Designation: E2321 – 03 (Reapproved 2011)

Standard Practice for Use of Test Methods E96/E96M for Determining the Water Vapor Transmission (WVT) of Exterior Insulation and Finish Systems (EIFS)[1]

This standard is issued under the fixed designation E2321; 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 standard describes how to use Test Methods E96/E96M to determine the water vapor transmission (WVT) characteristics of an EIFS sample.

1.2 An Exterior Insulation and Finish System (EIFS) is a multilayer exterior building wall material that consists of a number of layers. For the purpose of this standard, these layers, whether they be individual EIFS component materials in single layers, or groups of EIFS component materials, are called the "EIFS sample."

1.3 The Water Method, Procedures B and D described in section X1.1.2 and X1.1.5 of Appendix X1 of Test Methods E96/E96M shall be used in this standard.

1.4 This standard is limited to specimens not over 1¼ in. (32 mm) in thickness, except as provided in Section 9 of this standard.

1.5 The values stated in inch-pound units are to be regarded as the standard. Metric inch-pound conversion factors for water vapor transmission, permeance, and permeability are stated in Table 1 of Test Methods E96/E96M. All conversions of mm Hg to Pa are made at a temperature of 0°C.

1.6 *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]

E96/E96M Test Methods for Water Vapor Transmission of Materials

E631 Terminology of Building Constructions

E2110 Terminology for Exterior Insulation and Finish Systems (EIFS)

3. Terminology

3.1 For definitions of general terms relating to:

3.1.1 Water vapor transmission of materials, see Test Methods E96/E96M.

3.1.2 Building construction, see Terminology E631.

3.1.3 EIFS, see Terminology E2110.

4. Summary of Practice

4.1 This standard describes how to determine the water vapor transmission (WVT) of the EIFS sample, using the Water Method, Procedures B and D, of Test Methods E96/E96M. In the Water Method, the dish or tray contains distilled water, and the water vapor passes through the test specimen from the inside of the dish to the chamber is which the specimen is contained. Eventually the rate of vapor flow stabilizes, and by weighting the change in weight over time, the water vapor transmission of the EIFS sample can be calculated.

4.1.1 For both Procedures, three specimens shall be used.

4.1.1.1 Procedure B shall be used for specimens that in actual use on a building would have the higher humidity on the indoor side of the wall.

4.1.1.2 Procedure D shall be used, for specimens that in actual use on a building would have the higher humidity on the outdoor side of the wall.

5. Significance and Use

5.1 The purpose of this test is to obtain steady state values of water vapor transfer through the EIFS sample. This characteristic of EIFS is commonly requested by regulatory and design organizations, and is used in thermal and moisture studies of building walls. The degree to which an EIFS allows water vapor to pass through it can affect the performance of an EIFS wall assembly.

5.2 A permeance value obtained under one set of test conditions does not indicate the value under a different set of

[1] This practice is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.58 on Exterior Insulation and Finish Systems (EIFS).

Current edition approved Nov. 15, 2011. Published December 2011. Originally approved in 2003. Last previous edition approved in 2003 as E2321 – 03. DOI: 10.1520/E2321-03R11.

[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.

conditions. For this reason, the test conditions selected are those that most closely approach the conditions of use for EIFS components and assemblies.

5.3 This standard should not be used alone as the sole means for evaluating the water vapor transmission characteristics of a given EIFS wall assembly. Other methods are available, and should be considered and used as appropriate.

5.4 To be meaningful in evaluating the thermal and moisture condition of a given EIFS wall assembly, the specimens used in this standard should represent closely the materials that actually exist, or will exist, on a given building.

6. Apparatus

6.1 The apparatus shall be as described in Test Methods E96/E96M, sections 6.1, 6.2, and 6.3. The Water Method, Procedures B and D, shall be used; the Desiccant Method shall not be used.

6.2 For specimens that include the thermal insulation board, the apparatus shall be a pan 11½ by 11½ in. (29 by 29 cm) square, as described in Figure X2.1 of Test Methods E96/E96M.

6.3 For specimens that do not include the thermal insulation, the apparatus shall be a dish 4 in. (10 cm) in diameter, as described in Figure X2.2 of Test Methods E96/E96M.

7. Materials

7.1 The materials used for determining the water vapor transmission (WVT) of EIFS components or combinations of components shall be as described in Test Methods E96/E96M, Section 7.

8. Sampling

8.1 Materials used for determining the water vapor transmission of EIFS components or assemblies shall be sampled as described in Section 8 of Test Methods E96/E96M.

9. Test Specimen

9.1 Test specimens for EIFS components or assemblies shall be constructed as Section 9 of Test Methods E96/E96M, except as modified below:

9.1.1 Test specimens of the EIFS sample shall be individual EIFS components (finish, reinforced basecoat or thermal insulation board), or combinations of individual EIFS components (for example, reinforced basecoat and finish, with the finish applied to the basecoat; or thermal insulation board with the reinforced basecoat applied to it; and so forth).

9.1.2 As a minimum, all test specimens shall be allowed to equilibrate by placing the test specimen in a controlled constant environmental chamber at the temperature and relative humidity settings for 168 h (7 days).

NOTE 1—If specimens include thermal insulation board, time for stabilization of water vapor flow will be longer than the specimen with EIFS coatings alone.

9.1.2.1 To determine the water vapor transmission, three specimens each of Procedure B and Procedure D shall be used.

9.1.3 All specimens shall have their thickness measured in accordance with 14.1.1 of Test Methods E96/E96M.

10. Attachment of Specimen to Test Dish

10.1 Test specimens for EIFS components or assemblies shall be attached to the test dish by sealing as specified in Test Methods E96/E96M, Section 10. (**Warning—**The sealant around the edge of the specimen in the pan or dish, must not be absorbed into porous material, if any, contained in the specimen itself.)

11. Test Procedure

11.1 The test procedure shall be as described in Test Methods E96/E96M, Section 12, the Water Method, Procedures B and D.

12. Calculation and Analysis of Results

12.1 Results of the rate of water vapor transmission (WVT) shall be determined and reported as specified in Section 13 of Test Methods E96/E96M.

13. Report

13.1 The report shall include the following:

13.1.1 Identification of the EIFS component or combinations of components tested.

13.1.1.1 All wet-applied materials shall be identified by the EIFS manufacturer's name, product name, and their thickness.

13.1.1.2 Specimens that include reinforcing mesh shall identify the reinforcing mesh by the EIFS manufacturer's name, product name, and weight per unit area.

13.1.1.3 Specimens that include thermal insulation board shall identify the thermal insulation board by thickness, type, and density.

13.1.2 *Thickness of Specific Materials:*

13.1.2.1 To measure thickness, test specimens shall be cut with a diamond saw from larger pieces of the EIFS from which the EIFS sample was obtained. Thickness shall be measured using a microscope, optical comparator or a ¼-in. (0.6-cm) diameter spherical head micrometer. Thickness shall be measured in accordance with Section 9 of Test Methods E96/E96M.

(1) For finish coat thickness measurement, a microscope or optical comparator shall be used.

(2) For components other than the finish coat, when a micrometer is used, thickness shall be measured in accordance with section 9.5 of Test Methods E96/E96M.

13.1.3 A drawing describing how the EIFS component or combination of components was configured for the test for both Procedure B and Procedure D shall be provided. The drawing shall indicate the direction of vapor flow.

13.1.4 Items 14.1.1 through 14.1.10 of Section 14 in Test Methods E96/E96M shall be included in the report.

14. Precision and Bias

14.1 Precision and bias for determination of the rate of water vapor transmission (WVT) as specified in this standard practice shall be established per Section 15, Test Methods E96/E96M.

15. Keywords

15.1 ASTM Test Methods E96/E96M; condensation; EIFS; exterior insulation and finish system; finish; insulation; moisture; permeability; permeance; reinforced basecoat; reinforcing mesh; water vapor; water vapor transmission; WVT