



# Standard Test Method for Determining Modulus, Tear and Adhesion Properties of Precured Elastomeric Joint Sealants<sup>1</sup>

This standard is issued under the fixed designation C 1523; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method describes a laboratory procedure for measuring modulus, tear, joint movement ability and adhesion properties of applied, Precured Elastomeric Joint Sealants, hereinafter referred to as “applied seal” and if not applied, hereinafter referred to as “seal,” on portland cement mortar as a standard substrate and on other substrates. It tests these properties after dry, wet, frozen, heat aged or artificially weather-aged conditionings, or both.

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

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 and health practices and determine the applicability of regulatory limitations prior to use.*

1.4 The committee with jurisdiction over this standard is not aware of any similar standard published by another committee or organization.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- C 717 Terminology of Building Seals and Sealants
- C 1375 Guide for Substrates Used in Testing Building Seals and Sealants
- C 1442 Practice for Conducting Tests on Sealants Using Artificial Weathering Apparatus
- D 1566 Terminology Relating to Rubber
- G 113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials
- G 151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices That Use Laboratory Light Sources

G 154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

G 155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials

## 3. Terminology

3.1 *Definitions*—Refer to Terminology C 717 for definitions of the following terms used in this test method: adhesive failure, cohesive failure, primer, modulus, and to Terminology D 1566 for tear and to Terminology G 113 for definitions related to artificial weathering.

## 4. Summary of Test Method

4.1 Model joints are prepared, the seal is adhered to the substrate utilizing an adhesive sealant specified by the manufacturer, hereinafter referred to as adhesive, then exposed to a variety of conditionings such as heat, cold, artificial weathering or water immersion. A specific set of specimens can go through each conditioning or separate specimens can be used for each conditioning. After exposure the test specimens are subjected to an elongation (strain) and held at this elongation for as long as is desired. The elongation (joint expansion) is performed with a tensometer to obtain tensile-forces during the pull. One aspect of the test has the applied seal cut in the middle of the joint and then elongated and the degree of tear propagation noted. After the initial strain the samples can be subjected to cycles of repeated strain. The samples can also be tested to destruction. The movement test and tear test can be done on separate sets of test specimens or done sequentially with the same test specimen.

## 5. Significance and Use

5.1 Seals are manufactured in flat extruded shapes and are primarily used to span joint openings. The seal is adhered to construction substrates utilizing a liquid applied adhesive, to seal building openings such as panel joints, metal flashing joints or other joints in place of conventional liquid applied sealants. In actual use, failure of an applied seal in an active joint is usually manifested by cohesive failure of the seal; adhesive failure between the adhesive and the substrate;

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

adhesive failure between the adhesive and the seal; cohesive failure of the substrate or tear propagation parallel to the joint length.

5.2 This test method can be used for testing the adhesion of the adhesive to the substrate and to the seal, tensile load at various strains and tear resistance at various strains after the specimens are exposed to wet, cold, hot and artificial weathering conditionings. All or some of these properties are experienced on actual job sites.

**6. Apparatus and Materials**

6.1 *Tensile Testing Machine*, capable of producing a tensile load on the specimen at a rate of  $50 \pm 5$  mm ( $2.0 \pm 0.20$  in.)/min., and with a recording chart to show load strain values (tensile modulus).

6.1.1 *Fixed Member*—A fixed or essentially stationary member carrying one grip.

6.1.2 *Movable Member*—A movable member carrying one grip.

6.1.3 *Grips*—The grips should be suitable to firmly grasp the test fixture that holds the test specimen.

6.1.4 *Grip Fixture*—A fixture capable of being held by the grips and furnishing a tensile force to the sealant specimen.

6.2 *Spatulas*, for use in applying the adhesive.

6.3 *Caulking Gun*, for extruding adhesive from cartridges.

6.4 *Primer*, if applicable.

6.5 *Adhesive*.

6.6 *Seal*.

6.7 *Spacer*—Pieces of rigid material that help to maintain a joint opening of 12 mm (0.5 in.) while preparing the test specimen.

6.8 *Substrates*—2 substrate samples are required for each test specimen. The substrate sample size shall be determined by the size of the test machine grips, yet they must be of a size to allow the application of a  $50 \pm 5$  mm ( $2 \pm 0.2$  in.) long seal.

6.9 *Freezer*,  $-18 \pm 2^\circ\text{C}$  ( $0 \pm 3.6^\circ\text{F}$ ).

6.10 *Oven*,  $70 \pm 2^\circ\text{C}$  ( $158 \pm 3.6^\circ\text{F}$ ).

6.11 *Apparatus*, in accordance with Practice G 151 and G 154, or G 155 and C 1442.

6.12 *Stencil Knife*, or similar instrument (5 mm cutting width).

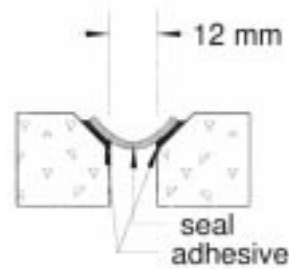


FIG. 2 Beveled Bridge Joint Configuration

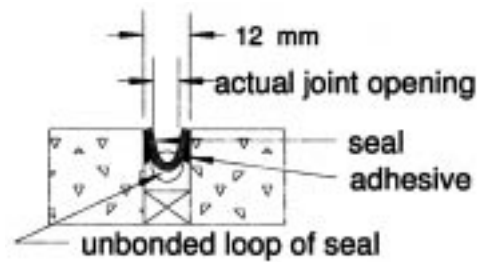


FIG. 3 U-joint Configuration

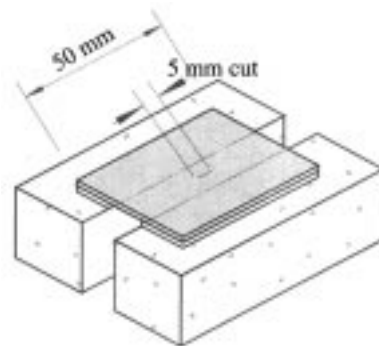


FIG. 4 Test Specimen Showing 5 mm Cut in the Middle of the Seal for Tear Propagation Testing

**7. Test Specimen**

7.1 The standard joint configuration used in this test method shall be the bridge joint application as shown in Fig. 1.

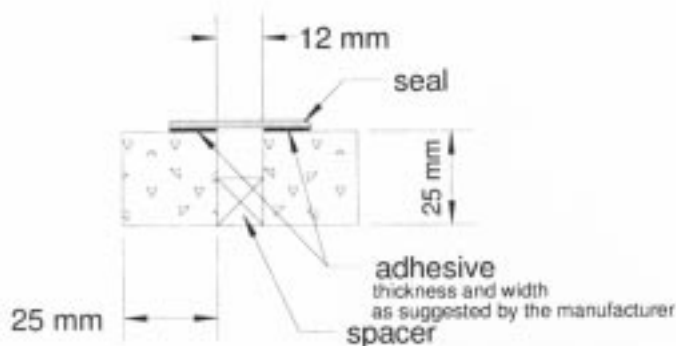


FIG. 1 Standard Substrate Test Specimen Assemblies

