation and Tensile Strength (Test Method D2370):

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 % [$1/2$ 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 (Practice D4798/D4798M):

Cycle employed	A
Uninsulated black panel temperature	63 ± 3 °C
Filter	Daylight
Radiant exposure (minimum)	6300 KJ/(m ² .nm) at 340 nm 756 MJ/m ² at 300 to 400 nm

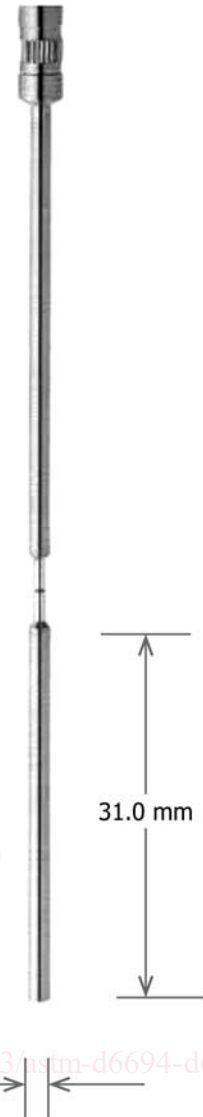


FIG. 1 Spindle Configuration

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)	D2370	min 100 %
Initial tensile strength (maximum stress)	D2370	min 1.03 MPa [150 psi]
Final percent elongation (break) after 5000 h accelerated weathering	D2370	min 100 %
Permeance	E96/E96M Procedure B	min 14.3×10^{-8} g/Pa.s.m ² [2.5 U.S. Perms]
Accelerated weathering 5000 h	D4798/D4798M	No cracking or checking; maintain at least 50 % of initial elongation
Adhesion to SPF	D903	Min 350 N/m [2.0 pli] wet
Tear resistance	D624	Min 3.5 kN.m [20 lb ft/in.]
Low-temperature flexibility	D522/D522M	Min pass 1.27 cm [$1/2$ in.] mandrel -26 °C [-15 °F]

NOTE 1—In Practice D4798/D4798M, 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 D6694/D6694M 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/(m².nm) at 340 nm specified in Practice D4798/D4798M, the exposure time required to accumulate the radiant energy specified in 6.3 is 5000 h.

6.4 Permeance Method (Test Method E96/E96M, 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 Method D903):

6.5.1 Crosshead speed 50 mm [2 in.]/min.