



Standard Specification for Elastomeric Joint Sealants¹

This standard is issued under the fixed designation C 920; 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.

^{ε1} NOTE—Editorial changes were made in July 2000.

1. Scope

1.1 This specification covers the properties of a cured single- or multicomponent cold-applied elastomeric joint sealant for sealing, caulking, or glazing operations on buildings, plazas, and decks for vehicular or pedestrian use, and types of construction other than highway and airfield pavements and bridges.

1.2 A sealant meeting the requirements of this specification shall be designated by the manufacturer to be one or more of the types, classes, grades, and uses defined in Section 7.

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

2. Referenced Documents

2.1 ASTM Standards:

- C 510 Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants²
- C 639 Test Method for Rheological (Flow) Properties of Elastomeric Sealants²
- C 661 Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer²
- C 679 Test Method for Tack-Free Time of Elastomeric Sealants²
- C 717 Terminology of Building Seals and Sealants²
- C 719 Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)²
- C 793 Test Method for Effects of Accelerated Weathering on Elastomeric Joint Sealants²
- C 794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants²
- C 1183 Test Method for Extrusion Rate of Elastomeric Sealants²
- C 1193 Guide for Use of Joint Sealants²

¹ This specification is under the jurisdiction of ASTM Committee C-24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.20 on General Sealant Standards.

Current edition approved March 10, 1998. Published July 1998. Originally published as C 920 – 79. Last previous edition C 920 – 95.

² Annual Book of ASTM Standards, Vol 04.07.

C 1246 Test Method for Effects of Heat Aging on Weight Loss, Cracking and Chalking of Elastomeric Sealants After Cure²

C 1247 Test Method for Sealants Exposed to Constant Immersion in Liquids²

3. Terminology

3.1 *Definitions*—Refer to Terminology C 717 for definitions of the following terms used in this specification: adhesive failure, caulking, chemically curing sealant, cohesive failure, cure, cured, elastomeric, glazing, joint, primer, seal, sealant.

4. Classification of Sealants

4.1 A sealant qualifying under this specification shall be classified as to type, grade, class, and use as follows:

4.1.1 *Type S*—A single-component sealant.

4.1.2 *Type M*—A multicomponent sealant.

4.1.3 *Grade P*—A pourable or selfleveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint at 4.4°C (40°F).

4.1.4 *Grade NS*—A nonsag or gunnable sealant that permits application in joints on vertical surfaces without sagging or slumping when applied at temperatures between 4.4 and 50°C (40 and 122°F).

4.1.5 *Class 25*—A sealant that when tested for adhesion and cohesion under cyclic movement (8.8) shall withstand an increase and decrease of at least 25 % of the joint width as measured at the time of application, and, in addition, meet all the requirements of this specification.

4.1.6 *Class 12½*—A sealant that when tested for adhesion and cohesion under cyclic movement (8.8) shall withstand an increase and decrease of at least 12½ % of the joint width as measured at the time of application, and, in addition, meet all the requirements of this specification.

4.1.7 *Use T*—A sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.

4.1.8 *Use NT*—A sealant designed for use in joints in nontraffic areas.

4.1.9 *Use I*—A sealant designed for use in joints which are submerged continuously in a liquid.

4.1.10 *Use M*—A sealant that meets the requirements of this specification when tested on mortar specimens in accordance with 9.9 and 9.10.

4.1.11 *Use G*—A sealant that meets the requirements of this specification when tested on glass specimens in accordance with 9.9-9.11.

4.1.12 *Use A*—A sealant that meets this specification when tested on aluminum specimens in accordance with 9.9 and 9.10.

4.1.13 *Use O*—A sealant that meets this specification when tested on substrates other than the standard substrates in accordance with 9.9 and 9.10.

5. Materials and Manufacture

5.1 A single-component sealant shall be a uniform mixture of a consistency suitable for immediate application by hand or pressure caulking gun or by hand tool. The sealant when completely cured shall form an elastomeric solid capable of maintaining a seal.

5.2 A multicomponent chemically curing sealant shall be furnished in two or more components. The resulting mixture shall be uniform and of a consistency suitable for immediate application by hand or pressure caulking gun, or by hand tool. The sealant when completely cured shall form an elastomeric solid capable of maintaining a seal.

6. General Requirements

6.1 Stability:

6.1.1 A single-component sealant, when stored in the original unopened container at temperatures of not more than 27°C (80°F) shall be capable of meeting the requirements of this specification for at least 6 months after date of delivery.

6.1.2 A multicomponent sealant, when stored in the original unopened container at temperatures of not more than 27°C (80°F) shall be capable of meeting the requirements of this specification for at least 6 months after date of delivery.

6.2 *Color*—The color of the sealant, after curing 14 days in a laboratory controlled at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) and 50 \pm 5 % relative humidity, shall be that color which has been agreed upon between the purchaser and the supplier.

6.3 The sealant shall be intended for use only on clean, dry surfaces. Where a primer is recommended by a manufacturer for a specific surface, all tests on that surface shall include the primer.

NOTE 1—The proper use of primers (or surface conditioners) in connection with the application of sealants is described in detail in Guide C 1193. This guide also describes proper methods for joint design, back-up materials, surface preparation, tooling of sealant, and other important procedures in sealant application in buildings.

6.4 The same conditions of time, temperature, and humidity shall be used for cure of test specimens for Test Methods C 661, C 719, C 794, and C 1247.

7. Significance and Use

7.1 This specification covers several classifications of sealants as described in Section 4 for various applications. It should be recognized by the purchaser or design professional that not all sealants meeting this specification are suitable for all applications and all substrates. It is essential, therefore, that

the applicable type, grade, class, and use be specified so that the proper classification of sealant is provided for the intended use. Test methods relate to special standard specimen substrates of mortar, glass, and aluminum. If tests are required using substrates in addition to or other than the standard, they should be so specified for testing.

8. Physical Requirements

8.1 Rheological Properties:

8.1.1 Grade P (pourable or selfleveling) sealant shall have flow characteristics such that when tested in accordance with Test Method C 639 it shall exhibit a smooth, level surface. (Refer to Types I and III in the test.)

8.1.2 Grade NS (nonsag) or gunnable sealant shall have flow characteristics such that when tested in accordance with Test Method C 639 it does not sag more than 4.8 mm ($\frac{3}{16}$ in.) in vertical displacement. Also the sealant shall show no deformation in horizontal displacement. (Refer to Types II and IV in the test.)

8.2 Extrusion Rate:

8.2.1 Type S (single component), Grade P (pourable or selfleveling) sealant shall have an extrusion rate of not less than 10 mL/min when tested in accordance with Test Method C 1183.

8.2.2 Type S (single component), Grade NS (nonsag or gunnable sealant) shall have an extrusion rate of not less than 10 mL/min when tested in accordance with Test Method C 1183.

8.3 Application Life:

8.3.1 Type M (multicomponent), Grade P (pourable or selfleveling) sealant, when tested in accordance with Test Method C 1183 shall be extrudable at a rate of not less than 10 mL/min 3 h after mixing.

8.4 Hardness:

8.4.1 Use T (traffic) sealant shall have a hardness reading, after being properly cured, of not less than 25 or more than 50 when tested in accordance with Test Method C 661.

NOTE 2—In applications of proper design, some sealants with less than 25 hardness may be used in traffic-bearing areas if recommended for use by the manufacturer and accepted by the purchaser.

8.4.2 Use NT (nontraffic) sealant shall have a hardness reading, after being properly cured, of not less than 15 or more than 50 when tested in accordance with Test Method C 661.

8.5 *Effects of Heat Aging*—The sealant shall not lose more than 7 % of its original weight or show any cracking or chalking when tested in accordance with Test Method C 1246.

8.6 *Tack-Free Time*—There shall be no transfer of the sealant to the polyethylene film when tested at 72 h in accordance with Test Method C 679.

8.7 *Stain and Color Change*—The sealant shall not cause any visible stain on the top surface of a white cement mortar base when tested in accordance with Test Method C 510.

8.8 *Adhesion and Cohesion Under Cyclic Movement*—The total loss in bond and cohesion areas among the three specimens tested for each surface shall be no more than 9 cm² ($1\frac{1}{2}$ in.²) when tested in accordance with Test Method C 719 with standard mortar, glass, and aluminum or any other specified substrates.

8.9 *Adhesion-in-Peel*—The peel strength for each individual test shall not be less than 22.2 N (5 lbf) when tested in accordance with Test Method C 794 with standard mortar, glass, and aluminum or any other specified substrate. In addition, the sealant shall show no more than 25 % adhesive bond loss for each individual test.

NOTE 3—Curing conditions are specified by all of the test methods cited. The manufacturer may request other conditions than those specified for the curing period provided they meet the following requirements: (1) the curing period shall extend for 21 days; (2) the temperature during the curing period shall not exceed 50°C (122°F); and (3) the amended curing conditions recommended by the manufacturer shall also be applied to the durability, adhesion in peel, and ultraviolet radiation exposure tests.

8.10 *Adhesion-in-Peel for Use G Exposed to Ultraviolet Exposure Through Glass*—The peel strength for each individual test shall not have less than 22.2 N (5 lbf) and the compound shall be no more than 25 % adhesive bond loss for each individual test when tested in accordance with Test Method C 794.

8.11 *Effects of Accelerated Weathering*—The sealant shall show no cracks greater than those shown in Example #2 of Fig. 1 in Test Method C 793 after the specified ultraviolet exposure and shall show no cracks greater than those shown in Example #2 of Fig. 2 in Test Method C 793 after exposure at cold temperature and the bend test when tested in accordance with Test Method C 793.

8.12 *Effects of Continuous Immersion for Use I Sealants:*

8.12.1 *Class 1*—After 6 weeks exposure, the total loss in bond and cohesion areas among the specimens tested for each substrate shall be no greater than 9.5 cm²(1.5 in.²) when tested according to Test Method C 1247 with standard glass, aluminum, or any other substrate specified.

8.12.2 *Class 2*—After 10 weeks exposure, the total loss in bond and cohesion areas among the specimens tested for each substrate shall be no greater than 9.5 cm²(1.5 in.²) when tested according to Test Method C 1247 with standard glass, aluminum, or any other substrate specified.

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9. Test Methods

9.1 *Standard Conditions for Laboratory Tests*—All tests described in the following paragraphs shall be performed in a laboratory controlled at 23 ± 2°C (73.4 ± 3.6°F) and 50 ± 5 % relative humidity. The sealant sample shall be conditioned at this temperature and relative humidity for at least 24 h before laboratory tests are made.

9.2 *Rheological Properties*—Test Method C 639.

9.3 *Extrusion Rate*—Test Method C 1183.

9.4 *Application Life*—Test Method C 1183.

9.5 *Hardness*—Test Method C 661.

9.6 *Effects of Heat Aging*—Test Method C 1246

9.7 *Tack-Free Time*—Test Method C 679.

9.8 *Stain and Color Change*—Test Method C 510.

9.9 *Adhesion and Cohesion After Cyclic Movement*—Test Method C 719.

9.10 *Adhesion-in-Peel*—Test Method C 794.

9.11 *Adhesion-in-Peel After Ultraviolet Exposure Through Glass*—Test Method C 794.

9.12 *Effects of Accelerated Weathering*—Test Method C 793.

9.13 *Sealants Exposed to Continuous Immersion*—Test Method C 1247.

10. Packaging and Marking

10.1 Packaged materials that are certified by the manufacturer to be in compliance with this specification shall be labeled as to type, class, grade, and use, in accordance with Section 7.

10.2 All certification to this specification shall state time, temperature, and humidity of cure used in the tests.

11. Keywords

11.1 continuous immersion; elastomeric sealants; joint sealants; sealants; specification