Designation: D7349/D7349M – 15 (Reapproved 2019)

Standard Test Method for Determining the Capability of Roofing and Waterproofing Materials to Seal Around Fasteners[1]

This standard is issued under the fixed designation D7349/D7349M; 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 qualitative test method determines the capability of asphalt-based roofing or waterproofing material to seal around a fastener that penetrates the material and prevent transmission of liquid water through the material at the penetration under defined conditions.

1.2 This test method is provided for adoption by ASTM or other consensus-based roofing and waterproofing product specifications as a standardized means to evaluate capability to seal around a fastener. Performance of this test method after subjecting the product to conditioning intended to simulate environmental stresses and strains is not prohibited.

1.3 The text of this test method references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.4 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 nonconformance with the standard.

1.5 *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.*

1.6 *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]

D1079 Terminology Relating to Roofing and Waterproofing

D3462/D3462M Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules

D5147/D5147M Test Methods for Sampling and Testing Modified Bituminous Sheet Material

F1667 Specification for Driven Fasteners: Nails, Spikes, and Staples

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D1079.

4. Summary of Test Method

4.1 The capability of asphalt-based roofing or waterproofing materials to seal around a penetrating fastener and prevent the passage of liquid water at the fastener/material interface is determined by penetrating the material with a fastener, erecting a water column over that penetration, and monitoring the assembly for water passage for a period of time.

4.2 The test method includes protocols that establish levels for the test method parameters. The protocol used to evaluate a material is designated in a standard specification for the material or by the user of this test method.

5. Significance and Use

5.1 In some situations, penetration through asphalt-based roofing or waterproofing materials by fasteners is a required part of the material installation process or occurs during installation of other system components. When fasteners penetrate the material as a purposeful and planned part of the construction process, it is reasonable to expect that materials designed to limit migration of liquid water at the interface between the penetrating fastener and the material will do so. This qualitative test method provides a means to evaluate the

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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.

ability of a material to limit water migration at fastener penetrations when tested under defined conditions.

6. Apparatus

6.1 *Specimen Roller*—A roller having a mass of 11.8 kg [26 lb] ± 0.5 %, diameter of 125 mm [5 in.] ± 5 %, and width of 125 mm [5 in.] ± 5 %.

6.2 *Water Column Container*—A 4-L [1-gal] can with the bottom cut out.

6.3 *Sealant*—Any commercially available sealant suitable for sealing the water column container to the roofing or waterproofing material that will not adversely affect the roofing or waterproofing material.

6.4 *Fastener*—The item that penetrates the test specimen. Use one fastener for each test specimen. Refer to Table 1.

6.5 *Substrate*—The material to which the test specimen is attached prior to penetration with the fastener. One piece 255 by 255 mm [10 by 10 in.] ± 5 % is required for each test specimen. Refer to Table 1.

6.6 *Intervening Material*—A material placed between the test specimen and the fastener. Refer to Table 1.

7. Sampling

7.1 From each lot of roofing or waterproofing material, select sample rolls in accordance with Test Methods D5147/D5147M.

7.2 The rolls so selected shall constitute the representative sample used for all tests pertaining to the lot of material being examined.

8. Test Specimens

8.1 Each test specimen shall consist of one piece of roofing or waterproofing material, 255 by 255 mm [10 by 10 in.] ± 5 % in size, selected at random from a sample roll.

8.2 At least one test specimen shall be selected from each sample roll.

8.3 Condition test specimens at 23 ± 2 °C [73.4 ± 3.6 °F] and 50 ± 10 % relative humidity for at least 4 h prior to test assembly preparation.

9. Test Assembly Preparation

9.1 Select a protocol from Table 1 for the material to be evaluated (see Appendix X1) or use the protocol designated by the standard specification for the material. Specify the number of specimens to be selected from each sample roll.

9.2 Prepare one test assembly for each test specimen, assembling the materials in accordance with these instructions and as illustrated in Fig. 1. Use the substrate, intervening material, fastener, and fastener driving method specified by the selected protocol (see Table 1).

9.3 Apply the test specimen to the substrate specified in the selected protocol (see Table 1, Substrate) as follows:

9.3.1 *Self-Adhesive Materials*—Peel the release paper or film off the roofing or waterproofing specimen and lightly place the specimen on the substrate, centering the specimen on the substrate with the edges of the specimen and substrate aligned. Roll the specimen to promote adhesion to the substrate using the specimen roller, completing a total of three back-and-forth cycles. Each cycle shall be completed in 4 to 6 s.

9.3.2 *Nonself-Adhesive Materials*—Place the specimen on the substrate, centering the specimen on the substrate with the edges of the specimen and substrate aligned.

9.4 Place two pieces of lumber, oriented parallel to each other and spaced 50 ± 10 mm [2 ± 0.5 in.] apart, underneath the substrate for support.

9.5 Place the intervening material specified in the selected protocol (see Table 1, Intervening Material) on top of the test specimen, centering it in both directions.

9.6 Drive one fastener specified in the selected protocol (see Table 1, Fastener) through the intervening material (if present), test specimen, and substrate near the center of the specimen in the area between the two pieces of supporting lumber in the manner specified in the selected protocol (see Table 1, Fastener Driving Method).

9.7 Place the water column container on the specimen, centered over the fastener. Apply a 6 to 10-mm [0.25 to 0.375-in.] bead of sealant completely around the outside rim of the water column container to bond it to the specimen. Allow a minimum of 2 h for the sealant to set, then apply another bead around the inside rim of the water column container.

9.8 Maintain the test assembly at 23 ± 2 °C [73.4 ± 3.6 °F] and 50 ± 10 % relative humidity for 24 h to allow the sealant to cure.

9.9 After the sealant has cured, condition the test assembly as specified in the selected protocol (see Table 1, Test Assembly Conditioning).

10. Procedure

10.1 Conduct the test using the water depth, test temperature, and test period specified in the selected protocol (see Table 1).

10.2 Place the test assembly atop a 4-L [1-gal] can from which the lid has been removed.

10.3 Fill the water column container to the depth specified in the selected protocol (see Table 1, Water Depth) with deionized or distilled water.

10.4 Place the test assembly and 4-L [1-gal] bottom can in a temperature controlled chamber maintained at the temperature specified by the selected protocol (see Table 1, Test Temperature).

10.5 Maintain the test assembly at the test temperature for the test period specified by the selected protocol (see Table 1, Test Period).

10.6 At the conclusion of the test period, remove the test assembly from the 4-L [1-gal] bottom can, carefully pour the water from the water column container without splashing onto the substrate, and blot the inside of the water column container dry. Examine the assembly and note any water in the 4-L [1-gal] bottom can, on the shank of the fastener, or on the underside of the substrate.