This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: C910 – 16 (Reapproved 2021)

Standard Test Method for Bond and Cohesion of One-Part Elastomeric Solvent Release-Type Sealants[1]

This standard is issued under the fixed designation C910; 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 determines the bond and cohesion of one-part, elastomeric, solvent release-type sealants after 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 concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—Currently there is no ISO standard similar to this test method.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C717 Terminology of Building Seals and Sealants

D1191 Test Method for Concrete Joint Sealers (Withdrawn 1996)[3]

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

3. Terminology

3.1 *Definitions*—Refer to Terminology C717 for definitions of the following terms used in this test method: elastomer, elastomeric, sealant, standard conditions, solvent-release sealant.

4. Apparatus

4.1 *Extension Machine,* as shown in Fig. 1, so designed that the test specimen can be automatically extended at a constant rate of 3.18 mm (⅛ in.)/h from a joint width of 12.7 mm (½ in.) to 14.29 mm (9⁄16 in.) at −23 ± 3 °C (−10 ± 5 °F).

4.2 *Oven,* forced-draft type, having temperature controlled at 70 ± 2 °C (158 ± 3.6 °F). See Specification E145.

4.3 *Oven,* convection type, having temperature controlled at 50 ± 1 °C (122 ± 2 °F).

4.4 *Freezer Chest or Cold Box,* having temperature controlled at −23 ± 3 °C (−10 ± 5 °F).

4.5 *Mortar Blocks,* six, prepared as described in Test Methods D1191, except that the blocks shall be approximately 25.4 mm (1 in.) wide by 76.2 mm (3 in.) long by 25.4 mm (1 in.) thick and surfaced by wet grinding on an iron lap with No. 60 silicon carbide or aluminum oxide grain.

4.6 *Plates,* six, of water-white polished float or plate glass approximately 25.4 mm (1 in.) wide by 76.2 mm (3 in.) long by 6.35 mm (¼ in.) thick.

4.7 *Aluminum Alloy Plates,* six, 6063-T5 or 6061-T6 clear anodized a minimum of 20 min over a scale-free finish, approximately 25.4 mm (1 in.) wide by 76.2 mm (3 in.) long by 6.35 mm (¼ in.) thick.

4.8 *Polyethylene Spacer Bars,* nine, approximately 12.7 mm (½ in.) by 12.7 mm (½ in.) by 50.8 mm (2 in.), 18 bars 12.7

[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 May 1, 2021. Published May 2021. Originally approved in 1979. Last previous edition approved in 2016 as C910–16. DOI: 10.1520/C0910-16R21.

[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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

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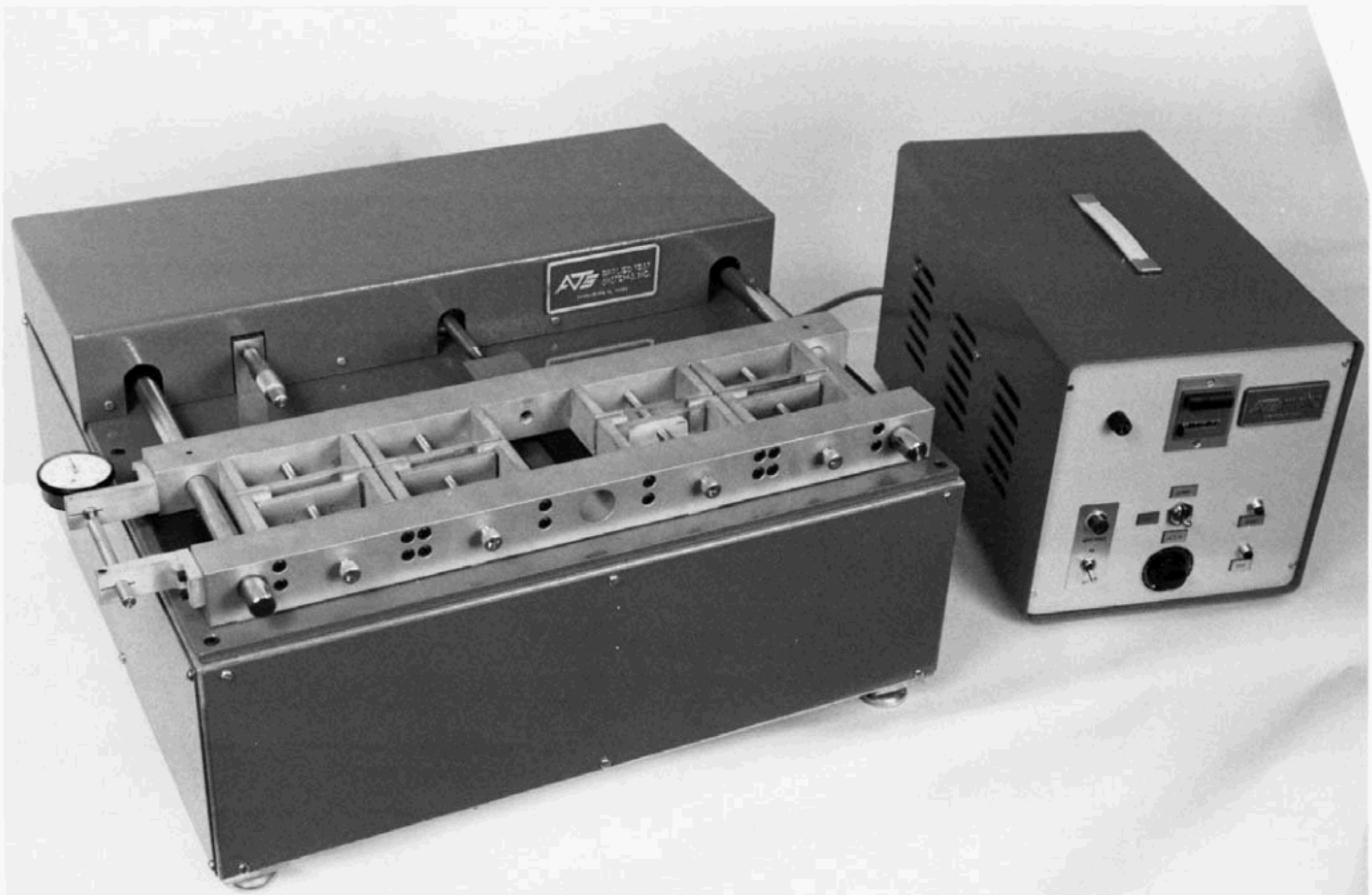

NOTE 1—Three-dimensional view of compression-extension machine with automatic control units shows four specimens ready for compression-extension cycling.

FIG. 1 Compression-Extension Machine

mm (½ in.) by 12.7 mm (½ in.) by 25.4 mm (1 in.) and 18 bars 14.29 mm (9⁄16 in.) by 6.35 mm (¼ in.) by 25.4 mm (1 in.).

5. Reagents

5.1 *Acetone or Methyl Ethyl Ketone Solvents.*

5.2 *Detergent Solution.*[4,5]

5.3 *Distilled Water.*

6. Sampling

6.1 Take all test specimens from a previously unopened container.

7. Procedure

7.1 Clean the glass and aluminum plate first with solvent, with detergent solution, followed by a final rinse with distilled water. Allow plates to air dry. Prepare the six mortar blocks as described in 4.5.

7.2 Precondition the unopened containers of sealant at standard conditions for a minimum of 24 h.

7.3 Prepare three test specimens for each substrate to be tested, as follows: Using the polyethylene spacer bars to control the joint dimensions, form a bead of sealant 12.7 mm (½ in.) wide by 12.7 mm (½ in.) thick by 50.8 mm (2 in.) long between the parallel 25.4 mm (1 in.) by 76.2 mm (3 in.) long faces of two similar blocks or plates.

7.4 Condition these specimens by allowing them to set for 24 h at standard conditions, then drying them in a convection oven for 7 days at 50 ± 1 °C (122 ± 2 °F).

7.5 Place the specimens in freezer for 24 h at −23 ± 3 °C (−10 ± 5 °F). Dislodge spacer bars from sealant, but do not remove spacer bars from assembled specimens.

7.6 Remove specimens from the freezer and condition them for 1 h at standard conditions.

7.7 Place the specimens in a forced-draft oven for 7 days at 70 ± 2 °C (158 ± 3.6 °F).

7.8 Remove the specimens from the oven. Place them in a freezer for 24 h at −23 ± 3 °C (−10 ± 5 °F).

7.9 Place the specimens, while frozen, in the grips of the extension machine and extend the joint width from the original

[4] Neodol 25-35, a registered trademark of Shell Oil Co., One Shell Plaza, Houston, TX 77002, has been found suitable.

[5] Dawn, a registered trademark of Proctor and Gamble Co., P.O. Box 579, Cincinnati, OH 54201, or Palmolive Green, a registered trademark of Colgate Palmolive Co., 300 T. Park Ave., New York, New York, have been found suitable for this purpose.

TABLE 1 Precision and Bias

C910 Bond Cohesion			Adhesion Loss[A]		
Material	Average	Estimated Standard Deviation Within Laboratory	Estimated Standard Deviation Between Laboratories	Repeat-ability Internal	Reproduci-bility
G1	0.056	0.114	0.120	0.32	0.34
G2	0.001	0.000	0.000	0.00	0.00
G3	0.065	0.144	0.158	0.41	0.45

C910 Bond Cohesion			Cohesion Loss[B]		
Material	Average	Estimated Standard Deviation Within Laboratory	Estimated Standard Deviation Between Laboratories	Repeat-ability Internal	Reproduci-bility
G1	0.001	0.000	0.000	0.000	0.000
G2	0.001	0.000	0.000	0.000	0.020
G3	0.015	0.035	0.036	0.099	0.102

[A] At 95 % confidence a variation of as much as 0.41 in.^{2} can be expected within a laboratory and 0.45 in.^{2} between laboratories.
[B] At 95 % confidence a variation of as much as 0.10 in.^{2} can be expected within a laboratory and 0.10 in.^{2} between laboratories.

12.7 mm (½ in.) to 14.29 mm (9⁄16 in.) at −23 ± 3 °C (−10 ± 5 °F) at the rate of 3.18 mm (⅛ in.)/h. After extension is completed, record any initial failure. Then apply appropriate spacers to maintain 14.29 mm (9⁄16 in.) thickness, remove specimens with spacers in place from machine and allow to warm for 3 h at 23 ± 2 °C (73.4 ± 3.6 °F). At this time examine specimens for adhesive or cohesive failure.

8. Report

8.1 Measure and record the loss in adhesive or cohesive failure, or both, in square centimetres (or square inches) for each individual test specimen of mortar, glass, and aluminum.

9. Precision and Bias[6]

9.1 The precision and bias calculations for this test method are based on the results of four laboratories testing three materials using five specimens. The results are given in Table 1.

10. Keywords

10.1 bend; cohesion; elastomeric; solvent-release sealant

[6] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:C24-1023.

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