



Standard Guide for Evaluating Temperature Effects to Aerosol Foam Sealant During and After Dispensing¹

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1. Scope

1.1 This guide covers the general effects of temperature during the use temperatures for aerosol foam sealant (either polyurethane or latex types).

1.2 The guide is intended to estimate the observed product dispensing character and foam quality of aerosol foam dispensed or cured, or both, at specific temperatures.

1.3 Such foam sealants are used for a variety of end use applications primarily intended to reduce air movement in building enclosures.

1.4 Currently two main foam sealant types are applicable to this standard, single component polyurethane and latex types.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 There are no other known test methods specific for measuring the product temperature range for aerosol foam sealant.

1.7 *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 limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards*:²

C1620 Specification for Aerosol Polyurethane and Aerosol Latex Foam Sealants

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

¹ This guide 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.

3.1.1 *cure temperature*—set temperature of the chamber used for curing the foam sealant. Also called the ambient air temperature for purposes of this guide.

3.1.2 *friability*—the property of a cured or semi cured foamed cellular material which permanently deforms and crumbles to a powder like consistency after a light finger force is applied to the material surface.

3.1.3 *product temperature*—temperature of the foam sealant in its original container after 24 h incubation.

3.1.4 *product use temperature*—one measurement from the outcome of this guide. The product use temperature is composed of two metrics as defined above, that is, the product temperature itself and the ambient air temperature during the cure.

3.1.5 *tack free time*—see Specification **C1620**.

4. Summary of Guide

4.1 *Procedure*—Select the desired temperatures to measure foam sealant specimens for “test product temperature” and “test-cure temperature.” A product for example could be tested at a product temperature of 5°C, and a cure temperature (ambient air temperature) of 0°C.

4.1.1 Specimens from a completely filled aerosol container's are dispensed at specified size and as bead segments.

4.1.2 Product temperature is maintained at selected “product temperature” prior to testing at the selected “cure temperature” (which may be the same or different than the product temperature).

4.1.3 Foam products are evaluated for flow rate, tack free time, friability, and skin and cell appearance as described herein.

5. Significance and Use

5.1 This guide is not intended to measure the precise temperature range for dispensing and curing product under all the possible substrate and environmental factors but to provide a basis for benchmarking a foam sealant product under specific laboratory conditions.

5.2 The product user is encouraged to evaluate each application and determine suitability for actual use.

6. Apparatus

6.1 *Two test chambers*, capable of controlling temperature from -15 to 45°C within $\pm 2^{\circ}\text{C}$.

6.2 *Smooth brown wrapping paper*, without coatings (7.5 by 25 cm).

7. Test Specimens and Substrates

7.1 Condition and prepare all test products at selected product conditions.

7.2 Condition and prepare all test substrates at selected curing conditions.

7.3 For each product tested it is essential to follow the manufacturer's label directions and to use the dispenser supplied with the product. One full aerosol can of product is needed for this test.

8. Conditioning

8.1 Condition filled aerosol cans of foam sealant and substrates under standard laboratory conditions of $23 \pm 2^{\circ}\text{C}$ and $50 \pm 5\%$ relative humidity prior to the selected test chamber conditioning (see 9.1 and 9.2).

9. Procedure

9.1 Condition substrates at the selected "cure temperature" for 24 h.

9.2 Condition aerosol foam cans at the selected "product temperature" for 24 h.

9.3 Shake the can vigorously for 30 s or as recommended in the product's instructions.

9.4 Weigh the full can of foam sealant without the cap but with the dispensing mechanism attached and record the starting weight.

9.5 After 24 h, remove the foam aerosol product container from the product conditioning chamber and immediately dispense a 1-cm diameter by 8-cm long foam sealant bead (or any desired test specimen size) onto the Kraft Paper while the paper is still in the curing test chamber. Close the door within 5 s of opening the curing chamber.

9.6 Note the approximate flow rate time and quality of foam sealant flow relative to dispensing at 23°C with 1 (lowest flow) and 5 (highest flow), for example, (1 = no flow; 2 = very slow; 3 = normal (flow rate at 23°C); 4 = fast; 5 = very fast) in data sheet.

9.7 After 2 h, open the curing chamber and check foam for friability and tack free by pressing into the foam with a nitrile or latex type surgical gloved finger. Close the door within 5 s.

NOTE 1—All measurements in 9.6 through 9.9 are based on internal standards created by the analyst for the specific product under test.

9.8 Recheck friability and tack free (see Specification C1620 for tack free) again in another hour by opening the curing chamber door for no more than 5 s.

9.9 After 24 h, do a final check for friability and tack free and remove the samples from the test chamber to room temperature. Rank and average skin appearance from 1 (worst) – 5

(best) for all test specimens compared to skin appearance at 23°C and 50 % RH. Also cut through the final cured foam sealant specimens with a box cutter or sharp knife in two directions to evaluate the internal foam cell structure. Rank and average internal foam sealant cell structure for all specimens from 1 (worst) – 5 (best) as compared to skin appearance at 23°C and 50 % RH.

9.9.1 **Warning**—The opening and closing of the chamber door must be minimized during the test and between the second and the third hour as some foams loose the friability extremely fast as the temperature rises above a critical temperature even momentarily. It is desirable to run a recording temperature device that continuously monitors to temperature as close as possible to the sample in the chamber.

FRIABILITY TABLE 1					
Test Time Duration	YES		NO		
Friable at 2 h					
Friable at 3 h					
Friable at 24 h					

TACK FREE TABLE 2					
Test Time Duration	YES		NO		
Tack Free at 2 h					
Tack Free at 3 h					
Tack Free at 24 h					

OTHER DATA RANKING TABLE 3					
Test Rank	1	2	3	4	5
Skin Appearance					
Internal Cell Structure					
Relative Flow Rate					

10. Report

10.1 Complete name or designation of product tested.

10.2 Label statement of the size or contents of the aerosol in units of grams, weight ounces, or milliliters, etc.

10.3 Statement of the dispensing direction for the product container, upright or inverted.

10.4 Date of initiation of the test.

10.5 Date of report.

10.6 Expiration date of product tested.

10.7 Diameter and length of the test specimen bead.

10.8 Approximate Flow rate: very slow, slow, normal, fast, none at test "product temperature" compared to flow rate at 23°C .

10.9 Tack free: state whether foam sealant specimens were tack free after 1 h at the cure-temperature condition.

10.10 Skin appearance rank (1–5) of the foam sealant after 24 h at "cure temperature" compared to cell appearance at 23°C and 50 % RH compared to skin appearance at 23°C and 50 % RH: rank (1–5) of the foam sealant after 24 h at "cure temperature."

10.11 Internal cell appearance rank (1–5) of the foam sealant after 24 h at "cure temperature" compared to cell appearance at 23°C and 50 % RH.

10.12 Friability state (friable or not friable) of the foam sealant after 1 h at "cure temperature."

10.13 Friability state (friable or not friable) of the foam sealant after 2 h at "cure temperature."

10.14 If a product is tested at multiple temperatures and meets the expected performance levels, the minimum Product Use Temperature can be reported in the following format: “This foam sealant tested under the laboratory conditions herein and the internal standards employed suggests a Minimum Ambient Use Temperature of X°C and a Minimum Product Temperature of Y°C.”

10.15 A statement that the test or tests were conducted in accordance with this Guide C1737.

11. Keywords

11.1 aerosol; aerosol foam; air barrier foam sealant; air exfiltration; air infiltration; foam sealant; latex foam sealant; polyurethane foam sealant

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