



Designation: D7349/D7349M – 10

Standard Test Method for Determining the Capability of Roofing and Waterproofing Materials to Seal around Fasteners¹

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 non-conformance 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 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

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 Steep Roofing Products and Assemblies.

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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.

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*—A4 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.] $\pm 5\%$ is required for each test specimen. Refer to **Table 1**.

TABLE 1 Protocols

PROTOCOL 1	
Substrate	APA Rated Sheathing, $\frac{3}{4}$ in., Exposure 1 plywood, 12 mm [$1\frac{1}{2}$ 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 \pm 0.25 h at 40 \pm 2°C [104 \pm 3.6°F], followed by 20 \pm 0.25 h at 23 \pm 2°C [73.4 \pm 3.6°F]
Water Depth	125 \pm 6 mm [5 \pm 0.25 in.]
Test Temperature	4 \pm 2°C [39.2 \pm 3.6°F]
Test Period	72 \pm 0.25 h
PROTOCOL 2	
Substrate	APA Rated Sheathing, $\frac{3}{4}$ in., Exposure 1 plywood, 12 mm [$1\frac{1}{2}$ 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 \pm 0.25 h at 40 \pm 2°C [104 \pm 3.6°F], followed by 20 \pm 0.25 h at 23 \pm 2°C [73.4 \pm 3.6°F]
Water Depth	25 \pm 1 mm [1.0 \pm 0.05 in.]
Test Temperature	4 \pm 2°C [39.2 \pm 3.6°F]
Test Period	8 \pm 0.25 h
PROTOCOL 3	
Substrate	APA Rated Sheathing, $\frac{3}{4}$ in., Exposure 1 oriented strand board, 12 mm [$1\frac{1}{2}$ 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 \pm 0.25 h at 23 \pm 2°C [73.4 \pm 3.6°F]
Water Depth	125 \pm 6 mm [5 \pm 0.25 in.]
Test Temperature	4 \pm 2°C [39.2 \pm 3.6°F]
Test Period	72 \pm 0.25 h
PROTOCOL 4	
Substrate	APA Rated Sheathing, $\frac{3}{4}$ in., Exposure 1 plywood, 12 mm [$1\frac{1}{2}$ in.] thick
Intervening Material	75 by 75 mm [3 by 3 in.] single-thickness piece of D3462 -labeled asphalt shingle
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]; hot dipped galvanized
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 \pm 0.25 h at 23 \pm 2°C [73.4 \pm 3.6°F]
Water Depth	125 \pm 6 mm [5 \pm 0.25 in.]
Test Temperature	4 \pm 2°C [39.2 \pm 3.6°F]
Test Period	72 \pm 0.25 h