Designation: C 679 – 03 (Reapproved 2009)ε1

Standard Test Method for Tack-Free Time of Elastomeric Sealants[1]

This standard is issued under the fixed designation C 679; 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 Department of Defense.

ε[1] NOTE—The term "standard conditions was added to 3.1 in March 2009.

1. Scope

1.1 This test method covers a procedure for the determination of the tack-free time property of single- and multi-component *elastomeric sealants* commonly used for sealing, *caulking*, and *glazing* in buildings and related construction.

1.2 This test method is applicable to *self-leveling* and *non-sag* grades of *sealant*. Sealants requiring slight heating to facilitate extrusion from the cartridge or gun are also described by this test method.

NOTE 1—See Specification C 920 for type and grade definitions.

1.3 The values stated in metric units are to be regarded as the standard. The values given in parentheses are provided for information purposes only.

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.*

NOTE 2—Currently, there is no ISO standard similar to this specification.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C 717 Terminology of Building Seals and Sealants

C 920 Specification for Elastomeric Joint Sealants

3. Terminology

3.1 *Definitions*—See Terminology C 717 for definitions of the following terms used in this test method: caulking, compound, cure, elastomeric, glazing, non-sag sealant, sealant, self-leveling sealant, and standard conditions.

4. Summary of Test Method

4.1 The test consists of lightly touching a surface of a curing sealant with a polyethylene film at regular intervals until the sealant does not attach itself to the film and the film appears clean when peeled from the surface.

4.2 More specifically a strip of polyethylene film is placed on the surface of the curing sealant and a 30-g (1.06-oz) weight is placed on the film. The weight is left in place for 30 s, then removed and the polyethylene strip is removed and examined for sealant attachment to the film. The length of time from when the sealant was first applied and tooled into the template until the time the sealant is no longer picked up by the film is called tack-free time.

4.3 With some sealants, interpretation of the end point is confusing in that a very thin film of sealant or oil will transfer to the film. For consistency of data, record the point where the bulk sealant is no longer transferred to the plastic but ignore the very thin uniform film of sealant or the plasticizer transferred to the plastic test strip.

5. Significance and Use

5.1 The tack-free time is a measure of the surface cure time and may generally be correlated to a variety of useful parameters such as the time interval before the sealant (*1*) resists damage by touch or light surface contact, (*2*) resists job-site or airborne dirt pick-up, (*3*) resists impinging rainfall.

5.2 The tack-free time is sometimes used as an on-the-job quality assurance test. A quality product that is consistent and reproducible will generally fall within a maximum and minimum tack-free time.

5.3 This test for tack-free time can be used at any temperature and humidity. It is important that if a sealant will be used in a climate quite different than the standard conditions called out in this test method, then those conditions be used to test the sealant.

[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.

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6. Apparatus

6.1 *Cabinet or Room*, capable of maintaining a temperature of 23 ± 2°C (73.4 ± 3.6°F) and 50 % ± 5 % relative humidity.

6.2 *Weight*, rectangular, with dimensions of 41 by 19 mm (1⅝ in. long by ¾ in. wide) and mass of 30 g (1.06 oz).

NOTE 3—The thickness of the weight should be approximately 6 mm (¼ in.) but planed to a thickness that will provide the 30-g (1.06-oz) mass.

6.3 *Polyethylene Strips*, several (often 6 or more), clear, low density with dimensions 127 by 25 by 0.15 mm (5 by 1 by 0.006 in.).

6.4 *Timer*, capable of measuring minutes and hours.

6.5 *Rectangular Plates*, several (often 6 or more), rectangular, approximately 152 by 76 mm (6 by 3 in.), made of non-porous material such as tin plated steel or aluminum.

6.6 *Template*, rectangular, of steel, brass or other suitable material, 3.2 mm (⅛ in.) thick with inside dimensions 95 by 25.4 mm (3¾ by 1 in.); outside dimensions approximately 120 by 31 mm (5¾ by 2 in.).

7. Sampling

7.1 The test sample shall consist of a factory-sealed can of compound (minimum contents, 450 mL or 1 pt) with an appropriate curing agent where applicable, or a standard cartridge, factory filled and sealed.

8. Procedure (see Fig. 1)

8.1 Thoroughly clean the templates and rectangular plates with methyl ethyl ketone, xylene, or similar solvent. (**Warning—**Methyl ethyl ketone, xylene, and similar solvents are both toxic and flammable and should be handled with caution in a well ventilated hood.)

8.2 Condition the sample of sealant in the original closed container for 24 h at 23 ± 2°C (73.4 ± 3.6°F) and 50 ± 5 % relative humidity. For single-component sealants, weigh out approximately 250 g of the sealant before testing. For multi-component sealants, thoroughly mix 250 g of the base compound with the appropriate amount of curing agent following the manufacturer's mixing instructions.

8.3 Prepare at least two specimens for each sealant as follows: Center the template on the metal plate and carefully fill it with sealant avoiding air pockets. Strike off the surface flat using a metal straightedge, to a uniform thickness.

8.4 *Relative Tack-Free Time Unknown*. If the relative tack-free time is unknown, the procedure is to pretest one of the test specimens by lightly touching the surface of the sealant with a film of polyethylene wrapped over the end of a finger. Touch the test piece in accordance with an appropriate time interval described in 8.5. Try to touch a different place on the surface each time. After the polyethylene wrapped finger is lightly touched to the surface of the sealant, it is immediately removed and examined to see if sealant was picked up on the polyethylene film. When no sealant is picked up on the polyethylene strip, perform the next test as described in 8.6.

8.5 *Time Intervals*—If the relative tack-free time is unknown, the procedure is to pretest, as in 8.4, one test specimen each minute for the first 10 min, each 2 min for the next 10 min, each 5 min for the next 160 min (3 h has elapsed), each hour for the next 69 h, each day until a positive result is achieved or until 21 days has elapsed. Table 1 summarizes the time intervals.

NOTE 4—Information provided by the manufacturer can save a great deal of time and lead the tester quickly to an appropriate time bracket.

8.6 After the pretest in 8.4 do the actual test by starting new, but just before the tack-free time estimated by the pretest. At the appropriate time lay a polyethylene strip over half of the same test specimen and gently place the brass weight on the strip and allow it to remain there for 30 s.

8.7 Remove the weight and then slowly withdraw the polyethylene strip pulling it with thumb and forefinger at 90° to the compound, at a constant rate of 1 in./15 s (see Fig. 1).

8.8 If the strip is clean or almost clean, repeat the test of 8.6 and 8.7 on a previously undisturbed test specimen.

8.9 If the strip is clean from the previously undisturbed test specimen, record the time from the moment the template was scraped level with a spatula until the pulling of this strip.

8.10 If the polyethylene strip still has sealant adhering to it, wait half the time of the preceding test time interval and repeat the test described in 8.6 and 8.7 on another undisturbed test piece.

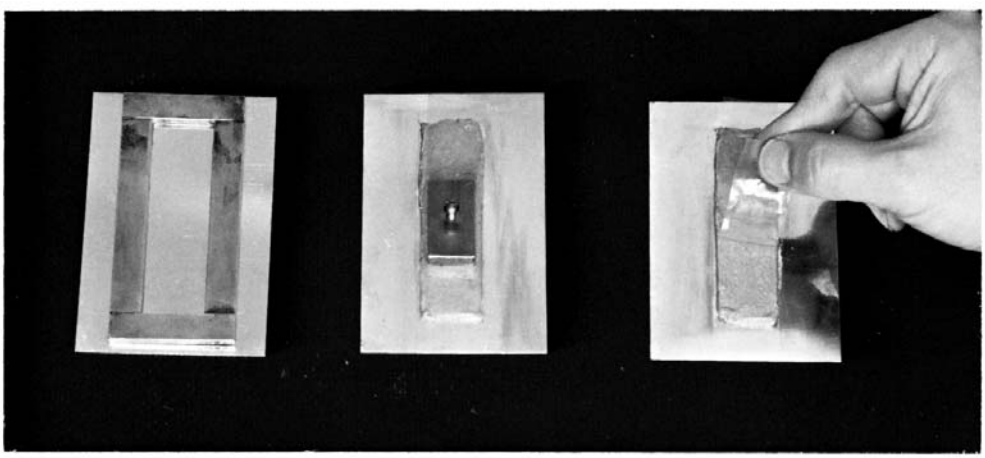

FIG. 1 Stages in the Tack-Free Time Test Procedure

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TABLE 1 Summary of Time Intervals

	For First 10 Min Test Each Minute	For Next 10 Min Test Each 2 Min	For Next 160 Min Test Each 5 Min	For Next 69 h Test Each Hour	For Next 18 Days Test Each Day
Total time elapsed	10 min	20 min	3 h	3 days	21 days

8.11 If the strip is again not clean, repeat 8.10 until a clean strip is achieved.

8.12 If an approximate tack-free time is known, consult Table 1 and choose the total elapsed time interval that matches the supposed tack-free time, back down one interval and start the pretest there and proceed with the pretest and test as described above.

8.13 If the tack-free time is shorter than anticipated, start with fresh specimens and pick a shorter elapsed time as the starting point.

8.14 If the tack-free time occurred at an occasion when no one was available to check it (that is, night or weekend) start the test over, at such a time where the anticipated final point will occur during working hours.

NOTE 5—Certain test conditions seem to have a particularly large influence on the accuracy of this test and therefore should be closely watched. Of prime importance is performing the test at the called out temperature and humidity.

TABLE 2 Precision Summary—Tack-Free Time for Chemical Curing Sealants (in hours)

Material	Average Value	Between Laboratories	Percent Between
D	0.278	0.047	17.138
C	0.306	0.076	25.059
B	12.200	6.340	51.970
A	16.300	2.636	16.173
E	53.600	27.005	50.383
Average	1 standard deviation		32.144

9. Report

9.1 Report the following information:

9.1.1 Trade name or other identification of the sealant tested.

9.1.2 Time of cure until no sealant was picked up on the polyethylene sheet from 8.9. The time should be reported to the nearest minute, nearest 2 min, or nearest 5 min, etc., as indicated by the time between tests. Record whether the film was clean or the film contained a thin layer of plasticizers.

9.1.3 For Type M sealants describe the mixing systems, the time taken to mix, and the time from after mixing and the start of the tack-free time test.

9.1.4 The temperature and relative humidity conditions utilized to generate the results, if different from standard conditions.

10. Precision and Bias [3]

10.1 Round-robin testing done at (23 ± 2°C) 73.4 ± 3.6°F and 50 ± 5 % relative humidity on five types of sealants by five laboratories indicates the precision between laboratories is 60 % of the test result (two standard deviations). No data is available to estimate precision within a laboratory. A summary of results is given in Table 2.

11. Keywords

11.1 sealants; tack; tack-free

[3] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR: C24–1024.

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