Standard Test Method for Determining Gap Bridging Ability of Air and Water Resistive Barrier Materials

1. Scope

1.1 This document covers a laboratory procedure for determining the ability of a flexible air (AB) or air and water resistive barrier (AWB) material installed over a rigid substrate to bridge a gap in the substrate and maintain continuity during substrate movement.

1.2 Rigid air barrier materials are not covered by this document as they require a separate material to bridge gaps between the boards.

1.3 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.

1.4 This standard does not purport to address all 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 The document shown below is referenced in the text of this document. Unless otherwise stated elsewhere in this document such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the committee approved this document.

Documents published by the American Society for Testing and Materials (ASTM)
100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959 USA
Telephone: (610) 832-9585 Fax: (610) 832-9555
www.astm.org

ASTM E631: Standard Terminology of Building Constructions

3. Terminology

3.1 Definitions - For definitions of general terms related to building construction used in this specification, refer to Terminology E631.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *air barrier material*, n (ab) - primary element that provides a continuous barrier to the movement of air

3.2.2 *air and water resistive barrier* (AWRB) - material that is primary element that provides a continuous barrier to the movement of air and resists liquid water that has penetrated the cladding system.

4. Summary of Test Method

4.1 This test method consists of testing five specimens of an AB or AWRB material installed on a flat substrate assembly which contains a gap between two pieces of stainless steel, placing the specimen in

a test machine, and subjecting the specimen to ten cycles of movement. Two temperatures are included, standard laboratory conditions and cold conditions.

5. Significance and Use

5.1 This test method is used to indicate a material's ability to bridge a gap and then maintain its integrity when the width of the gap moves.

6. Apparatus and Materials

6.1 *Automatic Extension and Compression Machine*, with cold box capable of maintaining − 26 ± 1°C (−15 ± 2°F).

6.2 *Circulating Hot-Air Oven,* capable of maintaining 70 ± 2°C (158 ± 4°F).

6.3 *Substrate* – stainless steel - #508 3 mm (1/8 in.) thick

7. Sampling

7.1 The testing laboratory shall be responsible for material sampling.

7.2 Randomly choose a sheet, pail or roll of the material to be tested, large enough to prepare specimens for testing.

8. Sample Conditioning

8.1 Condition AB or AWRB materials and the substrate, at standard conditions of 23 ± 2°C (73 ± 4°F) and 50 ± 5 % relative humidity for a minimum of 24 h before any test specimens are prepared.

9. Specimen Preparation

9.1 Prepare the substrate assembly by cutting the stainless steel to size, nominally 100 mm by 50 mm (4 inch x 2 inch) making sure that they are cut square.

9.2 The substrate material shall be #508 stainless steel.

9.3 Prepare five test specimen assemblies each containing two pieces of stainless steel, a gap between the pieces and the AB or AWRB material installed on the two pieces of stainless steel and across the gap between the two pieces.

9.4 For each test specimen assembly, position two pieces of stainless steel on a flat surface with a space between them that correlates to one of the gap classes listed below. Install a spacer (where there is a gap) between the pieces to ensure the proper size of gap is maintained during specimen assembly preparation and during conditioning. Clamp the substrate pieces in a way to prevent any movement of the substrates. Remove the spacer after the substrates are clamped in the testing equipment.

9.5 The gap between the two pieces of stainless steel to be bridged by the material are;

Class 1.	0 mm	(0 in.)
Class 2.	2 mm	(1/16 in.)
Class 3.	4 mm	(1/8 in.)
Class 4.	6 mm	(15/64 in.)

9.6 Follow the manufacturer's instructions for preparing material for installation.

Note: These instructions may call for the use of primers which require a drying time or multiple coats of liquid applied materials with a specified drying time between coats, etc.

9.7 Install the material onto the stainless-steel pieces, covering the complete surface of both pieces and the gap between the two pieces in accordance with the manufacturer's instructions.

9.8 Where the material requires time to cure, condition at 23 ± 2°C (74 ± 4°F) and 50 ± 2% RH for the period of time recommended by the material manufacturer then condition the test specimen assemblies (clamped pieces of substrate with the material installed) for 7 d in a circulating hot-air oven at 70 ± 2°C (158 ± 3.6°F).

9.9 Cut and remove a nominal 6 mm (¼ in.) strip of material on both sides of the specimen assembly, the edge along the side which includes going across the gap. This will eliminate edge effect. There is no need to remove any material from the ends of the specimen. If needed to fit the test specimen into the jaws of the testing machine, metal angles can be adhered to the test specimen after the conditioning period.

10. Test Temperatures

10.1 Type A temperature

10.1.1 Pre-condition five specimens and the test machine at 23 ± 2°C (74 ± 4°F) and 50 ± 2% RH for a minimum of 24 hours.

10.2 Type B temperature

10.2.1 Precondition five specimens and the test machine at -26 ± 2°C (-15 ± 4°F) and 75 ± 10% RH for a minimum of 24 hours.

11. Test Procedure

11.1 Subject the specimen to ten cycles of movement while maintaining the temperature type chosen. A cycle consists of pulling the stainless-steel pieces apart at the rate of 3 mm (⅛ in.)/h until the gap between the pieces are an additional 3 mm (⅛ in.) apart from the starting position and then closing the gap at the same rate until the pieces are back to the original space between them.

11.2 Complete the test with the stainless-steel pieces positioned at the original space between the pieces.

11.3 Examine the material covering the gap under florescent light for any cracking, splitting, pinholes, or any other adverse conditions.

12. Report

12.1 The test report shall include the following information;

a. date of test,
b. name of entity conducting the test, testing location, name of the person conducting the test,
c. brief description of the procedure used for the test
d. identification of material tested, including material manufacturer's name, trade name of the material, material category and type, manufacturer's production code (lot number) and thickness tested
e. description of the testing apparatus used, including: name of apparatus manufacturer, model number and brief description
f. identification of each specimen including material category and type, thickness, gap size and temperature during testing, and

g. all observable physical changes in the material at the gap (cracking, splitting, etc.) with photographs of each specimen and a close up of the material at the gap.

13. Keywords

13.1 gap bridging; air barrier, air barrier material, water resistive barrier

Figure 1 – Test specimen assembly