**Designation: C 711 – 93 (Reapproved 1997)**

**Designation: C 711 – 03**

# 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 C 711; 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] 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.

Current edition approved ~~April 15, 1993.~~ May 10, 2003. Published June ~~1993.~~ 2003. Originally ~~published as C 711 – 72.~~ approved in 1972. Last previous edition approved in 1997 as C 711 – ~~72~~93 (19~~88~~97).

## 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 *This standard does not purport to address all of the safety ~~problems~~, 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:*

C 717 Terminology of Building Seals and Sealants[2]

## 3. Terminology

3.1 *Definitions*—Refer to Terminology C 717 for definitions of the following terms used in this Test Method: elastomer, elastomeric, joint, sealant, solvent-release sealant.

## 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.

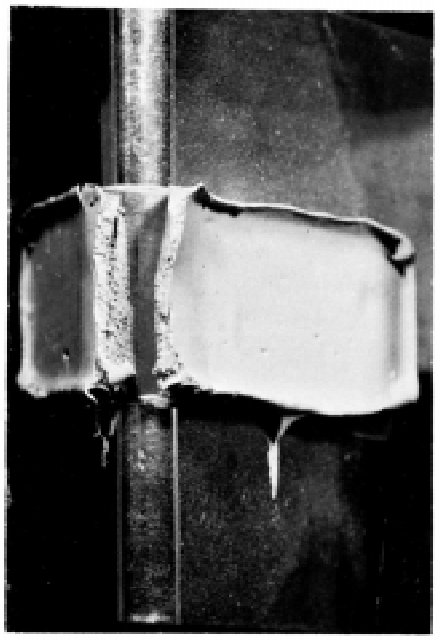
## 6. Sampling

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

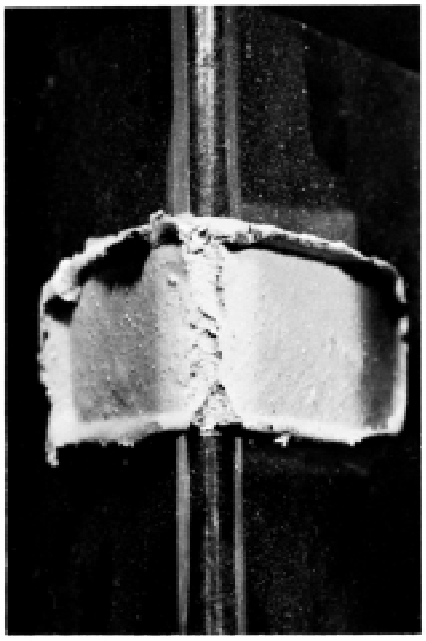
## 7. Test Specimens

7.1 Prepare three test specimens as follows:

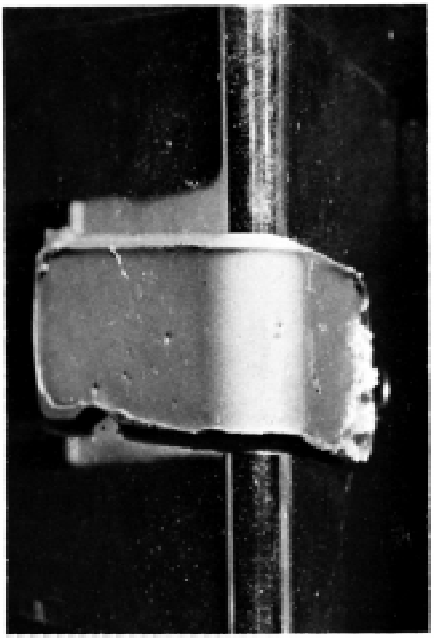
[2] *Annual Book of ASTM Standards*, Vol 04.07.



(*a*) Complete Cracking and Adhesive Failure



(*b*) Severe Cracking



(*c*) No Cracking or Adhesive Failure

**FIG. 1 Low-Temperature Flexibility (Tenacity)**

7.1.1 Condition the sealant sample in the original closed container for at least 5 h at 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity.

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.

## 8. Conditioning

8.1 Condition the specimens for at least 24 h at 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity.

## 9. Procedure

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

16 h at 158 ± 3.6°F (70 ± 2°C)
8 h at − 10± 5°F (−23 ± 3°C) (1)

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