



Designation: D1970/D1970M – 17

# Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection<sup>1</sup>

This standard is issued under the fixed designation D1970/D1970M; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This specification covers polymer modified bituminous sheet materials intended for use as underlayment on roof eaves, or valleys, or both, to prevent leakage of shingle, tile, or metal roofs from water back-up due to ice dams.

1.2 These underlayment sheets have a sticky adhesive layer which is exposed by removal of a protective sheet. The top surface is suitable to work on during the application of the exposed roofing.

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 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.

1.4 *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 and health 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:*<sup>2</sup>

**D228/D228M** Test Methods for Sampling, Testing, and

<sup>1</sup> This specification 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

Analysis of Asphalt Roll Roofing, Cap Sheets, and Shingles Used in Roofing and Waterproofing  
**D903** Test Method for Peel or Stripping Strength of Adhesive Bonds

**D1079** Terminology Relating to Roofing and Waterproofing  
**D1204** Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheet or Film at Elevated Temperature

**D2523** Practice for Testing Load-Strain Properties of Roofing Membranes

**D4073** Test Method for Tensile-Tear Strength of Bituminous Roofing Membranes

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

**D7349/D7349M** Test Method for Determining the Capability of Roofing and Waterproofing Materials to Seal around Fasteners

**E96/E96M** Test Methods for Water Vapor Transmission of Materials

## 3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *lot*—for the purpose of sampling, a lot shall consist of all material manufactured in one production run (not to exceed 24 h) using the same source of raw materials.

## 4. Workmanship, Finish, and Appearance

4.1 The underlayment sheet shall be supplied in roll form.

4.2 The underlayment sheet shall be substantially uniform in thickness and appearance. It shall be free of visible defects such as holes, ragged or untrue edges, breaks, cracks, tears, protuberances, and indentations, except for those perforations or protuberances which are intentional.

4.3 The surface of the underlayment sheet shall be designed to provide traction and slip resistance to the applicator.

NOTE 1—The intent of 4.3 is to recognize that surface slipperiness is important when working on a roof and, while no test method is specified in this standard, several methods for assessing the relative slipperiness of

surfaces are available. It is the further intent of this paragraph to ensure that, whatever method is used, the friction coefficient or resistance to slipping of the surface of these products should be at least as great as asphalt-saturated felt shingle underlayment tested under the same conditions of temperature and wetness as agreed between purchaser and seller.

4.4 Sheet sections shall be suitable for joining by the manufacturer's recommended procedure. The entire lower surface of the underlayment sheet shall be capable of being fully adhered to the roof deck.

## 5. Physical Requirements

5.1 The underlayment sheet shall conform to the physical requirements prescribed in **Table 1**.

5.2 The underlayment sheet shall not crack nor be so sticky as to cause tearing or other damage upon being unrolled at material temperatures between 4.4 and 60°C [40 and 140°F].

## 6. Sampling

6.1 From each lot of underlayment sheet, select sample rolls in accordance with Test Methods **D228/D228M**.

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

## 7. Test Methods

7.1 *Conditioning*—Unless otherwise specified, condition test specimens for at least 4 h at 23 ± 2°C [73.4 ± 3.6°F] and 50 ± 5 % relative humidity prior to testing.

### 7.2 Thickness:

7.2.1 Measure the thickness of the roofing underlayment in accordance with Test Methods **D5147/D5147M**.

7.2.2 Report the number of measurements, the average and standard deviation across the sheet.

7.3 *Maximum Load and Elongation at Break*—This test method covers the determination of the maximum load and elongation at break of the underlayment sheets, as set forth in Practice **D2523** except as noted below.

### 7.3.1 Specimens:

7.3.1.1 Prepare five specimens from each sample roll in both the longitudinal and transverse directions. Specimens shall be 25 mm [1 in.] ± 5 % wide by a minimum of 150 mm [6 in.] ± 5 % long. For materials with high elongation the length of the sample may be reduced to 100 mm [4 in.] ± 5 % if necessary to avoid limitations imposed by dimensions of the test machine.

### 7.3.2 Procedure:

7.3.2.1 Condition each specimen at least 2 h at 23 ± 2°C [73.4 ± 3.6°F].

7.3.2.2 Use a constant rate of elongation (CRE) tension testing machine, preferably with automatic load and strain recording equipment and clamps that permit a uniform clamping pressure on the specimen without slipping. The initial clamp separation shall be a minimum of 75 mm [3 in.] ± 5 % for sheets having an ultimate elongation of 75 % or less at 23.9°C [75°F] and 50 mm [2 in.] ± 5 % for sheets having an ultimate elongation greater than 75 % at 23.9°C [75°F].

7.3.2.3 Maintain a rate of separation of 50 mm [2 in.] ± 3 % per min.

7.3.2.4 Record the percent elongation of each specimen at the visual break of the modified bitumen portion using an extensometer, or mark the extension at visual break of the modified bitumen portion from the chart of the stress versus time (knowing the speed of the chart drive and the jaw separation rate).

7.3.2.5 Record the maximum load attained by each specimen.

### 7.3.3 Calculation:

7.3.3.1 Determine the percent elongation at break of the modified bitumen portion obtained from the extensometer in accordance with the manufacturer's instructions, or read directly. Calculate the percent elongation from the chart as follows:

$$\% \text{ Elongation} = \frac{a}{b} \times 100 \% \quad (1)$$

where:

*a* = extension at modified bitumen break (extension at break on chart × jaw separation rate divided by chart speed), and

*b* = initial jaw separation.

7.3.3.2 Determine the average percent elongation at break of the modified bitumen portion in each direction.

7.3.3.3 Calculate the average *maximum load* in each direction.

7.3.4 *Report*—For each set of five specimens in each direction report the individual measurements, the average and standard deviation for the size of specimen (initial length between jaws), maximum load in kN/m [lbf/in.], percent elongation at modified bitumen break, and method of determining elongation.

7.4 *Adhesion to Plywood*—This test method covers the determination of the adhesive properties of the underlayment sheets to plywood, as set forth in Test Method **D903** except as noted below.

### 7.4.1 Specimen Preparation:

**TABLE 1 Physical Requirements of Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection**

Property	SI	Inch-Pound
Thickness, min	1.0 mm	40 mils
Maximum load, min		
Longitudinal	4.4 kN/m	25 lbf/in.
Transverse	4.4 kN/m	25 lbf/in.
Elongation at break, min of modified bitumen portion		10 %
Adhesion to plywood, min at 40°F	0.92 kgf/30.5 cm	2.0 lbf/ft width
Adhesion to plywood, min at 75°F	5.44 kgf/30.5 cm	12.0 lbf/ft width
Thermal stability, max	3 mm	0.1 in.
Flexibility at −29°C [−20°F]		pass
Tear resistance		
Longitudinal, min	89 N	20 lbf
Transverse, min	89 N	20 lbf
Moisture vapor permeance, max	5.7 ng/Pa.S.M. <sup>2</sup>	0.1 U.S. Perms
Sealability around nail		pass
Waterproof integrity of lap seam		pass

7.4.1.1 The test specimen shall consist of one piece of underlayment sheet,  $75 \pm 2$  by  $200 \pm 2$  mm [ $3 \pm 0.125$  by  $8 \pm 0.125$  in.], bonded for  $15 \text{ in.}^2$  ( $75 \times 125$  mm) [ $3$  by  $5$  in.] to one piece of 6 mm [ $\frac{1}{4}$  in.] minimum thick plywood, APA Grade, Exposure 1,  $75$  by  $150$  mm [ $3$  by  $6$  in.]. The plywood must not be reused for testing.

7.4.1.2 Roll test specimen three times back and forth with a roller which has a mass of  $11.8$  kg [ $26$  lb]  $\pm 0.5$  %, diameter of  $125$  mm [ $5$  in.]  $\pm 5$  %, and width of  $125$  mm [ $5$  in.]  $\pm 5$  % ( $2$  to  $3$  s per cycle).

7.4.1.3 At least five specimens shall be tested for each test temperature.

7.4.1.4 It is recommended that specimens be assembled individually. Cutting specimens to size after assembly may influence the test results.

7.4.2 *Conditioning*—The test shall be performed at  $23 \pm 2^\circ\text{C}$  [ $73.4 \pm 3.6^\circ\text{F}$ ] and  $4 \pm 2^\circ\text{C}$  [ $39.2 \pm 3.6^\circ\text{F}$ ]. Materials used to construct test specimens and the roller, must be conditioned at the test temperature for at least  $4$  h prior to assembly. Similarly, test specimens must be conditioned at the test temperatures for at least  $1$  h prior to testing.

NOTE 2—Adhesion to other potential wood deck materials may be determined by this test method, but it has been observed that substrates such as APA approved nonveneer sheets typically give greater adhesion values than the minimum specified in this standard for plywood.

#### 7.4.3 Apparatus:

7.4.3.1 Perform the test in a constant rate of extension type tester.

7.4.3.2 The rate of travel of the power-actuated grip shall be  $50$  mm [ $2$  in.]/min  $\pm 3$  %. This rate which provides a laminate separation rate of  $25$  mm [ $1$  in.]/min  $\pm 3$  % shall be uniform throughout the test.

#### 7.4.4 Procedure:

7.4.4.1 Conduct the test after the test specimens have been conditioned at the test temperature (in the environmental chamber) for  $15$  min.

7.4.4.2 Separate the free end of the underlayment sheet from the plywood for a distance of about  $50$  mm [ $2$  in.] leaving about  $75$  mm [ $3$  in.] of bonded length. Place the specimen in the testing machine by clamping the free end of the plywood in one grip, turning back the free end of the sheet and clamping it in the other grip. Maintain the specimen in the approximate plane of the clamps during the test. Peel at least three quarters of the bonded area, even though a peel or stripping value may be indicated before this point.

7.4.5 *Calculation*—Determine the peel strength on the chart as the average load line that will visually accommodate the recorded curve. Record the load so indicated, corrected for tare.

7.4.6 *Reporting*—For each series of tests, report the number of measurements, the average, and the standard deviation of all the test values in kg/ $30.5$  cm width [ $\text{lb/ft}$  of width].

7.5 *Thermal Stability*—This test method determines the thermal stability of the underlayment sheets as set forth in Test Method **D1204**, except as noted below.

#### 7.5.1 Specimens:

7.5.1.1 The test specimen shall consist of one piece of underlayment sheet,  $100 \pm 2$  by  $100 \pm 2$  mm [ $4 \pm 0.125$  by

$4 \pm 0.125$  in.], centered and bonded (as described in 7.4.1) to one piece of 6 mm [ $\frac{1}{4}$  in.] minimum thick plywood, (APA Grade, Exposure 1)  $150 \pm 2$  by  $200 \pm 2$  mm [ $6 \pm 0.125$  by  $8 \pm 0.125$  in.].

7.5.1.2 At least five specimens shall be tested for each sample roll.

#### 7.5.2 Procedure:

7.5.2.1 Set specimens at a  $45^\circ$  angle in a hot air circulating oven maintained at  $70 \pm 2^\circ\text{C}$  [ $158 \pm 4^\circ\text{F}$ ] for  $14$  days.

7.5.2.2 At the end of the oven-exposure period, allow specimens to equilibrate to  $23.9 \pm 1.1^\circ\text{C}$  [ $75 \pm 2^\circ\text{F}$ ] and  $50 \pm 5$  % relative humidity for at least  $4$  h.

7.5.2.3 From the lower edge of the sheet measure to the nearest  $2.5$  mm [ $0.1$  in.] the furthest point of modified bitumen flow. Estimate the average flow across the entire lower edge of the sample.

7.5.3 *Report*—Report the individual specimen values, the average and the standard deviation.

7.6 *Flexibility at  $-29^\circ\text{C}$  [ $-20^\circ\text{F}$ ]*—This test method determines the low temperature flexibility of the underlayment sheets. For the sheet material to be given a *pass* rating in this test, the material must demonstrate either no visible signs of cracking after bending at the test temperature through an angle of  $180 \pm 5^\circ$  around a  $25$  mm [ $1$  in.]  $\pm 5$  % diameter mandrel in  $2 \pm 1$  s, or minor surface cracking is observed in one or more specimens that have been bent over the mandrel and a head of water confirmation, performed on a sheet of material that has been subjected to this bending, yields a passing result.

7.6.1 *Specimens*—Prepare five specimens from each roll in both the longitudinal and transverse direction. Specimens shall be  $25$  mm [ $1$  in.]  $\pm 5$  % wide by  $150$  mm [ $6$  in.]  $\pm 5$  % long. Remove the release liner from each specimen.

7.6.2 *Conditioning*—Condition specimens and mandrel in a refrigeration unit for a minimum of  $2$  h at  $-29 \pm 2^\circ\text{C}$  [ $-20 \pm 3.6^\circ\text{F}$ ].

#### 7.6.3 Procedure:

7.6.3.1 After the specimens have been conditioned, conduct the test at  $-29 \pm 2^\circ\text{C}$  [ $-20 \pm 3.6^\circ\text{F}$ ]. Complete the entire procedure inside the refrigeration unit. Position the center of the specimen firmly on the mandrel with the weathering side up. Bend the projecting ends without exerting any stress other than that required to keep the specimen in contact with the mandrel. Bend the specimen through an arc of  $180 \pm 5^\circ$  within  $2 \pm 1$  s until the projecting ends of the specimen are parallel to each other while keeping the bottom surface in contact with the mandrel. Repeat this procedure using a different specimen and bend with the weathering side down.

7.6.3.2 Remove the specimen from the refrigerated unit and immediately inspect for any signs of cracking.

7.6.3.3 Repeat the procedure for any remaining specimens. If the temperature of the refrigeration unit increases during testing, allow the refrigeration unit to equilibrate to test temperature prior to testing subsequent samples.

7.6.3.4 All specimens must pass at the test temperature of  $-29 \pm 2^\circ\text{C}$  [ $-20 \pm 3.6^\circ\text{F}$ ]. Report as a pass if no cracking is visible on any specimen. If cracking is visible on any specimen, performance of a head of water confirmation is required.

**7.6.3.5 Head of Water Confirmation**—If visible cracking is observed on one or more specimens that have been bent over the mandrel during the first portion of the Flexibility at  $-29^{\circ}\text{C}$  [ $-20^{\circ}\text{F}$ ] Test, the head of water confirmation shall be performed.

(1) **Apparatus**—**Water Column Container**—A water impermeable cylinder with a minimum inside diameter of 100 mm [4 in.] and a minimum depth of 150 mm [6 in.] suitable for erecting a water column on the underlayment test specimen assembly.

(2) **Specimen**—At least one specimen shall be tested. The test specimen shall consist of one piece of underlayment sheet 180 by 180 mm [7 by 7 in.] or larger in size. Remove the release liner from the specimen.

(3) **Conditioning**—Condition specimens and mandrel in a refrigeration unit for a minimum of 2 h at  $-29 \pm 2^{\circ}\text{C}$  [ $-20 \pm 3.6^{\circ}\text{F}$ ].

(4) **Procedure**—(a) After the specimen has been conditioned, position the center of the specimen firmly on the mandrel with the weathering side up. Bend the projecting ends without exerting any stress other than that required to keep the specimen in contact with the mandrel. Complete the entire procedure inside the refrigerated unit within  $2 \pm 1$  s. Bend the specimen until the projecting ends of the specimen are parallel to each other keeping the bottom surface in contact with the mandrel through an arc of  $180 \pm 5^{\circ}$ . (b) Place the sample in a refrigeration unit maintained at  $4 \pm 2^{\circ}\text{C}$  [ $40 \pm 5^{\circ}\text{F}$ ]. Carefully return the specimen to a flat condition and place it on a piece of plywood. (c) In the refrigeration unit, center the water column container over the area of the specimen that was bent. Apply a 6-mm [0.25-in.] bead of sealant completely around the outside rim of the water column container to bond it to the specimen. Allow 2 h for the sealant to set, then apply another bead around the inside rim of the water column container. (See **Note 3**.) (d) After waiting 24 h for the sealant to cure, place this assembly over a container capable of catching all the water in case there is a leak. Fill the water column container to a depth of 125 mm [5 in.]  $\pm 5\%$  with deionized or distilled water. Keep the entire assembly in the refrigeration unit maintained at  $4 \pm 2^{\circ}\text{C}$  [ $40 \pm 5^{\circ}\text{F}$ ] for a period of 72 h. (e) At the conclusion of the 72 h period, remove the water column container, specimen, and plywood and note any water in the bottom container. Pour the water from the water column container and blot the inside dry. Remove the underlayment sheet and the water column container and examine the area of the plywood under the underlayment sheet for any sign of water. (f) Observe whether or not water is found between the plywood and the underlayment sheet. Report as a *failure* if water is present in this area, or as a *pass* if dry.

**NOTE 3**—Silicone sealant has been found to work well for this purpose, especially those varieties designed for use at cold temperatures. However, use of any sealant that does not interact with the underlayment sheet is acceptable.

**7.6.4 Report**—Report whether the material passes or fails at the specified temperature.

**7.7 Tear Resistance**—This test method covers the determination of the tear resistance of the underlayment sheets as set forth in Test Method **D4073** except as noted below.

**7.7.1 Procedure**—Test procedure shall be in accordance with Test Method **D4073** except that the rate of jaw separation shall be 50 mm [2.0 in.]/min  $\pm 3\%$ .

**7.7.2 Calculation**—Calculate the average tear strength in each direction.

**7.7.3 Report**—Report the individual specimen values, the average and standard deviation in each direction.

**7.8 Moisture Vapor Permeability**—Sample the underlayment sheet and determine the moisture vapor transmission in accordance with Test Methods **E96/E96M**.

**7.9 Capability to Seal Around Nail (Head of Water Test):**

**7.9.1** Perform Test Method **D7349/D7349M**, Protocol 4, with the following modifications:

**7.9.1.1** Collect sample rolls in accordance with Specification D1970/D1970M rather than following the sample collection procedure referenced in Test Method **D7349/D7349M**.

**7.9.1.2** Evaluate two specimens per sample roll.

**7.9.1.3** For each test specimen, penetrate the test material and intervening material with two fasteners spaced 25 to 51 mm [1 to 2 in.] apart.

**NOTE 4**—Test Method **D7349/D7349M**, Protocol 4, prescribes the use of a shingle as an intervening material because the majority of steep roof installations use asphalt shingles as the roof cover. The scope of Specification D1970/D1970M includes shingle, tile, and metal roofs, and therefore, it is not prohibited to use other roof covers as intervening materials for research or investigative purposes.

**7.9.2 Report**—Report as a *pass* if all specimens evaluated by Test Method **D7349/D7349M** yield a passing result. Report as a *failure* if one or more specimens evaluated by Test Method **D7349/D7349M** do not yield a passing result.

**7.10 Waterproof Integrity of Side Lap Seam (Head of Water Test):**

**7.10.1** This test method determines the waterproof integrity of side lap seams formed according to the manufacturers' instructions and rolled as described in **7.4.1.2** at  $23 \pm 2^{\circ}\text{C}$  [ $73 \pm 3.6^{\circ}\text{F}$ ].

**7.10.2 Apparatus:**

**7.10.2.1 Water Column Container**—A water impermeable cylinder with a minimum inside diameter of 150 mm [6 in.] and a minimum depth of 150 mm [6 in.] suitable for erecting a water column on the underlayment test specimen assembly.

**NOTE 5**—A 4-L [1 gal] metal can with the bottom cut out serves well as a water column container.

**7.10.3 Specimens:**

**7.10.3.1** Each test specimen shall consist of two pieces of underlayment sheet assembled to form a lap seam in accordance with the manufacturer's instructions on a piece of 10 mm [ $\frac{3}{8}$  in.] minimum thick, APA Grade Exposure 1 plywood at least 300 by 300 mm [12 by 12 in.] in size.

(1) The piece used as the lower portion of the test specimen shall include the edge of the sheet intended by the manufacturer to form the lower portion of a side lap and shall be of sufficient size to allow creation of the assembled specimen.

(2) The piece used as the upper portion of the lap seam shall include the edge of the sheet intended by the manufacturer to form the upper portion of a side lap and shall be of sufficient size to allow creation of the assembled specimen.



7.10.3.2 At least two specimens shall be tested for each sample roll.

7.10.4 Procedure:

7.10.4.1 At room temperature ( $23 \pm 2^\circ\text{C}$  [ $73 \pm 3.6^\circ\text{F}$ ]), peel the entire release liner off the piece of a specimen intended as the lower portion of the lap seam and place the sheet on the plywood as shown in Fig. 1. Roll the sheet as specified in 7.4.1.2.

7.10.4.2 Remove only the portion of the release liner necessary to expose the bottom coating that will cover the lap seam from a piece of a specimen intended to form the upper portion of a lap seam. Place this piece over the previously-applied piece to form a lap seam of the appropriate width. At least 12 mm [ $\frac{1}{2}$  in.] of the lap area of the lower piece, measured parallel to the lap, shall remain uncovered on each end of the lower piece lap area as shown in Fig. 1.

7.10.4.3 Press down the edges of the sheet manually with finger pressure just hard enough to keep them from lifting. Roll over the lap as specified in 7.4.1.2. The upper sheet shall be adhered only in the lap seam area and shall be unadhered to the plywood outside the lap seam area.

7.10.4.4 Center the water column container over the leading (exposed) edge of the lap seam as shown in Fig. 1. Apply a 6-mm [0.25-in.] bead of sealant completely around the outside rim of the water column container to bond it to the specimen. Allow 2 h for the sealant to set, then apply another bead around the inside rim of the water column container.

NOTE 6—Silicone sealant has been found to work well for this purpose, especially those varieties designed for use at cold temperatures. However, any sealant that does not interact with the underlayment sheet is acceptable.

7.10.4.5 As shown in Fig. 1, apply a bead of sealant along the leading (exposed) edge of the lap seam outside the water column container and along the edges of the lap seam from the leading edge of the seam to the exposed plywood. Allow 2 h for the sealant to set, then apply another bead around the inside rim of the water column container.

7.10.4.6 After waiting 24 h at ambient temperature for the sealant to cure, fill the water column container to a depth of 125 mm [5 in.]  $\pm 5\%$  with deionized or distilled water. Set the test assembly over a container capable of catching all the water in case there is a leak. Place the entire assembly in a refrigeration unit maintained at  $4 \pm 2^\circ\text{C}$  [ $40 \pm 3.6^\circ\text{F}$ ] for a period of 72 h.

7.10.4.7 At the conclusion of the test, remove the test assembly from the refrigeration unit, pour the water from the water column container, and blot the inside of the water column container dry. Peel the water column container from the underlayment sheet then lift the unadhered portion of the upper piece and inspect the underside for any sign of water.

7.10.5 Report—Observe and report whether or not water is found between the plywood and the unadhered upper piece. Report as a *failure* if water is present in this area, or as a *pass* if dry. All specimens must pass to satisfy the requirement of Table 1.

## 8. Precision and Bias

8.1 The precision statements for the test methods included in this specification are under development.

## 9. Inspection

9.1 Inspection of the material shall be agreed upon between the purchaser and the manufacturer/supplier as part of the purchase contract.

## 10. Rejection and Rehearing

10.1 Failure to conform to any of the requirements prescribed in this specification will constitute grounds for rejection. In case of rejection, the seller shall have the right to reinspect the rejected material and resubmit the lot after removal of those packages not conforming to the requirements. Alternative arrangements for replacement of defective material may be agreed upon between the purchaser and supplier as part of the purchase contract.

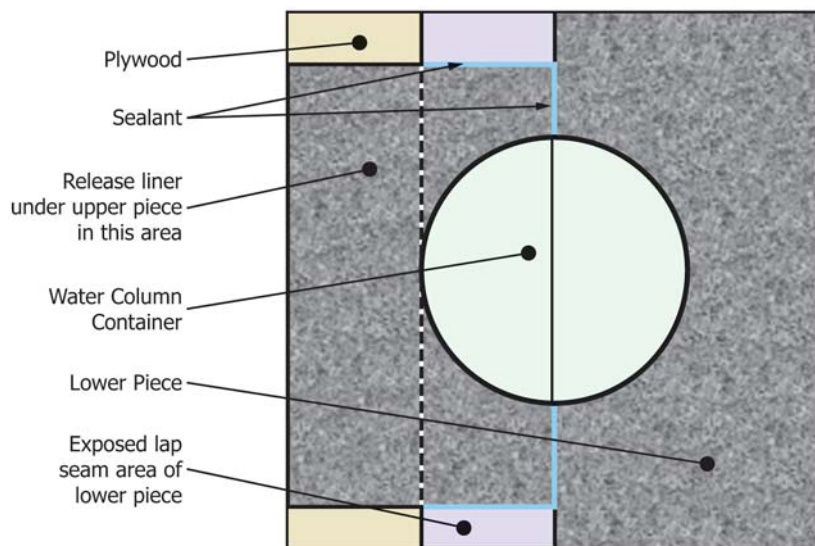


FIG. 1 Waterproof Integrity of Side Lap Test Specimen Assembly



## 11. Packaging and Package Marking

11.1 The area per roll and packaging shall be as agreed upon by the purchaser and the seller.

11.2 Unless otherwise specified, each package shall be plainly marked with the manufacturer's name, brand name, area of the roll, and the ASTM designation.

11.3 The rolls shall be securely wrapped or banded in a substantial manner to prevent shifting of material and to permit normal handling.

11.4 The packaging or banding, or both, used by the manufacturer shall be designed so as not to interfere with the recommended application or service of the product.

## 12. Keywords

12.1 ice dam protections; polymer-modified; self-adherings; steep roofings; underlayments

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