



Designation: D7281 – 07 (Reapproved 2021)

Standard Test Method for Determining Water Migration Resistance Through Roof Membranes¹

This standard is issued under the fixed designation D7281; 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 test method covers the determination of water migration resistance of roof membranes including built-up roof membranes, modified bitumen, and single-ply roof membranes. The procedures were developed to determine the potential for leakage of water through the roof membranes resulting from a standing head of water and when pressurized with air from the underside.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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.*

1.4 *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

G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

3. Terminology

3.1 *Definitions:*

3.1.1 *adhere*—to cause two surfaces to be held together by adhesion. Roof membranes are often “partially” or “totally adhered” to a substrate.

¹ This test method is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.20 on Roofing Membrane Systems.

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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.

3.1.2 *batten*—a narrow band or plate that is used to fasten or prevent the displacement of a single-ply membrane.

3.1.3 *delamination*—separation between lamination or bonded material or component; for example, laminated layers of rigid insulation or the felt plies in a built-up roof.

3.1.4 *field seam*—a splice made in the field of a single-ply membrane that joins two sheets together using an adhesive, splicing tape, heat, or solvent-welding.

3.1.5 *mechanically fastened membranes*—a single ply or base ply (part of a multi-layer system) membrane that has been positively attached at intervals to the substrate, usually with fasteners and/or other mechanical devices, such as battens.

3.1.6 *NPT*—National Pipe Thread.

4. Summary of Test Method

4.1 Roofing membranes are conditioned and installed in the leakage test apparatus (Fig. 1). A 152-mm (6-in.) head of water is maintained over the sample for seven days at ambient conditions, 21 °C (70 °F). At the end of the seven-day period, air shall be introduced into the bottom section of the apparatus, increasing the pressure to 6.9 kPa (1 psig) and immediately released to ambient conditions. This cycle is repeated 25 times.

5. Significance and Use

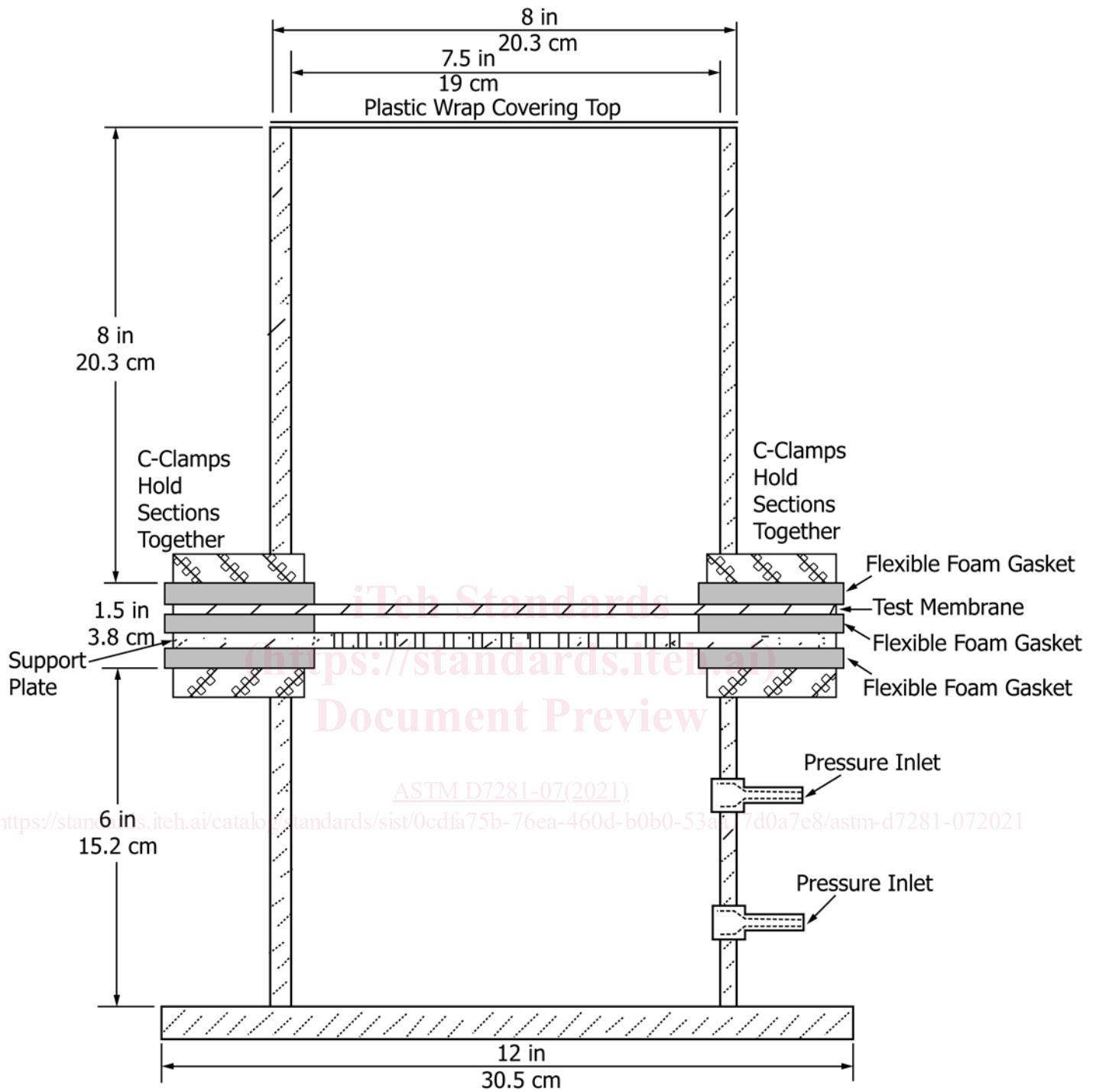
5.1 This test method provides a means of evaluating roof membranes, seams, and laps for resistance to water migration from standing water on the roof. This test method evaluates roof membranes when first applied and also after simulated deterioration caused by the ultraviolet energy of the sun.

6. Apparatus

6.1 The test apparatus consists of top section, a support plate, and a bottom section, which are clamped together with the sample being evaluated placed as a diaphragm between the top sections and the support plate.

6.1.1 The top section consists of a 203-mm (8-in.) diameter, 6-mm (1/4-in.) wall thickness by 203-mm (8-in.) length of clear acrylic pipe, which is cemented to a 305-mm (12-in.) diameter flange.

6.1.2 The support plate is a round poly(vinyl chloride) plate, 6-mm (1/4-in.) thick and a 241-mm (9½-in.) diameter with 6-mm (1/4-in.) diameter holes spaced 25 mm (1 in.) on center.



Half Scale

FIG. 1 Leakage Test Apparatus

6.1.3 The bottom section consists of a 305-mm (12-in.) diameter flange attached to a 203-mm (8-in.) diameter, 6-mm (1/4-in.) wall thickness by 152-mm (6-in.) length of clear acrylic pipe, which is fabricated with two threaded holes 6 mm (1/4 in.) NPT. These holes are used after the test apparatus sections are clamped together, with the roof cover between them. One hole provides a connection point for air pressure to

be increased and released; the other hole provides a connection for the pressure gauge. A 305-mm (12-in.) diameter bottom cap is adhered to the bottom section.

6.1.4 The gasket material consists of a non-absorbent, flexible closed-cell foam. A silicone sealant is permitted to be used to further aid in preventing water from leaking around the perimeter of the flange of the test apparatus.