Designation: C 731 – 00

Standard Test Method for Extrudability, After Package Aging, of Latex Sealants[1]

This standard is issued under the fixed designation C 731; 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 metric (SI) units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety problems, 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.*

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

2. Referenced Documents

2.1 *ASTM Standards:*

C 717 Terminology of Building Seals and Sealants[2]

3. Terminology

3.1 *Definition*—Refer to Terminology C 717 for definitions of the following terms used in this test method: latex sealant, sealant.

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 50 psi (0.34 MPa).

6.5 *Freezer*, capable of maintaining − 17 ± 1°C (0 ± 2°F).

6.6 *Circulating Air Oven*, capable of maintaining 50 ± 1°C (122 ± 2°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± 1°C (0 ± 2°F) and 8 h at 23 ± 1°C (73.4± 2°F), followed by 7 days at 50 ± 1°C (122 ± 2°F).

8.2 Condition the sealant which is still in its original container, for a minimum of 5 days at 23 ± 1°C (73.4 ± 2°F) and 50 ± 5 % relative humidity.

8.3 Condition the polyethylene cartridge for a minimum of 16 h at the same conditions as specified in 8.2.

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.

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[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 Sealant Standards.

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[2] *Annual Book of ASTM Standards*, Vol 04.07.

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. Calculation

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

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 Bias [3]

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 is available from ASTM. Request RR:C24-1017.