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Standard Test Method for Evaluating the Tensile-Adhesion Performance of an Exterior Insulation and Finish System (EIFS)¹

This standard is issued under the fixed designation E2134;E2134/E2134M; 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 evaluates the tensile-adhesion performance of an exterior insulation and finish System (EIFS) or its individual components by two different procedures: Procedure A, Dry Conditioning and Testing of Specimens; and Procedure B, Wet Conditioning and Testing of Specimens.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as the standard. The ~~inch-pound units given in parentheses are for information only~~. 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.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[E4 Practices for Force Verification of Testing Machines](#)

[E631 Terminology of Building Constructions](#)

[E2110 Terminology for Exterior Insulation and Finish Systems \(EIFS\)](#)

2.2 *EIFS Industry Members Association (EIMA):*³

[Guideline Specification for Exterior Insulation and Finish Systems, Class PB](#)

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of general terms relating to building construction used in this test method, general terminology regarding EIFS and building in general, see Terminology [E2110](#) (for EIFS terms) and Terminology [E631](#) (for buildings in general).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *adhesion*—the state in which two surfaces are held together by forces at the interface.

3.2.2 *cohesion*—the molecular attraction that holds a body together. The internal strength of a material.

3.2.3 *specimen*—the entire assembled unit cut from the sample and submitted for test as described in Section 7.

3.2.4 *tensile-adhesion strength*—the ultimate strength in tension normal to the plane of the system.

4. Summary of Test Method

4.1 Specimens are tested by applying tensile loads normal to the plane of the system in a controlled environment to determine the tensile adhesion of the system or individual components of the system, of both.

¹ This test method 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).

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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 Available from ~~EIMA, 3000 Corporate Center Drive, Suite 270, Morrow, GA 30260~~ EIFS Industry Members Association (EIMA), 513 West Broad Street, Suite 210, Falls Church, VA 22046-3257, <http://www.eima.com>.

5. Significance and Use

5.1 Maintenance of adequate tensile adhesion of EIFS components to each other, and to the substrate are essential for long term performance of the system.

5.2 The tensile-adhesion properties obtained by this test method are not purported to be representative of wind load or other structural and moisture related properties of the EIFS wall assembly. Tensile-adhesion properties using this test method are used as one of the factors in evaluating substrates and to compare adhesives.

6. Apparatus

6.1 *Tensile Test Machine*, capable of producing a tensile load on the test specimen at a constant cross-head rate of 1.5 mm/min (~~0.05 in./min~~)[0.05 in./min].

6.2 *Load Measuring Device*, calibrated according to Practice E4, the test machine load measuring device shall be capable of measuring the load to an accuracy of $\pm 1\%$ of the maximum load applied to the test specimen.

6.3 *Loading Fixtures*—The loading fixtures shall be self-aligning and shall not apply eccentric loads. The loading fixtures shall be a minimum of 12.0-mm (~~0.5-in.-thick~~)[0.5-in.-thick] metal blocks to keep the bonded facings essentially flat under the maximum applied load. The size of the loading blocks shall be not less than the bonded area of the test specimen.

6.4 *Temperature Control Chamber*—A room or chamber capable of maintaining $23 \pm 3^\circ\text{C}$ (~~75~~[75 \pm 5°F]) and $50 \pm 5\%$ relative humidity.

6.5 *Containers*, corrosion resistant containers of sufficient size to hold specimens.

7. Sample Preparation

7.1 Prepare one sample for each test condition described in Sections 9, 10, and 11. Samples shall be not less than 150 by 200 mm (~~6~~[6 by 8 in.]) in size, such that, six test specimens no smaller than 50 by 50 mm (~~2~~[2 by 2 in.]) can be cut from each sample after the specified sample conditioning. Samples may be cut from larger sheets for ease of system fabrication.

NOTE 1—As required above, test specimen size shall not be smaller than 50 by 50 mm (~~2~~[2 by 2 in.]). However, as test specimen size increases, axial loading eccentricities become greater and can compromise the accuracy of the test results. To limit the effect of eccentricities, maximum test sample size should be limited to about 76 by 76 mm (~~3~~[3 by 3 in.]).

7.2 Apply the adhesive in a uniform, continuous layer, such that the measured tensile load is representative of a fully bonded 50 by 50 mm (~~2~~[2 by 2 in.]) test specimen. Apply the specified amount of adhesive. Smooth-out the adhesive using a flat trowel to ensure a uniform, continuous layer.

7.3 Samples conditioned wet under Section 11 or exposed to optional environmental conditioning under Section 9 may optionally have their back-sides protected from moisture using minimum 0.4-mm (~~0.015-in.-thick~~)[0.015-in.-thick] aluminum foil bent half the distance up each edge of the sample. Following application of the aluminum foil, all four sample edges shall be dipped in hot wax to protect the edge from ingress of moisture.

7.4 For system testing, each sample shall consist of a substrate, adhesive, 25 mm (~~1-in.-thick~~)[1 in.-thick] insulation board, reinforced base coat, primer (if used) and a finish coat.

7.5 For testing the interface between the substrate and adhesive, each sample shall consist of a substrate and adhesive only.

7.6 For testing the interface between the adhesive and insulation board, each sample shall consist of an adhesive and 25 mm (~~1-in.-thick~~)[1 in.-thick] insulation board.

7.7 For testing the interface between the base coat and insulation board, each sample shall consist of 25 mm (~~1-in.-thick~~)[1 in.-thick] insulation board and reinforced base coat.

7.8 For testing the interface between the base coat, primer (if used) and finish coat, each sample shall consist of the reinforced base coat and finish coat.

NOTE 2—For mechanically attached EIF Systems, tensile-adhesion performance is only required for the interface between the reinforced base coat and finish coat.

8. Sample Curing

8.1 Allow samples to cure a minimum of seven days (28 days for samples containing hydraulic cement) at a constant $23 \pm 3^\circ\text{C}$ (~~73~~[73 \pm 5°F]) and $50 \pm 5\%$ relative humidity unless otherwise specified.

9. Specified Sample Exposure (When Specified)

9.1 Often it is desired to determine the effects of a specified sample exposure condition on tensile-adhesion strength. The tensile-adhesion test shall be conducted on companion samples before and after each exposure period.

NOTE 3—Depending on project objectives, it may be desired to determine retention of tensile-adhesion strength after extended wetting periods,