Designation: D7349 – 08a

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; 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 SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1079 Terminology Relating to Roofing and Waterproofing

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

D5147 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 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.

[1] This test method is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.02 on Prepared Roofings, Shingles and Siding Materials.

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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.

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.

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 four hours 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

TABLE 1 Protocols

PROTOCOL 1	
Substrate	APA Rated Sheathing, 32/16 , Exposure 1 plywood, 12 mm (15/32 in.) thick
Intervening Material	None
Fastener	ASTM F1667 NLRFSS-53Z [smooth shank steel roofing nail 32 mm (1.25 in.) long with a shank diameter of 3.05 mm (0.120 in.), a head diameter of 9.52 mm (0.375 in.), and a zinc coating]
Fastener Driving Method	With a hammer, perpendicular to the specimen, until the fastener head is flush with the surface of the specimen
Test Assembly Conditioning	4 ± 0.25 h at 40 ± 2°C (104 ± 3.6°F), followed by 20 ± 0.25 h at 23 ± 2°C (73.4 ± 3.6°F)
Water Depth	125 ± 6 mm (5 ± 0.25 in.)
Test Temperature	4 ± 2°C (39.2 ± 3.6°F)
Test Period	72 ± 0.25 h
PROTOCOL 2	
Substrate	APA Rated Sheathing, 32/16 , Exposure 1 plywood, 12 mm (15/32 in.) thick
Intervening Material	None
Fastener	ASTM F1667 NLRFSS-53Z [smooth shank steel roofing nail 32 mm (1.25 in.) long with a shank diameter of 3.05 mm (0.120 in.), a head diameter of 9.52 mm (0.375 in.), and a zinc coating]
Fastener Driving Method	With a hammer, perpendicular to the specimen, until the fastener head is flush with the surface of the specimen
Test Assembly Conditioning	4 ± 0.25 h at 40 ± 2°C (104 ± 3.6°F), followed by 20 ± 0.25 h at 23 ± 2°C (73.4 ± 3.6°F)
Water Depth	25 ± 1 mm (1.0 ± 0.05 in.)
Test Temperature	4 ± 2°C (39.2 ± 3.6°F)
Test Period	8 ± 0.25 h
PROTOCOL 3	
Substrate	APA Rated Sheathing, 32/16 , Exposure 1 oriented strand board, 12 mm (15/32 in.) thick
Intervening Material	75 by 75 mm (3 by 3 in.) single-thickness piece of D3462-labeled asphalt shingle
Fastener	ASTM F1667 NLRFSR-53Z [ring shank steel roofing nail 32 mm (1.25 in.) long with a shank diameter of 3.05 mm (0.120 in.), a head diameter of 9.52 mm (0.375 in.), and a zinc coating]
Fastener Driving Method	With a hammer, perpendicular to the specimen, until the fastener head is flush with the surface of the intervening material
Test Assembly Conditioning	24 ± 0.25 h at 23 ± 2°C (73.4 ± 3.6°F)
Water Depth	125 ± 6 mm (5 ± 0.25 in.)
Test Temperature	4 ± 2°C (39.2 ± 3.6°F)
Test Period	72 ± 0.25 h