Designation: C603 – 14

Standard Test Method for Extrusion Rate and Application Life of Elastomeric Sealants[1]

This standard is issued under the fixed designation C603; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers two laboratory procedures for determining the extrusion rate and application life (or "pot life") of elastomeric chemically curing sealants for use in building construction.

NOTE 1—These sealants are supplied with various rheological properties ranging from pourable liquids to nonsagging pastes. Single-component sealants are supplied ready for use upon opening the container, and their rate of cure is determined by the climatic conditions to which they are exposed. Multicomponent sealants are supplied as a base component and a curing agent separately packaged. After mixing the two parts, the sealant is ready for application, and curing begins immediately.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.3 There is no known ISO equivalent to this test method.

1.4 *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]

C717 Terminology of Building Seals and Sealants

3. Terminology

3.1 Refer to Terminology C717 for definitions of the following terms used in this standard: standard conditions.

4. Significance and Use

4.1 The results obtained by this test method are simply a measure of the time required to extrude a known volume of sealant through a known orifice under a predetermined pressure.

4.2 This test method is not considered a measure of cure rate.

5. Apparatus

5.1 *Caulking Gun,* 177-mL (6-fl oz) capacity, air-powered.

5.2 *Polyethylene Cartridge,* 177-mL (6-fl oz), with the front end having an inside diameter of 13.7 ± 0.05 mm (0.540 ± 0.002 in.).

5.3 *Air Supply,* providing 345 kPa (50-psi) pressure and having the necessary connection fittings for attachment to the air-powered caulking gun.

5.4 *Timing Device* (clock or watch), calibrated in seconds.

5.5 *500-mL (1-pt) Container*

6. Procedure

6.1 *Extrusion Rate of Single-Component Sealant*—First condition the unopened container for at least 16 h at standard conditions. Then place a sufficient amount of sealant into the 177-mL (6-fl oz) cartridge to fill it completely with the plunger in place, fully retracted. Using no nozzle on the cartridge, gun the sealant at 345 kPa (50-psi) pressure into the 500-mL (1-pt) container, measuring the time in seconds required to empty the cartridge.

NOTE 2—When the printed instructions of the sealant manufacturer so recommended, heat the sealant before extruding it into the container.

6.2 *Extrusion Rate or Application Life or both, of Mixed Multicomponent Sealant*—First condition the unopened containers of both sealant and curing agent for at least 16 h at standard conditions. Then mix 400 g of the sealant with the proper amount of curing agent, stirring the mixture by hand for 5 min. Place a sufficient amount of the mixed compound into the 177-mL (6-fl oz) cartridge to fill it completely with the plunger in place, fully retracted, and set the filled cartridge aside, in a vertical position, at standard conditions, for 3 h

[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.

(Note 3). Then, using no nozzle on the cartridge, gun the sealant at 345 kPa (50-psi) pressure into the 500-mL (1-pt) container, measuring the time in seconds required to empty the cartridge.

NOTE 3—Curing times and conditions for multi-component mixed compounds may vary. Therefore curing periods of longer or shorter than 3 h, and under other than the specified standard conditions, or either one of these two may be specified in some cases.

7. Report

7.1 The report on the extrusion rate of the single-component sealant shall state:

7.1.1 The trade name (or other identification) of the sealant.

TABLE 1 Precision and Bias Data[A]

Material	Average	Estimated Standard Deviation Within a Laboratory	Estimated Standard Deviation Between Laboratories	Repeat-ability Internal	Reproduci-bility
G1	3.6	0.32	1.24	0.91	3.40
G2	2.4	0.52	1.54	1.48	4.36
G3	5.3	0.30	2.37	0.86	6.70
G4	6.3	2.32	6.46	6.56	18.28
G5	2.1	0.22	0.89	0.62	2.51

[A] At 95 % confidence a variation of as much as 6.56 can be expected within a laboratory and 18.28 between laboratories.

7.1.2 The time, in seconds, required to empty the cartridge (the extrusion rate), and

7.1.3 Any variation, specified or otherwise, from the above described test method, including heating of the sealant if so required.

7.2 The report on the extrusion rate or application life, or both, of the multicomponent sealant shall state:

7.2.1 The trade name (or other identification) of the sealant,

7.2.2 The time, in seconds, required to empty the cartridge after the 3-h (or other specified) curing period, and

7.2.3 Any variations, specified or otherwise, from the above described test method, including the length of curing period and the conditions of temperature and humidity during this period.

8. Precision and Bias[3]

8.1 The precision and bias calculations for this test method are based on the results of four laboratories testing five materials, each in triplicate. The results are given in Table 1.

9. Keywords

9.1 application life; extrusion rate; pot life; sealant

[3] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:C24-1010.