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

This standard is issued under the fixed designation E1783/E1783M; 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 strip seal is an elastomeric extrusion. This extrusion is either a membrane or tubular having an internal baffle system produced continuously and longitudinally throughout the material. These extrusions are secured in or over a joint by locking rails or an end dam nosing material. The architectural strip seal is compressed and expanded by this mechanical or chemical attachment.

NOTE 1—Movement capability is defined in Test Method [E1399/E1399M](#).

1.2 This specification covers all colors of architectural strip seals.

NOTE 2—The products described in this specification are manufactured from thermoplastic elastomers defined as “fully cured elastomeric alloys” in Test Method [D5048](#).

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.*

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](#)

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 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.

- ~~D518 Test Method for Rubber Deterioration—Surface Cracking (Withdrawn 2007)~~³
- D573 Test Method for Rubber—Deterioration in an Air Oven
- 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
- D5048 Test Method for Measuring the Comparative Burning Characteristics and Resistance to Burn-Through of Solid Plastics Using a 125-mm Flame
- ~~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 document.

3.1.1 *architectural strip seal—seal, n—*a preformed membrane or tubular extrusion, manufactured from a fully cured elastomeric alloy, having flanges or other means of mechanically or chemically securing it.

3.1.1.1 *Discussion—*

Joint is defined in Guide E577.

4. Materials and Manufacture

4.1 The architectural strip seal shall be a preformed extrusion manufactured from a fully cured elastomeric alloy. This alloy shall be classified under Classification D2000.

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 strip seal shall be free of defects in workmanship. Defects in the extrusion consist of the following:

TABLE 1 Requirements for Fully Cured Elastomeric Alloy Injection Molded Plaques

Property	Requirement						Test Method
	Type I	Type II	Type III	Type IV	Type V	Type VI	
Tensile strength, min, MPa [psi]	13.8 [2000]	9.7 [1400]	7.2 [1050]	6.0 [870]	5.8 [850]	5.8 [850]	D412
Elongation at break, min,%	500	460	380	350	340	340	D412
Hardness, Type A durometer, points (5 s delay)	87 ± 3	80 ± 3	73 ± 3	70 ± 3	67 ± 3	64 ± 3	D2240
Relative density at 23 °C [73 °F]	0.95 ± 0.02	0.96 ± 0.02	0.97 ± 0.02	0.97 ± 0.02	0.97 ± 0.02	0.97 ± 0.02	D792
100 % Modulus, min, MPa [psi]	6.1 [890]	3.8 [550]	2.8 [400]	2.2 [320]	1.9 [280]	1.9 [280]	D412
Mass gain, max %, (24 h at 121 °C [23 °F])	60	75	80	90	95	95	D471

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TABLE 2 Material Requirements for Architectural Strip Seals

Property	Requirement						Test Method
	Type I	Type II	Type III	Type IV	Type V	Type VI	
Tensile strength, min, MPa [psi]	13.8 [2000]	9.7 [1400]	7.2 [1050]	6.0 [870]	5.8 [850]	5.8 [850]	D412
Elongation at break, min, %	500	460	380	350	340	340	D412
Hardness, Type A durometer, points (5 s delay)	87 ± 3	80 ± 3	73 ± 3	70 ± 3	67 ± 3	64 ± 3	D2240
Ozone resistance 1 ppm 100 h at 40 °C [104 °F] 7× magnification	no cracks	no cracks	no cracks	no cracks	no cracks	no cracks	D792
Compression set, % max, 22 h at 100 °C [212 °F]	45	40	38	35	35	35	D412
Compression set, % max, 70 h at 100 °C [212 °F]	50	45	43	40	40	40	D471
Heat aging, 70 h at 100 °C [212 °F] change in:							D865
Hardness, Shore A, max, points (5 s delay)	3	3	3	3	3	3	
Ultimate tensile strength max, % loss	5	5	5	5	5	5	
Ultimate elongation max, % loss	5	5	5	5	5	5	
Tear resistance, min, N/mm [lb/in.]	45 [257]	30 [171]	20 [114]	20 [114]	20 [114]	20 [114]	D624
Brittleness temperature, min, °C [°F]	-61 [-78]	-62 [-80]	-60 [-76]	-56 [-69]	-63 [-81]	-63 [-81]	D746
Water absorption, max, % loss/gain	5	5	6	6	7	7	D471

7.1.1 Holes,

7.1.2 Air bubbles, and

7.1.3 Parts not conforming to 6.1.

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. Specimen Preparation

8.1 Maintain laboratory at a temperature of 23 ± 2 °C [73 ± 4 °F]. 23 °C \pm 2 °C [73 °F \pm 4 °F].

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

8.3 *Test Plaque Specimens:*

8.3.1 Use equipment in accordance with Annex A1.

8.3.2 Produce 20 quality assurance test plaques in accordance with Annex A2.

8.4 *Strip Seal Specimens:*

8.4.1 Cut all test specimens from the architectural strip 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.

8.4.2 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.

8.4.3 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.

8.4.4 Prepare the test specimens for ozone resistance in accordance with Procedure A Method B Procedure B1 of Test Method D518D1149, and wipe them with toluene before testing to remove surface contamination.

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

9. Significance and Use

9.1 Architectural strip seals included in this specification shall be those:

- 9.1.1 Extruded as a membrane,
- 9.1.2 Extruded as tubular,
- 9.1.3 With frames,
- 9.1.4 With flanges mechanically secured,
- 9.1.5 With flanges chemically secured,
- 9.1.6 Used in interior or exterior applications, and
- 9.1.7 Used in any construction of the building.

9.2 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:

- 9.2.1 The physical properties of the fully cured elastomeric alloy, and
- 9.2.2 The movement capability in relation to the nominal joint width as defined under Test Method **E1399/E1399M**.

9.3 This specification compares similar architectural strip seals but is not intended to reflect the system's application. "Similar" refers to the same type of architectural strip seal within the same subsection under **9.1**.

9.4 This specification does not provide information on the following:

- 9.4.1 Durability of the architectural strip seal under actual service conditions, including the effects of cycled temperature on the strip seal;
- 9.4.2 Loading capability of the system and the effects of a load on the functional parameters established by this specification;
- 9.4.3 Shear and rotational movements of the specimen;
- 9.4.4 Any other attributes of the specimen, such as fire resistance, wear resistance, chemical resistance, air infiltration, watertightness, and so forth; and

NOTE 3—This specification addresses fully cured elastomeric alloys. Test Methods **D395**, **D573**, **D1052**, and **D1149** are tests better suited for evaluating thermoset materials.

9.4.5 Testing or compatibility of substrates.

9.5 This specification is intended to be used as only one element in the selection of an architectural strip 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.

10. Sampling

10.1 The fully cured elastomeric alloy injection molded plaques shall be sampled and tested to determine material conformance to **Table 1**.