



Designation: C731 – 15 (Reapproved 2022)

Standard Test Method for Extrudability, After Package Aging, of Latex Sealants¹

This standard is issued under the fixed designation C731; 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 test method covers a laboratory procedure for the determination of extrudability of latex sealants after freeze-thaw and heat cycling.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.3 *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.*

NOTE 1—Currently there is no ISO standard similar to this test method.

1.4 *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

C717 Terminology of Building Seals and Sealants

3. Terminology

3.1 *Definitions:* Refer to Terminology **C717** for definitions of the following terms used in this test method: latex sealant, sealant, standard conditions.

4. Summary of Test Method

4.1 After being subjected to 5 freeze-thaw cycles followed by 7 days of heat aging, the sealant is extruded under pressure

from an air-powered caulking gun, and the extrudability is measured in grams per second.

5. Significance and Use

5.1 Extrudability measurements of latex sealants serve to indicate only their ease of application; they do not predict the performance capability of the compound after installation.

5.2 This test method also measures freeze-thaw and heat stability of such sealants.

6. Apparatus

6.1 *Caulking Gun*, air-powdered.

6.2 *Polyethylene Cartridge*, 6 fluid oz and plunger.

6.3 *Polyethylene Cartridge Nozzle*, 64 mm (2½ in.) in length with 3 mm (⅛-in.) orifice.

6.4 *Air Compressor*, capable of producing 0.34 MPa (50 psi).

6.5 *Freezer*, capable of maintaining $-17\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ($0\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$).

6.6 *Circulating Air Oven*, capable of maintaining $50\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ($122\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$).

6.7 *Stop Watch*, standard laboratory.

6.8 *Analytical Balance*, accurate to 1 g.

6.9 *Jar*, approximately 0.5 L (1-pt).

6.10 *Spatula*.

7. Sampling

7.1 After conditioning as specified in **8.1**, take the sealant to be tested directly from a container as commercially supplied by the manufacturer.

8. Conditioning

8.1 Subject the sealant in its original container to 5 freeze-thaw cycles, each cycle consisting of 16 h at $-17\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ($0\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$) and 8 h at $23\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ($73.4\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$), followed by 7 days at $50\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ($122\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$).

8.2 Condition the sealant which is still in its original container, for a minimum of 5 days at standard conditions.

8.3 Condition the polyethylene cartridge for a minimum of 16 h at standard conditions.

¹ This test method is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.20 on General Test Methods.

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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.

9. Procedure

9.1 After conditioning, transfer the sealant from its container into the polyethylene cartridge either by gunning or with the spatula. Avoid trapping air in the sealant during transfer.

9.2 Place the filled cartridge in the air-powered caulking gun and attach the cartridge nozzle.

9.3 Weigh the jar and record its tare weight.

9.4 Gun the entire contents of the cartridge at 0.34 MPa (50 psi) into the empty, tared, jar, using a stop watch to time the extrusion.

9.5 Weigh the jar containing the sealant.

10. Calculation

10.1 Calculate the weight of sealant extruded by subtracting the tare weight of the jar from the weight obtained in 9.5.

TABLE 1 Precision and Bias Data^A

Material	Average	Estimated Standard Deviation Within a Laboratory	Estimated Standard Deviation Between Laboratories	Repeatability (Internal)	Reproducibility
G1	14.92	0.29	4.36	0.81	12.33
G2	14.57	0.58	3.36	1.64	9.50
G3	14.82	0.83	3.71	2.36	10.49

^A At 95 % confidence a variation of as much as 2.36 g/s can be expected within a laboratory and 12.33 g/s between laboratories.

10.2 Calculate the rate of extrudability as follows:

$$\text{Rate of extrudability} = w/t \quad (1)$$

where:

w = weight of compound extruded, g, and

t = elapsed time, s.

11. Report

11.1 Report the rate of extrudability in grams per second.

12. Precision and Bias³

12.1 *Precision*—The precision calculations for this test method are based on the results of five laboratories testing three materials, each in duplicate. The results are given in **Table 1**.

12.2 *Bias*—Since there is no accepted reference material suitable for determining the bias for this test method for extrudability, bias has not been determined.

13. Keywords

13.1 extrudability; freeze-thaw stability; heat stability; latex sealant

³ Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:C24-1017.

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