



Designation: ~~C961–06 (Reapproved 2011)~~ C961 – 15

Standard Test Method for Lap Shear Strength of Sealants¹

This standard is issued under the fixed designation C961; 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 determining the lap shear strength of sealants. It also provides information on the adhesive bond of the sealants to the tested substrates.

1.2 The values stated in 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 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 subcommittee with jurisdiction of this standard is not aware of any similar or equivalent ISO standard.

2. Referenced Documents

2.1 *ASTM Standards:*²

[C717 Terminology of Building Seals and Sealants](#)

3. Terminology

3.1 *Definitions*—~~The Refer to Terminology C717 for definitions of the following terms used in this test method are found in Terminology method: C717, 4.1: adhesive failure, cohesive failure, sealant, standard conditions, and substrate.~~

4. Summary of Test Method

4.1 The sealant is placed between two glass substrates. The sample is placed in a tensile tester and pulled at a constant rate to failure. The maximum shear force and mode of failure is noted. Maximum shear stress is calculated and reported.

5. Significance and Use

5.1 Sealants are generally subjected to longitudinal and lateral shear stresses in end use applications. This test method measures the cohesive strength of sealants when subjected to shear stresses, and also provides information regarding the adhesive bond to the substrates being tested.

6. Apparatus

6.1 *Sealant Applicator or Oven*, capable of maintaining the sealant within $\pm 2.8^\circ\text{C}$ ($\pm 5^\circ\text{F}$) of the specified temperature.

6.2 *Substrates*, of annealed glass that are 25.4 mm wide by 76.2 mm long and 6.35 mm thick (1 by 3 by 0.25 in.). Other substrates may be used when specified ([Fig. 1](#)).

6.3 *Template*, to provide 3.18-mm ($\frac{1}{8}$ -in.) sealant thickness ([Fig. 2](#)).

6.4 *Hot Knife or Spatula*.

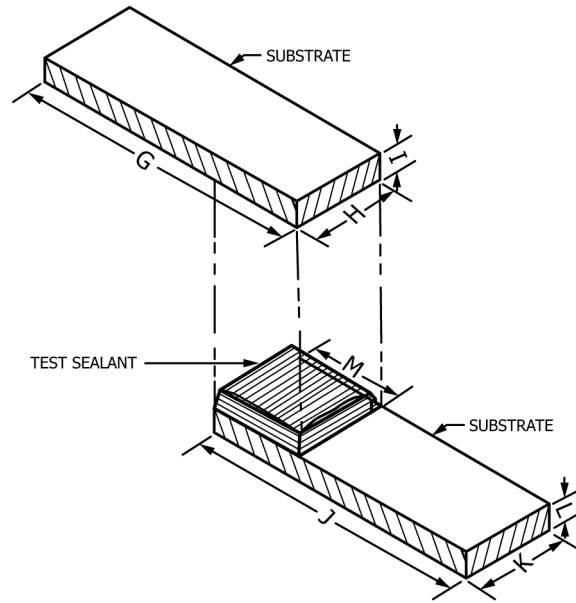
6.5 *Tension Testing Machine*, capable of pulling a specimen at a rate of 12.7 mm (0.5 in.)/min.

7. Sampling

7.1 Sealant shall be free of external surface contaminants such as talc, oil, dust, and moisture. Handling of the sealant surfaces in contact with the substrate shall be minimized.

¹ This test method is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.30 on Adhesion. Current edition approved Dec. 1, 2015. Published January 2015. Originally approved in 1981. Last previous edition approved in 2006 as C961-06(2011). DOI: 10.1520/C0961-06R11.10.1520/C0961-15.

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.



Dimension	mm	Length	in.
G, J	76.2 ± 0.25		(3.00 ± 0.01)
H, K, M	25.4 ± 0.25		(1.00 ± 0.01)
I, L	6.35 ± 0.10		(0.250 ± 0.004)

FIG. 1 Assembly of Test Sealant on Substrates

7.2 A 1.0-kg (2.2-lb) representative sample shall be taken from bulk stock for testing.

8. Test Specimens

8.1 Prepare six test specimens from the bulk sample by using the applicator or the oven method.

8.1.1 Applicator Method:

8.1.1.1 Clean the substrate surface with soap and water followed by a water rinse and solvent wipe with methyl ethyl ketone (MEK).

NOTE 1—At the request of the sealant manufacturer, an alternative cleaning procedure may be used.

8.1.1.2 Using an appropriate die or nozzle, apply a 25.4 by 25.4-mm (1 by 1-in.) layer of sealant onto one end of the substrate surface at a thickness that when compressed will comply with 8.1.1.4. Substrates shall be at a temperature of $23 \pm 2^\circ\text{C}$, $50 \pm 10\%$ relative humidity ($73.4 \pm 3.6^\circ\text{F}$)-standard conditions. Apply the sealant at the specified temperature $\pm 2.8^\circ\text{C}$ ($\pm 5^\circ\text{F}$) (Fig. 1).

8.1.1.3 Immediately after sealant application place a second substrate onto the sealant to form an overlap of 6.45 cm^2 (1 in.²) (Fig. 1).

8.1.1.4 Using a template (Fig. 2), compress the overlaid sealant to form the 3.18-mm ($\frac{1}{8}$ -in.) thick overlap (Fig. 3).

8.1.1.5 Remove excess sealant from the specimen with a hot knife or spatula.

8.1.2 Oven Method:

8.1.2.1 Clean the substrate surface with soap and water followed by a water rinse and solvent wipe with MEK (Note 1).

8.1.2.2 Place sufficient sealant onto the substrate so that when compressed, a 6.45-cm^2 (1-in.²) overlap that will comply with 8.1.2.4 is obtained.

8.1.2.3 Separately place both the substrate with sealant and the overlapping substrate into an oven and condition for 30 min at the specified temperature.

8.1.2.4 Immediately upon removing the substrates from the oven, place the second substrate onto the sealant on the first substrate (Fig. 1). Using the template (Fig. 2), compress the overlaid sealant to form a 3.18-mm ($\frac{1}{8}$ -in.) thick overlap (Fig. 3).

8.1.2.5 Remove excess sealant from the specimen with a hot knife or spatula.

9. Conditioning

9.1 Condition all test specimens at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$)-standard conditions for at least 24 h prior to testing.

9.2 Additional conditioning may be done as specified by mutual agreement between the purchaser and sealant manufacturer.