

Standard for Air and Water-Resistive Barriers – Fluid Applied Membrane - Material Specification

1. Scope

1.1 This document provides the material properties, performance requirements and test methods for air and water-resistive barrier fluid applied membrane material that is used in building assemblies, whether installed on a building site or in a prefabrication facility.

1.2 The test methods listed in this document are used to determine the values for the material properties. These values are intended for use in specifications, material evaluations and quality control. They are not intended to predict in situ end-use material performance and the values will change from the reported when tested under different conditions.

1.3 This document only covers materials that do not require testing to be done with the material installed on a substrate unless specifically required by the test method. Therefore, the material is acceptable to be installed on supplier approved substrates.

1.4 This document is limited to the characterization of the material and does not address installed performance of the material. The installation procedures required by the supplier may affect the material properties' performance.

1.5 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.

1.6 The testing and evaluation of a material against this document may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this document has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any existing applicable regulatory requirements prior to its use.

2. Referenced Documents

2.1 The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Documents Published by the Air Barrier Association of America (ABAA)
1600 Boston-Providence Hwy Walpole, MA 02081 U.S.A.
Telephone: (866) 956-5888 Fax: (866) 956-5819
www.airbarrier.org

ABAA T0002, Standard Test Method for Pull-Off Strength of Adhered Air and Water-Resistive Barriers Using an Adhesion Tester

ABAA T0004, Standard Test Method for Determining Gap Bridging Ability of Air and Water-Resistive Barrier Materials

Documents Published by the American Society for Testing and Materials (ASTM)
100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959 U.S.A.
Telephone: (610) 832-9585 Fax: (610) 832-9555

www.astm.org

ASTM C794-18, Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

ASTM C1338-15, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings

ASTM C1498-04a (Reapproved 2016), Standard Test Method for Hygroscopic Sorption Isotherms of Building Material

ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

ASTM D522/D522M – 17, Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings

ASTM D543-14, Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents

ASTM D570-98, Standard Test Method for Water Absorption of Plastics

ASTM D2247-15, Standard Practice for Testing Water-Resistance of Coatings in 100% Relative Humidity

ASTM E84-19b, Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM E96-16, Standard Test Methods for Water Vapor Transmission of Materials

ASTM E2178-13, Standard Test Method for Air Permeance of Building Materials

ASTM E2485/E2485M-13 (2018), Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water-Resistive Barrier Coatings

Documents published by the Environmental Protection Agency

<http://www.ecfr.gov/cgi-bin/textidx?sid=c7836e6ff67e5ad001bcb19ccfd99c1a&node=40:8.0.11.1&rgn=div5#40:8.0.1.1.0.1.1.7>

EPA Method 24—Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings

3. Terminology

3.1 For the purposes of this document, the terms and definitions given in ASTM E631 and the following apply.

3.1.1 accredited testing laboratory, n
organization accredited to ISO 17025 by a member of the IAF/ILAC Multilateral Agreement, possessing the necessary competence to test material to the specific test method

3.1.2 air barrier material, n,
primary element that provides a continuous barrier to the movement of air

3.1.3 fluid applied membrane, n
liquid based material that is sprayed or rolled onto a continuous exterior substrate to provide the primary resistance to air leakage and water penetration.

4. Requirements

4.1 General

4.1.1 The material, independent of a substrate, is intended to create a plane of airtightness and water-resistance to provide the function of an air barrier and a water-resistive barrier in a building assembly.

4.2 Detailed

4.2.1 The material shall meet the material property values specified in Table 1.

4.3 Health and Safety Requirements

4.3.1 The supplier shall ensure that a Safety Data Sheet (SDS) is available for the material covered by this document. The SDS will include all information required by OSHA and describe any known health hazards to installers or occupants of buildings. The supplier's installation instructions and SDS shall include personal protection required during the installation process.

5. Sampling

5.1 The accredited testing laboratory determining compliance to this document shall be responsible for the random sampling of the material. Sampling shall be conducted by selecting unopened containers from a single lot of material to conduct all the testing required by this document.

5.2 Unless otherwise specified, the number of containers of material shall be left to the discretion of the laboratory determining compliance with this document.

6. Sample Panels

6.1 Sample sheets of free film material shall be produced by installing the material on a substrate that the material will not adhere to. The material shall be installed in accordance with the supplier's published installation instructions and at the supplier's required minimum installation thickness.

7. Conditioning of Sample Panels

7.1 Unless otherwise specified, after the material has cured, sample sheets with the substrate attached shall be conditioned in accordance with ASTM D618, Procedure A [i.e., 88 h at $(23 \pm 2) ^\circ\text{C}$ [$(73 \pm 5) ^\circ\text{F}$], $(50 \pm 5) \% \text{ R.H.}$] prior to cutting and/or testing for material properties.

8. Preparation of Specimens

8.1 After the material has been conditioned, the free film shall be removed from the substrate. Unless otherwise specified in the test method, the specimens shall be cut from the sample sheets. When cutting the specimens from sample sheets, the edge of any specimen shall not be less than 50 mm (2 inches) from the edge of the sample sheet except where noted in this document. The thickness of the material in each specimen shall be the supplier's published installed thickness requirement. All tests shall be conducted with the material at the same thickness. The thickness of each specimen used in a test shall be reported.

9. Test Methods

9.1 Each test shall be conducted with virgin specimens and shall be independent from each other. All tests shall be conducted in an atmosphere of $(23 \pm 5) ^\circ\text{C}$ [$(73 \pm 9) ^\circ\text{F}$], $(50 \pm 10) \% \text{ R.H.}$

9.2 Air Leakage Rate – Material

9.2.1 The air leakage rate of the material shall be determined in accordance with ASTM E2178 using five specimens with a CMU substrate.

9.2.2 The results shall be reported as the average of the five specimens.

9.3 Air Leakage Rate – Fastener

9.3.1 The fastener air leakage shall be determined in accordance with ASTM E2178 with a modified specimen.

9.3.2 The specimen shall be prepared by constructing a 16 gauge steel frame having outermost dimensions of 1200 mm by 1200 mm (48 inches by 48 inches), made of steel channels with four steel studs: one on each end and two spaced equidistant between. A 16 mm ($\frac{5}{8}$ inch) gypsum material shall be installed on the steel frame and fastened with # 8 – 30 mm (1 $\frac{1}{4}$) long flat head self-tapping screws installed 150 mm (6 inches) on centre around the perimeter only and in such a manner that the locations of the perimeter fasteners will be cover within the perimeter seal of the test apparatus and not contributing to the measured air leakage of the test specimen. The edges of the frame and material shall be sealed so that the air can only go through the fastened material.

9.3.3 Install the fluid applied material over the gypsum board in accordance with the supplier's published installation requirements and at the supplier's minimum required installation thickness. Allow the material to cure as required by the supplier. Determine the extraneous leakage in accordance with ASTM E2178 with the fluid applied material installed.

9.3.4 Once the extraneous leakage with the fluid applied material installed has been determined and without disrupting the test specimen or its mounting in the apparatus, install 48 screws into the interior framing members per panel equally spaced on the interior framing members in the panel. The screws are to be #12 – 30 mm (1 $\frac{1}{4}$ inch) long bugle self-tapping screws which are to be installed 6 mm (1/4 inch) proud of the bottom side of the lowest point of the bugle to the surface of the fluid applied material (Figure 1).

Conduct the air leakage rate test within 48 hours after the fasteners have been installed in accordance with ASTM E2178 to determine the air leakage of the sub-assembly with the fasteners installed.

9.3.5 The results shall be reported as the average of the five specimens.

9.4 Alkali Resistance

9.4.1 The alkali resistance of the free film material shall be determined with ASTM D543 Practice A Procedure 1 (sodium hydroxide solution 10% concentration with a pH of 12) using three specimens.

9.4.2 The results of the three specimens shall be reported individually.

9.5 Elongation

9.5.1 The elongation of the free film material shall be determined in accordance with ASTM D412 Method A Die C using five specimens.

9.5.2 The results shall be reported as the average of the five specimens.

9.6 Freeze Thaw Resistance

9.6.1 The freeze-thaw resistance of the free film material shall be determined in accordance with ASTM E2485 Method A except that five specimens of the material measuring 150 mm by 150 mm (6 inches by 6 inches) shall be used.

9.6.2 The results of the three specimens shall be reported individually.

9.7 Fungi Resistance

9.7.1 The fungi resistance of the free film material shall be determined in accordance with ASTM C1338 using three specimens measuring 150 mm x 150 mm (6 inch x 6 inch).

9.7.2 The results of the three specimens shall be reported individually as a percentage of fungal growth on the surface area being tested.

9.8 Gap Bridging Ability

9.8.1 The gap bridging ability shall be determined in accordance with ABAA T0004 using five specimens. The material shall be installed at the supplier's minimum required installation thickness.

9.8.2 The results of the five specimens shall be reported individually as the gap size and the temperature the material was tested at.

9.9 Low Temperature Flexibility

9.9.1 The low temperature flexibility of the material shall be determined in accordance with ASTM D522/D522M using three specimens.

9.9.2 Directly cast films to aluminium substrate to result in a dry film thickness in accordance with the supplier's published minimum installation instructions. Allow the material to dry/cure at $(23 \pm 2) ^\circ\text{C}$ [$(73 \pm 4) ^\circ\text{F}$] and $(50 \pm 10) \% \text{ R.H}$ followed by 120 h at $50 ^\circ\text{C}$ before testing. Conduct the test using a using a 13 mm (1/2 in.) diameter mandrel and conduct the test at $-26 ^\circ\text{C}$ ($-15 ^\circ\text{F}$).

9.9.3 The results of the three specimens shall be reported individually for any cracking.

9.10 Peel Adhesion (180 degrees)

9.10.1 The peel adhesion of the material shall be determined in accordance with ASTM C794 using three specimens.

9.10.2 Allow the material to cure. Test peel adhesion after 1 min, 1 hour and 24 hours after the material has cured in accordance with the supplier's requirements.

9.10.3 The results shall be reported as the average of the three specimens.

9.11 Pull Adhesion

9.11.1 The pull adhesion of the material to a substrate shall be determined in accordance with ABAA 0002. The material shall be installed on gypsum board and OSB panel measuring 1 meter by 1 meter (39 inch by 39 inch). The material shall be tested on three 200 mm x 400 mm (8 inch x 16 inch) medium density CMU blocks. A single test requires three pulls. The fluid applied material shall be cut through, but care shall be taken to not cut into the substrate.

9.11.2 The results shall be reported as the average of the three pulls on each of the substrates.

9.12 Surface Burning Characteristics – Flame Spread and Smoke Development Index

9.12.1 The surface burning characteristics of the material shall be determined in accordance with ASTM E84. The substrate shall be cement board. Install the material over the cement board in accordance with the supplier's published installation requirements and at the supplier's minimum required installation thickness.

9.12.2 The flame-spread rating and smoke development index of the two specimens shall be reported individually.

9.13 Volatile Organic Compounds

9.13.1 The volatile organic compounds of the free film material shall be determined in accordance with EPA Method 24 using three specimens measuring 150 mm by 150 mm (6 inch by 6 inch).

9.13.2 The results of the three specimens shall be reported individually.

9.14 Water Absorption by Diffusion

9.14.1 The water adsorption of the free film material shall be determined in accordance with ASTM C1498 using three specimens measuring 150 mm by 150 mm (6 inch by 6 inch).

9.14.2 The results shall be reported as the average of the three specimens.

9.15 Water-Resistance in 100% Relative Humidity

9.15.1 The water-resistance of the free film material shall be determined in accordance with ASTM D2247 using three specimens measuring 100 mm by 150 mm (4 inch by 6 inch). The specimens shall be placed on a rack in the chamber.

9.15.2 The results shall be reported as the average of the three specimens.

9.16 Water Vapor Transmission Rate

9.16.1 The water vapor transmission rate of three specimens of the free film material shall be determined in accordance with ASTM E96 test method for both the desiccant method Procedure A and the water method Procedure B. The size of the specimen shall be in accordance with the test apparatus.

9.16.2 The results shall be reported as the average of the three specimens.

10. Reporting Requirements

10.1 Test data shall be reported in the form of a table with test method, property, requirement, result and pass/fail columns including results for all properties listed in this document followed by a statement on whether the material met the requirements of this document.

10.2 In addition to the information specified in the individual test methods, all reports describing the testing of the material in accordance with this document shall include the following information:

- a. Supplier's name, address, production facility address and material designation
- b. Material description including name and type
- c. Lot number and manufactured date
- d. Sampling information
- e. Name and location of laboratory performing the tests and the accreditation body for the laboratory
- f. Size and applied thickness (wet mil and dry mil) of each specimen used for each test

- g. Report of all test results according to the test methods, with the same precision as the requirements listed in Table 1, comparison of the results to the requirements in Table 1 and indicate whether the property was passed or failed
- h. Declaration of conformity with this document
- i. An appendix to the report shall contain the data used to generate the above items

11. Marking and Labelling

11.1 Each container shall be clearly marked with the following information:

- a. Supplier's name
- b. Material name
- c. Type of material (e.g. fluid applied air and water-resistive barrier)
- d. Country of manufacturer
- e. Lot number
- f. Storage temperature range
- g. Expiration date

12. Supplier's Documentation

12.1 The supplier shall allow publication of the results of each physical property test required by this document in material evaluation reports or listings when claiming to meet this document.

12.2 The supplier shall provide the contractor, upon request, with the following:

- a. Description of the material including their properties
- b. Safety data sheet (SDS)
- c. Instructions for safe handling, use and disposal of the material
- d. Physical properties for the material
- e. Limitations for use of the material
- f. Installation instructions

13. Keywords

air barrier, water-resistive, membrane

TABLE 1
REQUIREMENTS FOR PHYSICAL PROPERTIES

Property	Unit	Requirements		Test Method
		Min.	Max.	
Air Leakage Rate - Material	L/(s·m ²) @ 75 Pa CFM/ft ² @ 1.57 psf	-	0.0200	ASTM E2178
		-	0.0040	
Air Leakage Rate - Fastener	L/(s·m ²) @ 75 Pa CFM/ft ² @ 1.57 psf	-	0.0200	ASTM E2178 with modified specimen
		-	0.0040	
Alkali Resistance	visual	No deleterious effects	-	ASTM D543 Practice A Procedure 1
Elongation	%	200	-	ASTM D412 Method A Die C
Freeze-Thaw Resistance	visual	no surface changes	-	ASTM E2485 Method A
Fungi Resistance	%	no growth	-	ASTM C1338
Gap Bridging Ability	mm inch	Report temperature material were tested at and the maximum gap tested		ABAA T0004
Low Temperature Flexibility	visual	no surface changes	-	ASTM D522 Method B
Peel Adhesion	N/mm lb/inch	0.875 5.0	- -	ASTM C794
Pull Adhesion – For each substrate	kPa psi	110 16	- -	ABAA T0002
Surface Burning Characteristics Flame Spread Index	-	-	75	ASTM E84
Smoke Development Index	-	-	450	
Volatile Organic Compounds	ppm	Report		EPA 24
Water Vapor Absorption by Diffusion	%	Report		ASTM C1498
Water-Resistance in 100% Relative Humidity	visual	-	No change in color, blistering, etc.	ASTM D2247
Water Vapor Transmission Rate – water and desiccant method	ng/(Pa·s·m ²) Perms	Report for both atmospheres		ASTM E96

FIGURE 1 - BUGLE SELF TAPING SCREW

Bugle self-tapping screws installed 6 mm (1/4 inch) proud of the bottom side of the lowest point of the bugle to the surface

