



Designation: C1216/C1216M – 13

# Standard Test Method for Adhesion and Cohesion of One-Part Elastomeric Solvent Release Sealants<sup>1</sup>

This standard is issued under the fixed designation C1216/C1216M; 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 is a laboratory procedure that determines the adhesion and cohesion performance of one-part elastomeric, solvent release sealants at high and low temperatures by the extension and compression of test specimens.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 The subcommittee with jurisdiction is not aware of any similar ISO standard.

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.* For a specific precautionary statement, see [Note 2](#).

## 2. Referenced Documents

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

[C33 Specification for Concrete Aggregates](#)

[C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars \(Using 2-in. or \[50-mm\] Cube Specimens\)](#)

[C150 Specification for Portland Cement](#)

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

2.2 *Aluminum Association Standard:*

[DAF-45 Designation System for Aluminum Finishes](#)<sup>3</sup>

<sup>1</sup> 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, 2013. Published June 2013. Originally approved in 1992. Last previous edition approved in 2008 as C1216 – 03(2008). DOI: 10.1520/C1216\_C1216M-13.

<sup>2</sup> 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.

<sup>3</sup> Available from Aluminum Association, 900 19th St. NW, Washington, DC 20006.

## 3. Terminology

3.1 *Definitions*—Refer to Terminology [C717](#) for definitions of the following terms used in this test method: adhesive failure, bond breaker, cohesive failure, elastomeric, joint, primer, sealant, solvent release sealant, substrate, and standard conditions.

## 4. Significance and Use

4.1 The failure of a building sealant in a joint that experiences movement is manifested by cohesive failure in the sealant or adhesive failure between the sealant and substrate, or both. This test method evaluates the performance of one-part elastomeric solvent release sealants in joints subjected to movement and temperature aging.

## 5. Apparatus

5.1 *Extension-Compression Machine*, as shown in [Fig. 1](#), designed to extend the test specimens automatically at a constant rate of 3.20 mm [ $\frac{1}{8}$  in.]/h from a joint width of 11.2 mm [ $\frac{7}{16}$  in.] to 14.29 mm [ $\frac{9}{16}$  in.] at  $-12 \pm 2.8^\circ\text{C}$  [ $+10 \pm 5^\circ\text{F}$ ].<sup>4</sup>

5.2 *Oven*, forced-draft type, having the temperature controlled to  $70 \pm 1^\circ\text{C}$  [ $158 \pm 2^\circ\text{F}$ ].

5.3 *Oven*, convection type, having the temperature controlled to  $50 \pm 1^\circ\text{C}$  [ $122 \pm 2^\circ\text{F}$ ].

5.4 *Freezer Chest or Cold Box*, having the temperature controlled to  $-12 \pm 2.8^\circ\text{C}$  [ $+10 \pm 5^\circ\text{F}$ ].

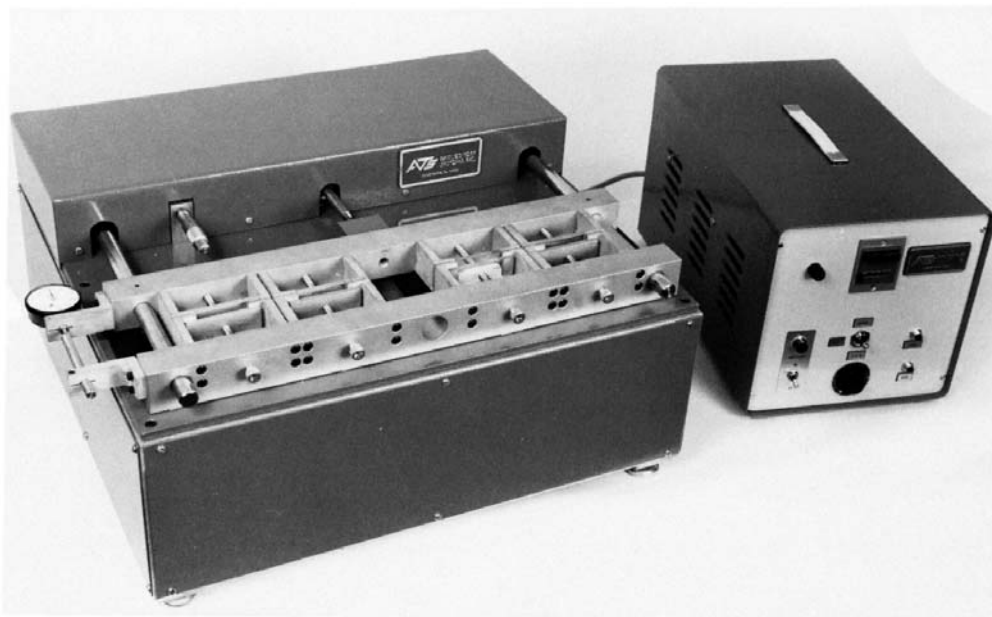
5.5 *C-Clamps*, or other clamping devices.

## 6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that

<sup>4</sup> Series 520 Sealant Compound Tester, manufactured by Applied Test Systems, Inc., 348 New Castle Rd., Butler, PA 16001, and a durability tester manufactured by Ambard, Inc., 269-11 Sist Ave., New Hyde Park, NY 11040, have been found suitable for this purpose.

The sole source of supply of the apparatus known to the committee at this time is Applied Test Systems and Ambard. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,<sup>1</sup> which you may attend.



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

all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.<sup>5</sup> Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 Acetone or Methyl Ethyl Ketone Solvents.

6.3 Detergent Solution.<sup>6</sup>

6.4 Distilled Water.

6.5 Primer, if required.

## 7. Sealants, Substrates, and Accessories

7.1 The sealants shall be obtained from previously unopened containers. Precondition the unopened containers of sealant at standard conditions as defined in Terminology C717 for a minimum of 24 h.

7.2 The standard substrates used in the test shall be Portland cement mortar, float glass, and aluminum alloy.

NOTE 1—When requested, other substrates such as brick, marble, etc. may be specified by the purchaser in addition to the standard substrates.

7.2.1 Mortar blocks, six, prepared as described in 8.2. The blocks shall be 25.4-mm [1-in.] wide by 76.2-mm [3-in.] long by 25.4-mm [1-in.] thick.

<sup>5</sup> Reagent Chemicals, American Chemical Society Specifications, Am. Chemical Soc., Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Reagent Chemicals and Standards*, by Joseph Rosin, D. Van Nostrand Co., Inc., New York, NY, and the *United States Pharmacopeia*.

<sup>6</sup> Dawn, a registered trademark of Procter and Gamble, Co., P.O. Box 599, Cincinnati, OH 54201, or Palmolive Green, a registered trademark of Colgate Palmolive Co., 300-T Park Ave., New York, NY 10022, have been found suitable for this purpose.

7.2.2 Glass Plates, six, of clear float glass 25.4-mm [1-in.] wide by 76.2-mm [3-in.] long by 6.35-mm [ $\frac{1}{4}$ -in.] thick. The float glass may require reinforcement to survive the rigors of the subsequent test procedure. This must be completed prior to the compression-extension cycling described in Section 10. Reinforcement is provided by adhering aluminum plates, 25.4-mm wide by 76.2-mm long by 6.35-mm thick, to the outside surfaces of the glass. Commercially available two-part epoxies are suitable as adhesives. Although the time of reinforcement is not critical, it has been found convenient to apply the aluminum plates to the glass before preparing the test specimens.

7.2.3 Aluminum Plates, six, 6063-T5 or 6061-T6 alloy clear, 25.4-mm [1-in.] wide by 76.2-mm [3-in.] long by 6.35-mm [ $\frac{1}{4}$ -in.] thick and anodized to AA-M32C12A31 quality as described by DAF-45.

7.3 Rigid Spacer Bars, nine, 12.7 mm [ $\frac{1}{2}$  in.] by 12.7 mm by 50.8 mm [2 in.]; 18 bars 12.7 mm by 12.7 mm by 25.4 mm [1 in.]; 18 bars 14.29 mm [ $\frac{9}{16}$  in.] by 6.35 mm [ $\frac{1}{4}$  in.] by 25.4 mm [1 in.]; and 18 bars 11.1 mm [ $\frac{7}{16}$  in.] by 6.35 mm by 25.4 mm.

7.4 Release Paper, or other suitable material, if necessary, to serve as a bond breaker to spacer bars for the preparation of test specimens.

## 8. Preparation of Substrates

8.1 Prior to use, the glass and aluminum (and, when specified, other metallic substrates) shall be cleaned by wiping the surface with methyl ethyl ketone or a similar solvent. Dip the surface in a 0.1 % detergent solution of a clear hand dishwashing detergent in distilled or deionized water. Rinse the surface without touching it in distilled or deionized water and allow it to air dry.