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Standard Specification for Aerosol Polyurethane and Aerosol Latex Foam Sealants[1]

This standard is issued under the fixed designation C1620; 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 the types, grades, and physical properties of aerosol polyurethane and aerosol latex foams extruded from pressurized containers and intended for building envelope air barrier sealant applications in building construction.

1.2 For specific aerosol foam sealant applications, operational temperature limit criteria shall be as agreed upon between the aerosol sealant manufacturer and the purchaser.

1.3 The values in SI units are to be regarded as standard. The values shown in parentheses are for information and approximation only.

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

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 and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C168 Terminology Relating to Thermal Insulation

C390 Practice for Sampling and Acceptance of Thermal Insulation Lots

C717 Terminology of Building Seals and Sealants

C1536 Test Method for Measuring the Yield for Aerosol Foam Sealants

C1642 Practice for Determining Air Leakage Rates of Aerosol Foam Sealants and Other Construction Joint Fill and Insulation Materials

C1643 Test Method to Measuring the Post Dispensing Volumetric Expansion of Aerosol Foam Sealants

C1737 Guide for Evaluating Temperature Effects to Aerosol Foam Sealant During and After Dispensing

D883 Terminology Relating to Plastics

D6226 Test Method for Open Cell Content of Rigid Cellular Plastics

E84 Test Method for Surface Burning Characteristics of Building Materials

E283 Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

E814 Test Method for Fire Tests of Penetration Firestop Systems

E2690 Practice for Specimen Preparation and Mounting of Caulks and Sealants to Assess Surface Burning Characteristics

IEEE/ASTM SI 10 American National Standard for Use of the International System of Units (SI) (The Modernized Metric System)

2.2 *Other Documents:*

SPFA Document AY119 Glossary of Terms Common to the Polyurethane Foam Industry[3]

CAN/CGSB 51.93 Air Barrier Materials[4]

CAN/ULC-S710.1 Standard for Thermal Insulation-Bead-Applied One-Component Polyurethane Air Sealant Foam, Part 1, Section 6.5.1, "Air Permeance"[4]

CAN/ULC-S710.2 Proposed Standard for Thermal Insulation-Bead-Applied One-Component Polyurethane Air Sealant Foam, Part 2, Product Installation[4]

49 Code of Federal Regulations 178.33[5]

UL 723 Test for Surface Burning Characteristics of Building Materials[6]

UL 1479 Standard for Fire Tests of Through-Penetration Firestops[6]

[1] This specification is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.61 on Aerosol Foam Sealants.

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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.

[3] Available from the Spray Polyurethane Foam Alliance, 440 Fair Lakes Court, Suite 105, Fairfax, VA 22033.

[4] Available from the Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, ON L4W 5N6 Canada.

[5] Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.

[6] Available from Underwriters Laboratories (UL), Corporate Progress, 333 Pfingsten Rd., Northbrook, IL 60062.

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this specification, refer to Terminologies C168, C717, D883, and SPFA Document AY119. (SPFA stands for Spray Polyurethane Foam Alliance.)[3]

3.1.2 *tack-free time, n*—as defined in 10.2.

3.1.3 *trim time, n*—as defined in 10.2.

4. Classification

4.1 *Type I Aerosol Polyurethane Foam Sealants* in containers one litre or less.

4.2 *Type II Aerosol Latex Foam Sealants* in containers one litre or less.

4.3 *Grade 1 Aerosol Foam Sealants* contain flammable gas blowing agent or propellant, or both, and are classified as a flammable aerosol by DOT.

4.4 *Grade 2 Aerosol Foam Sealants* contain nonflammable blowing agent or propellants, or both, and are not classified flammable.

5. Ordering Information

5.1 Orders for materials purchased under this specification shall include the following information:

5.1.1 Manufacturer,
5.1.2 Product identification information or product name,
5.1.3 ASTM Specification C1620,
5.1.4 Product classification (see Section 4),
5.1.5 Certificate of compliance (if required),
5.1.6 Ordering date,
5.1.7 Target delivery date,
5.1.8 Special packaging or handling (if required),
5.1.9 Special markings (if required), and
5.1.10 Special compliance information, as applicable for the user.

5.2 Purchases for governmental agencies shall comply with their special needs.

6. Materials and Manufacture

6.1 Aerosol polyurethane foam sealants are produced by the catalyzed chemical polymerization reaction of proprietary chemical formulations and appropriate blowing agents. The product of this reaction is bead extruded from pressurized containers through a nozzle device at the point of application to a building joint as a foamed sealant material. Bead foam curing is achieved with moisture from atmosphere and substrates.

6.2 Aerosol latex foam sealants are produced by the blending of proprietary formulations and appropriate blowing agents. This mixture is bead extruded from pressurized containers through a nozzle device at the point of application to a building joint as foamed sealant material. Bead foam drying then continues over a brief period of time with the loss of formulation moisture.

6.3 Aerosol foam sealant can be used as an alternative Fireblocking sealing material if it meets all requirements per building codes. An evaluation report, such as ICC-ESR report, can serve as such qualification and will detail the specific sealing applications that are recognized.

6.3.1 Fireblocking is the restriction of hidden fire movement via the inside of hollow concealed spaces in wood frame walls. It is typically accomplished by the construction of top plate and vertical studs (usually a 2 by 4) in the wall. Gaps in the plates or studs that accommodate wiring or piping could allow the free passage of flame or hot gases, and should be sealed with Fireblocking material. These materials can be a prescribed material or alternative material that meets comparative testing requirement of building code.

6.3.2 A qualified Fireblocking foam sealant may be only tested per modified Test Method E814 as a part of comparative testing program; it cannot be used in an Firestop assembly unless fully tested per Test Method E814 or UL 1479.

6.4 Aerosol foam sealant can be part of Firestop assembly if it is fully tested per Test Method E814 or UL 1479. The aerosol foam sealant as Firestop component must be installed as prescribed in the test report or listing program such as Through-penetration Firestop Systems of Underwriters Laboratory. A qualified Firestop assembly shall be rated in terms of T and F rating.

6.4.1 Firestop refers to Through-penetration Firestop Systems that must be fully tested per Test Method E814 or UL 1479 and the assembly must be rated in terms of T and F rating.

6.5 The aerosol foam sealant product shall be suitable for shelf-stable pressurized containment, ready to dispense.

6.6 In most field applications, the aerosol foam sealant is foamed-in-place directly into open joints and cavities in building envelope wall and roof areas by consumers or trained professionals to resist the undesirable transmission of moisture, conditioned air, heat, and atmospheric air infiltration/exfiltration of gases and heat energy.

7. Physical Requirements

7.1 Aerosol foam sealants shall have physical property characteristics as shown in Table 1.

7.2 Other physical properties shall be specified as agreed upon between the manufacturer and the purchaser, if required for engineering design purposes, such as the anticipation of service temperature extremes, conductive thermal resistance values, or fire resistance requirements.

8. Sampling

8.1 For the purposes of sampling, the lot shall consist of all the single-use containers of sealant purchased and delivered at one time.

8.2 Sampling for inspection tests, if required, shall be for physical properties agreed upon between sealant manufacturer and purchaser.

8.3 Refer to Practice C390 for sampling practices as appropriate.

9. Test Specimen Preparation

9.1 Aerosol foam sealant specimens for physical property testing shall be made in accordance with the manufacturer's recommendations unless specified differently herein.

TABLE 1 Properties of Aerosol Foam Sealants

Physical Property	Test Method	Type I Grade 1	Type I Grade 2	Type II Grade 1
Linear yield	C1536	Report value for product	Report value for product	Report value for product
Open Cell Content	D6226	Report	Report	Report
Air permeability (max flow rate)	C1642 E283	1.5 L/(s· m^2) (0.3 ft^3 /(min·ft^2) 0.02 L/(s· m) (0.01 ft^3/ (min · ft)	1.5 L/(s· m^2) (0.3ft^3 /(min·ft^2) 0.02 L/(s· m) (0.01 ft^3/(min · ft)	1.5 L/(s· m^2) (0.3 ft^3/ (min·ft^2) 0.02 L/(s· m) (0.01 ft^3/(min · ft)
Tack-free time (max)	see 10.2	30 min.	30 min.	30 min.
Trim time (max)	see 10.2	2 h	2 h	N/A
Flame spread index	E84	as labeled	as labeled	as labeled
Smoke index	E84	as labeled	as labeled	as labeled
Post-dispensing expansion/ contraction[A]	C1643	Report	Report	Report
Shelf life (can) min	stored in standard laboratory C/RH	12 months	12 months	12 months
Freeze/thaw resistance (can)[A]	consult manufacturer	N/A	N/A	3 cycles

[A]Subcommittee C24.61 continues to develop standardized ASTM International test methods for these properties. Until consensus standards are established for these test methods, consult with product manufacturers regarding their product values and the test methods used.

9.1.1 Pressurized containers shall be conditioned for 24 to 48 h under controlled temperature and humidity environment conditions before the extrusion of foam sealant beads onto an approved substrate surface.

9.1.2 Unless otherwise specified and reported, the controlled environment conditions shall be 23 ± 2°C and 50 ± 5 % RH.

9.1.3 Replicate testing specimens shall be of sufficient quantity and dimensions to satisfy specific test requirements.

10. Test Methods

10.1 *Yield*—Determine linear bead and volumetric yield for aerosol foam sealants in accordance with Test Method C1536.

10.2 *Tack-free Time and Trim Time*—Determine aerosol foam sealant curing times by subjective visual observations, using a clean, flat, wooden tongue depressor, a sharp box-cutter knife, and a 30 cm (11.81 in.) length of 1 cm (0.39 in.) diameter bead foam sealant freshly dispensed under standard laboratory conditions of temperature and humidity (Reference Test Method C1536). Begin timing observations and periodically touch the foam bead surface with the clean, flat, tongue depressor surface until the bead surface no longer adheres after gentle contact pressure. Report the elapsed time, to the nearest minute, as "tack-free" time. Then, cut through the bead at 1–min intervals until the knife blade is free of wet (sticky) sealant foam. Record that time as "trim time."

10.3 *Flame Spread*—When required, determine spread of flame characteristics in accordance with Test Method E84 (note that foam sealants are tested in the "Caulkings and Sealants" methodology rather than the "Foamed Plastics" methodology). Foam sealants are typically tested as nominal 2 cm (¾-in.) diameter beads laid down in strips on cementitious board, with the percent coverage of foam beads per surface area of board reported.

NOTE 1—Typically, bead foam sealants are flame spread tested with two 2 cm (¾-in.) diameter beads of sealant foam covering 8.3 % of the exposed sample area. UL 723 test method results are often substituted and accepted as equivalent to E84 test methods by regulatory authorities.

10.4 *Smoke Index*—See 10.3 for Smoke Index (Smoke Developed) by light obscuration in accordance with Test Method E84.

10.5 *Post Dispensing Expansion or Contraction*—Determine the Post Dispensing Expansion or contraction per Practice C1642.

10.6 *Air Infiltration or Permeance*—Determine the Air Leakage Rate per Practice C1642. References are provided to Canadian General Standards Board (GCSB) document CAN/CGSB 51.93 "Air Barrier Materials," Underwriters Laboratories of Canada (National Standard of Canada) document CAN/ULC-S710.1 "Proposed Standard for Thermal Insulation-Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1 Material Specification," Section 6.5.1, "Air Permeance," and Test Method E283.

10.7 *Shelf Life (of Un-opened Pressurized Product in Container*—Determine product shelf life by subjective observation after shelf storage in a controlled air environment (standard laboratory air, see 9.1.2). After such storage, acceptable bead foam sealant shall extrude from its container at a rate such that a continuous bead of quality product is obtained at a rate to fill gaps and cracks effectively, that is, product suitable for the uses intended.

10.8 *Freeze-Thaw Resistance (of Unused Pressurized Product in Container)*—Subcommittee C24.61 continues to develop a standardized test for this important physical property. Until a consensus standard is established, consult aerosol foam sealant manufacturers regarding their product values and test method.

10.9 *Temperature Effects (Optional)*—Refer to Guide C1737.

11. Packaging and Package Marking

11.1 Unless otherwise specified or agreed upon between manufacturer and buyer, the fluid components of aerosol foam sealant shall be packaged in the manufacturer's standard commercial containers.

11.1.1 Aerosol foam sealants conforming to this specification shall be packaged in containers not exceeding 1 L in fluid capacity.

11.1.2 Sealant containers shall meet the requirements of D.O.T. 49 Code of Federal Regulations 178.33 Spec. 2P, or Spec. 2Q, or both.

11.2 Each container shall be marked with the following information:

11.2.1 Manufacturer's name and address,

11.2.2 Manufacturer's product designation and production code date,

11.2.3 ASTM Specification C1620 compliance,

11.2.4 Manufacturer's lot number, date of production or expiration date, or both,

11.2.5 Net weight of the container contents,

11.2.6 Instructions for safe handling practices and storage environment,

11.2.7 Application and container disposal instructions, and

11.2.8 Product acceptance listings (Model building codes, UL, and other regulatory product approvals as applicable).

12. Keywords

12.1 aerosol foam sealant; aerosol latex foam sealant; aerosol polyurethane foam sealant; air leakage; bead foam sealant; cure time; foam-in-place sealant; one component polyurethane foam sealant; tack-free time; trim time

APPENDIX

(Nonmandatory Information)

X1. GENERAL INFORMATION

X1.1 The properties of aerosol foam sealant materials can vary depending upon such factors as the thickness of the applied sealant; the temperature, dryness, and type of substrate material; the ambient temperature and humidity at the point and time of application; and of course, different supplier's proprietary formulations.

X1.2 Closed-cell polyurethane foams generally exhibit their highest conductive thermal resistance (R value) at the time of manufacture. Thermal resistance values can also be significantly influenced by installation-related and service-related variables such as foam thickness, environmental conditions in service, and exposure to ultraviolet radiation and mechanical damage circumstances.

X1.2.1 The air barrier performance of aerosol foam sealant materials depends upon meeting the specification properties herein and compliance with all manufacturer's use instructions and stated limitations.

X1.3 Cellular plastic insulation materials are considered to be combustible (not flammable) to varying degrees when exposed to direct contact with an ignition source (such as an open flame or extremely high temperatures or both).

X1.3.1 Foam sealant durability is beyond the scope of this document. Consult individual manufacturers for data or other evaluations of durability.

X1.4 Consult local building and fire code regulations, insurance requirements, and sealant manufacturer's application instructions or literature for each installation and construction system that will use aerosol foam sealant materials if suitability for any application is in doubt.