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Standard Specification for Preformed Architectural Compression Seals for Buildings and Parking Structures¹

This standard is issued under the fixed designation E1612/E1612M; 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 specification covers the physical requirements for the fully cured elastomeric alloy and the movement capabilities of preformed architectural compression seals used for sealing expansion joints in buildings and parking structures. The preformed architectural compression seal is a rectangular elastomeric extrusion, having an internal baffle system produced continuously and longitudinally throughout the material. The architectural compression seal functions under compression and is usually chemically bonded in place with an adhesive.

NOTE 1—Movement capability is defined in Test Method E1399/E1399M.

1.2 This specification covers all colors of architectural compression seals.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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.*

¹ This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

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2. Referenced Documents

2.1 ASTM Standards:²

- D395 Test Methods for Rubber Property—Compression Set
- D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D471 Test Method for Rubber Property—Effect of Liquids
- D518 Test Method for Rubber Deterioration—Surface Cracking (Withdrawn 2007)³
- D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- D746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
- D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D865 Test Method for Rubber—Deterioration by Heating in Air (Test Tube Enclosure)
- D1052 Test Method for Measuring Rubber Deterioration—Cut Growth Using Ross Flexing Apparatus
- D1149 Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment
- D2000 Classification System for Rubber Products in Automotive Applications
- D2240 Test Method for Rubber Property—Durometer Hardness
- D3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products
- E577 Guide for Dimensional Coordination of Rectilinear Building Parts and Systems (Withdrawn 2011)³
- E631 Terminology of Building Constructions
- E1399/E1399M Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems

3. Terminology

3.1 *Definitions*—Terms defined in Terminology E631 will prevail for terms not defined in this specification.

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.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *architectural compression seal*—a preformed extrusion, manufactured from a fully cured elastomeric alloy, having an internal baffle system produced continuously and longitudinally throughout the material without flanges or means of securing it mechanically.

3.2.2 *architectural joint system*—any filler or cover, except poured or formed in place sealants, used to span, cover, fill, or seal a joint.

3.2.2.1 *Discussion*—Joint is defined in Guide E577.

4. Materials and Manufacture

4.1 The architectural compression seal shall be a preformed extrusion manufactured from a fully cured elastomeric alloy. This alloy shall be classified under Classification System D2000 as either of the following:

- 4.1.1 M2CE 706 A16B15C12C20F19Z1Z2, or
- 4.1.2 M2CE 708 A16B15C12C20F19Z1Z2.

4.2 Z1 represents more than 2 000 000 flex cycles as tested under the Ross Flex Test, Test Method D1052.

4.3 Z2 represents a 40 % maximum compression set as in accordance with Test Methods D395, Method B, 22 h at 125 °C [257 °F] at 25 % deflection.

5. Physical Requirements

5.1 The fully cured elastomeric alloy supplied in plaque form shall conform to the material requirements prescribed in Table 1.

5.2 The finished architectural joint seal shall conform to the material requirements prescribed in Table 2.

5.3 The movement capabilities shall be established using Test Method E1399/E1399M.

6. Dimensions, Mass, and Permissible Variations

6.1 The size, shape, internal structure, and tolerances shall be as agreed upon by the purchaser and the producer or supplier.

7. Workmanship, Color, and Appearance

7.1 The architectural compression seal shall be free of defects in workmanship. Defects in the extrusion shall consist of the following:

- 7.1.1 Holes,
- 7.1.2 Air bubbles, and
- 7.1.3 Parts not conforming to 6.1.

TABLE 1 Requirements for Fully Cured Elastomeric Alloy Injection Molded Plaques

Property	Requirement	Test Method
Tensile strength, min, MPa [psi]	4.3 [625]	D412
Elongation at break, min, %	300	D412
Hardness, Type A durometer, points (5 s delay)	61–76	D2240
Specific gravity at 23 °C [73 °F]	0.93–1.13	D792
100 % modulus, min, MPa [psi]	1.7 [250]	D412
Weight gain, max, % (24 h at 121 °C [73 °F] ASTM No. 3 Oil)	95	D471

TABLE 2 Material Requirements for Architectural Compression Seals

Property	Requirement	Test Method
Tensile strength, min, MPa [psi]	4.3 [625]	D412
Elongation at break, min, %	300	D412
Hardness, Type A durometer, points (5 s delay)	68 ± 8	D2240
Ozone resistance, 1 ppm, 100 h at 40 °C [104 °F] 7 × magnification	No Cracks	D1149
Compression set, % max, 22 h at 100 °C [212 °F]	35	D395
Compression set, % max, 70 h at 100 °C [212 °F]	40	D395
Heat aging, 70 h at 100 °C [212 °F] change in:		D865
Hardness, Shore A, max, points (5 s delay)	4	
Ultimate tensile strength, max, % loss	15	
Ultimate elongation, max, % loss	15	
Tear resistance, min, N/mm [lb/in.]	21 [120]	D624
Brittleness temperature, min, °C [°F]	–48 [–55]	D746
Water absorption, max, % loss/gain	4	D471

7.2 The cross section of the seal shall be as agreed upon by the purchaser and the producer or supplier.

7.3 The color of the seal shall be as agreed upon by the purchaser and the producer or supplier.

8. Significance and Use

8.1 Architectural compression seals included in this specification shall be those as follows:

- 8.1.1 Without frames.
- 8.1.2 Without flanges and nosing material(s).
- 8.1.3 Used in interior or exterior applications.
- 8.1.4 Used in any construction of the building.

8.2 This specification will give users, producers, building officials, code authorities, and others a basis for verifying material and performance characteristics of representative specimens under common test conditions. This specification will produce data on the following:

- 8.2.1 The physical properties of the fully cured elastomeric alloy.
- 8.2.2 The movement capability in relation to the nominal joint width as defined under Test Method E1399/E1399M.

8.3 This specification compares similar architectural compression seals but is not intended to reflect the system’s application. “Similar” refers to the same type of architectural compression seal within the same subsection under 8.1.

8.4 This specification does not provide information on the following:

- 8.4.1 Durability of the architectural compression seal under actual service conditions, including the effects of cycled temperature on the compression seal.
- 8.4.2 Loading capability of the system and the effects of a load on the functional parameters established by this specification.
- 8.4.3 Shear and rotational movements of the specimen.
- 8.4.4 Any other attributes of the specimen, such as fire resistance, wear resistance, chemical resistance, air infiltration, watertightness, and so forth.
- 8.4.5 Testing or compatibility of substrates.

8.4.6 Strip seals.

8.4.7 Architectural compression seals used with frames.

8.4.8 Architectural compression seals used with flanges and nosing material(s).

8.5 This specification is intended to be used only as one element in the selection of an architectural compression seal for a particular application. It is not intended as an independent pass or fail acceptance procedure. Other standards shall be used in conjunction with this specification to evaluate the importance of other service conditions such as durability, structural loading, and compatibility.

9. Sampling

9.1 The fully cured elastomeric alloy injection-molded plaques shall be sampled and tested to determine material conformance to [Table 1](#).

9.2 The finished part shall also be sampled and tested to determine whether the part conforms to the material requirements given in [Table 2](#), tolerances, design, and the producer's functional parameters in accordance with Test Method [E1399/E1399M](#).

9.3 A lot of material shall consist of the following quantity for each:

9.3.1 A specified mass as manufactured by the producer. Sample each lot.

9.3.2 A cross section as manufactured by the producer. Sample each lot.

9.4 Obtain samples by one of the following methods:

9.4.1 Take samples provided by the producer.

9.4.2 Take samples at random from each shipment.

9.5 A sample constitutes a minimum, as required, to perform the tests but not less than the following:

9.5.1 23 kg [50 lb] of the fully cured elastomeric alloy in pellet form.

9.5.2 2.8 m [9 lf] of each specific size and cross section of the finished part.

10. Specimen Preparation

10.1 Maintain the laboratory at a temperature of 23 °C ± 2 °C [73 °F ± 4 °F].

10.2 Maintain the laboratory at a relative humidity of 50 % ± 5 %.

10.3 *Test Plaque Specimens:*

10.3.1 Use equipment in accordance with [Annex A1](#).

10.3.2 Produce 20 quality assurance test plaques in accordance with [Annex A2](#).

10.4 *Compression Seal Specimens:*

10.4.1 Cut all test specimens from the architectural compression seal sample. Except as otherwise specified in the applicable specifications or test methods given in [Table 2](#), prepare the test specimens in accordance with the requirements of Practice [D3183](#).

10.4.2 Prepare the test specimens for determining tensile strength and elongation using Die C (Test Methods [D412](#)) or

Die D when the flat sections of a seal are too small for Die C. However, the requirements of [Table 2](#) shall apply regardless of the die used.

10.4.3 The grain or flow pattern for all specimens prepared for tensile strength and elongation testing (Test Methods [D412](#)) shall be parallel to the length of the die.

10.4.4 Prepare the test specimens for ozone resistance in accordance with Procedure A of Test Method [D518](#), and wipe them with toluene before testing to remove surface contamination.

10.4.5 The grain or flow pattern for all specimens prepared for tear resistance testing (Test Method [D624](#)) shall be perpendicular to the length of the die.

11. Test Methods

11.1 Determine compliance of the fully cured elastomeric alloy injection-molded plaques with the requirements of [Table 1](#) by conducting the tests in accordance with the test methods specified.

11.2 Determine compliance of the architectural compression seal material with the requirements of [Table 2](#) by conducting the tests in accordance with the test methods specified.

11.3 Determine compliance with the manufacturer's performance data by conducting the tests in accordance with Test Method [E1399/E1399M](#).

12. Acceptance

12.1 The acceptance of the architectural compression seal shall be based on one or more of the following procedures, when specified by the purchaser:

12.1.1 When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected, or both, as directed in this specification and that the requirements have been met. When specified in the purchase order or contract, a report of the test results from [Tables 1 and 2](#) shall be furnished.

12.1.2 When specified in the purchase order or contract, certified test results shall be provided by an independent testing agent.

12.1.3 Testing by the purchaser of any or all properties shall be in accordance with the provisions of this specification. The results shall be accompanied by a statement from an independent expert witness certifying that the material has been sampled, tested, and inspected in accordance with the provisions of this specification.

13. Product Marking

13.1 The architectural compression seals shall be packaged for shipment in containers or on spools or pallets marked clearly with the name of the producer or supplier, or both, size of the seal, lot number, ASTM standard number, and date of manufacture.

14. Precision and Bias

14.1 *Precision*—The precision of this sample preparation will be determined when experience with its use has grown sufficiently to justify a cooperative study.