Designation: C711 – 14

Standard Test Method for Low-Temperature Flexibility and Tenacity of One-Part, Elastomeric, Solvent-Release Type Sealants[1]

This standard is issued under the fixed designation C711; 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 determination of the low-temperature flexibility and tenacity of one-part, elastomeric, solvent-release type sealants after cyclic high- and low-temperature aging.

1.2 The subcommittee with jurisdiction is not aware of any similar ISO standard.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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 *Definitions*—Refer to Terminology C717 for definitions of the following terms used in this Test Method: elastomer, elastomeric, joint, sealant, solvent-release sealant, standard conditions.

4. Significance and Use

4.1 This test method is not intended to simulate an actual use condition but it will give some indication of the elastomeric properties or flexibility of a building joint sealant at low temperature. It can serve to differentiate between elastomer-based sealants and sealants based on nonelastic binders that can harden or embrittle on aging and crack or lose adhesion when flexed at low temperature. In addition, it can aid in identifying sealants that have poor flexibility because they are overextended and contain a very low level of elastomeric binder as well as those sealants having binders that will embrittle at low temperature.

5. Apparatus

5.1 *Aluminum Panels,* 3, thin, approximately 3 in. (76 mm) wide by 5 in. (127 mm) long by 0.012 in. (0.30 mm) thick.

5.2 *Spatula,* steel, with thin knife edge.

5.3 *Template,* rectangular, of steel or brass, ⅛ in. (3.2 mm) high, 1 by 3¾ in. (25 by 95 mm) inside and approximately 2 by 4¾ in. (51 by 121 mm) outside.

5.4 *Oven,* forced-draft type, having a temperature controlled at 158 ± 3.6°F (70 ± 2°C).

5.5 *Freezer Chest or Cold Box,* having a controlled temperature of −10 ± 5°F (−23 ± 3°C).

5.6 *Mandrel or Rod,* with a diameter of ¼ in. (6.4 mm), with a suitable holder or rack to support it.

5.7 *Methyl Ethyl Ketone,* or similar solvent.

6. Sampling

6.1 Take the test specimen from a previously unopened container as received from the sealant manufacturer.

7. Test Specimens

7.1 Prepare three test specimens as follows:

7.1.1 Condition the sealant sample in the original closed container for at least 24 h at standard conditions.

7.1.2 Thoroughly clean template and aluminum panels with solvent.

7.1.3 Center the template on the aluminum panel and carefully fill it with compound, avoiding air pockets. Strike off the surface of the compound flat to a uniform ⅛-in. (3.2-mm) thickness.

7.1.4 With the thin knife edge of the spatula, cut all around the outside edge of the compound and lift the template straight up and off leaving the formed sealant on the plate.

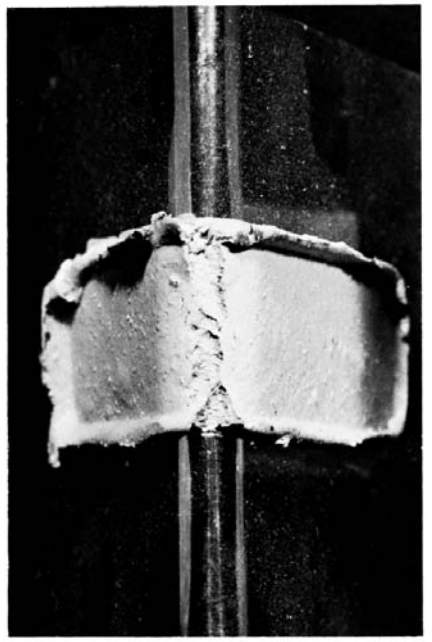
---

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

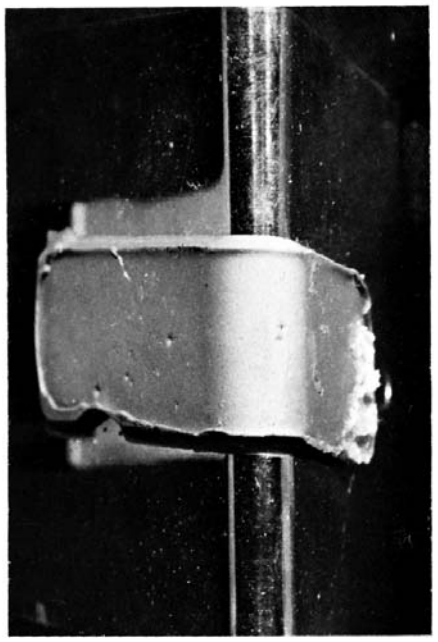
Current edition approved July 1, 2014. Published August 2014. Originally approved in 1972. Last previous edition approved in 2009 as C711 – 03(2009). DOI: 10.1520/C0711-14.

[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.

(*a*) Complete Cracking and Adhesive Failure



(*b*) Severe Cracking



(*c*) No Cracking or Adhesive Failure

FIG. 1 Low-Temperature Flexibility (Tenacity)

8. Conditioning

8.1 Condition the specimens for at least 24 h at standard conditions.

9. Procedure

9.1 Expose the conditioned specimens three times to the following temperature cycle:

$$\text{16 h at } 158 \pm 3.6°\text{F } (70 \pm 2°\text{C}) \qquad (1)$$

$$\text{8 h at } -10 \pm 5°\text{F } (-23 \pm 3°\text{C})$$

9.2 At the end of the third cycle, while it is in the freezer at – 10°F (–23°C) bend the panel through 180° over the ¼-in. (6.4-mm) diameter mandrel with the sealant side uppermost. Perform the bend in not less than 1 s and not more than 1.5 s.

Immediately after bending examine the sealant for cracking, separation, delamination, and adhesive failure. Minor surface crazing or hairline cracks and minor edge cracking may be ignored.

10. Report

10.1 Report any deep cracking, separation, delamination, or adhesive failure. Fig. 1 illustrates a variety of typical results of this test method.

11. Precision and Bias

11.1 In two separate round-robin tests, four laboratories tested six sealant samples using this procedure. There was unanimous agreement in both cases in rating the same two samples as showing severe cracking and the same four samples as showing no cracking or adhesive failure.

12. Keywords

12.1 elastomeric; flexibility; solvent-release sealant