AMERICAN NATIONAL STANDARD

ANSI/EIMA 99-A-2017

Standard for Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage

Approved American National Standard ANSI

EIMA EIFS INDUSTRY MEMBERS ASSOCIATION

© 2017 EIFS Industry Members Association

Table of Contents

Canvass Member Roster ii
Foreword iii
1 Scope 1
2 References 1
3 Definitions 3
4 Design Considerations 4
5 Product Delivery, Storage, and Handling 5
6 Quality Assurance 5
7 EIFS Contractor Requirements 5
8 Submittals 6
9 Environmental and Weather Conditions 6
10 Coordination/Scheduling 6
11 Manufacturers 6
12 Materials 7
13 Performance Characteristics 8
Table 1 Air/Water-Resistive Barrier Requirements 8
Table 2 Performance Tests 9
Table 3 Component Performance Tests 10
Table 4 System Fire Performance Tests 11
Table 5 Fire Performance Tests 11
Table 6 Structural Performance Tests 11
Table 7 Impact Performance Tests 12
14 Execution 12
Annex 17

Canvass Member Roster[1]

USER

Robert Aird – Robert A. Aird Inc.

David Dolnick – The Brady Companies

Gary Ehrlich, P.E. – National Association of Home Builders

Richard Hensel – HRC, Inc.

Wesley Hotchkiss – L & W Supply

Richard Huntley – WeKanDo Construction, Inc.

David Neff – Manning Materials Corporation

Ron Nickson – National Multifamily Housing Council

Dale Seroka – Capitol Building Supply

GENERAL INTEREST

Jeffery Beard, PhD – Drexel University

Michael Beaton, P.E. – Intertek

Jesse Beitel – JENSEN HUGHES, Inc.

Ron Chelli – Wind-lock Corporation

Ernest Conrad, P.E. – Conrad Engineers

Robert Grupe – Association of the Wall and Ceilings Industry

Esmeralda Martinez – TI RADCO, LLP

Brian Randall – National Gypsum

Todd Watson, P.E. – R.J. Kenney Associates, Inc.

PRODUCER

James Connaughton – Dow Construction Chemicals

William Egan – BASF Corporation

John Gorman – JPS Composite Materials

Peter Harrison – ParexUSA

William Preston – Dryvit Systems

Thomas Savoy – Insulfoam

Eric Smith – Saint-Gobain ADFORS

George Tessier – Wacker Chemical Corporation

Terry Viness, P.E. – Sto Corporation

Theresa Weston, PhD – DuPont

[1] This list represents the membership at the time the Canvass Member Roster was balloted on the final text of this edition.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

Foreword[1]

ANSI/EIMA 99A – 2017 embodies the minimum requirements for specifying and installing Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage. The generic materials, details, and design considerations for EIFS and EIFS with Drainage are described in this standard. For specifications, application instructions, and details specific to a particular EIF System, consult the EIFS manufacturer's product literature. In addition, care has been taken to incorporate the reference documents that constitute provisions of this American National Standard. The Annex contained in this standard is considered part of the standard.

Suggestions for improvement to this standard are welcome and should be sent via e-mail to Dustin Antonello at dantonello@eima.com

[1] The information contained in this portion of the document is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this portion of the document may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

American National Standard for Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage

Sponsor

EIMA - EIFS Industry Members Association

1 Scope

1.1 This standard provides the minimum requirements for specifying and installing Exterior Insulation and Finish Systems (EIFS) and Exterior Insulation and Finish Systems (EIFS) with Drainage, as well as the minimum performance requirements for EIFS and EIFS with Drainage.

1.2 The requirements for materials, mixtures, and details shall be contained in the project plans and specifications. The EIFS manufacturer's literature and application instructions shall be used to provide guidance.

2 References[1]

2.1 ASTM Standards[2]

ASTM B117, Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM C150/C150M, Standard Specification for Portland Cement

ASTM C297/C297M, Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions

ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

ASTM C717, Standard Terminology of Building Seals and Sealants

ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

ASTM C1382, Standard Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints

ASTM C1397, Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage

ASTM D779, Standard Test Method for Determining the Water Vapor Resistance of Sheet Materials in Contact with Liquid Water by the Dry Indicator Method

ASTM D828, Standard Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus

ASTM D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting

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

ASTM D2898, Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing

ASTM D3273, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

---

[1] For electronic copies, visit ANSI's Electronic Standards Store (ESS) at www/ansi.org. For printed versions of all these standards, contact Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704, (800) 854-7179

[2] Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

ASTM D5034, Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)

ASTM E72, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction

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

ASTM E96/E96M, Standard Test Methods for Water Vapor Transmission of Materials

ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials

ASTM E283, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ASTM E330/E330M, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

ASTM E331, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

ASTM E1233/E1233M, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Air Pressure Differential

ASTM E2098/E2098M, Standard Test Method for Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for Use in Class PB Exterior Insulation and Finish Systems (EIFS), after Exposure to a Sodium Hydroxide Solution

ASTM E2110, Standard Terminology for Exterior Insulation and Finish Systems (EIFS)

ASTM E2134/E2134M, Standard Test Method for Evaluating the Tensile-Adhesion Performance of an Exterior Insulation and Finish System (EIFS)

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

ASTM E2273, Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies

ASTM E2357, Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

ASTM E2430/E2430M, Standard Specification for Expanded Polystyrene (“EPS”) Thermal Insulation Boards For Use In Exterior Insulation and Finish Systems (“EIFS”)

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

ASTM E2486/E2486M, Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS)

ASTM E2556/E2556M, Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment

ASTM E2570/E2570M, Standard Test Methods for Evaluating Water-Resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage

ASTM G153, Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

ASTM G155, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

2.2 NFPA Standards[1]

NFPA 268, Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source

[1] Available from NFPA, 1 Batterymarch Park, Quincy, MA 02169

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

NFPA 285, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

2.3 Other Standards

AATCC TM127, Water Resistance: Hydrostatic Pressure Test[1]

3 Definitions

3.1 Adhesive: A material or mixture used to attach the insulation board to the substrate.

3.2 Aesthetic Reveal: A groove cut into the insulation board which serves the function of decoration and/or provides a starting or stopping point for application of the finish coat.

3.3 Backer Rod: Closed-cell, flexible polyethylene foam rod. It is sized for the specific joint widths plus 25-30% and is compressed and inserted into a joint cavity to a specific depth to form the face of a joint. The rod limits the depth of the sealant joint and helps to produce an hourglass sealant shape that helps to distribute stresses to the sealant.

3.4 Back Wrap: A means of terminating an EIFS by continuing the reinforced base coat on the face of the insulation board around its edge to the substrate. In executing the process of back wrapping, a strip of reinforcing mesh is either mechanically or adhesively secured to the substrate at the EIFS termination prior to installation of the insulation board. After installation of the insulation board, the strip of reinforcing mesh should tightly wrap the edge of the insulation board, extend onto its face, and be completely encapsulated with base coat.

3.5 Base Coat: A material or mixture applied to the face of the insulation board that is used to encapsulate the reinforcing mesh.

3.6 Cold Joint: The visible junction in a finish coat indicating that the finish was not applied continuously to a wet edge.

3.7 Cure: A chemical process through which the properties of a material are developed.

3.8 Drainage Medium: A material, space, or plane that creates a means to drain incidental water to the exterior.

3.9 Drainage: The collection and discharge of water by gravity flow.

3.10 Dry: A process of volatile evaporation through which the properties of a material are developed.

3.11 Durability: The capability of the system to maintain serviceability when subjected to environmental stresses during its anticipated service life.

3.12 Edge Wrap: A method used to protect the exposed edges of the insulation board with reinforcing mesh and base coat.

3.13 EIFS: A nonstructural, nonload-bearing, exterior wall cladding system that consist of an insulation board attached either adhesively or mechanically, or both, to the substrate; an integrally reinforced base coat; and a textured protective finish.

3.14 EIFS with Drainage: An EIFS that incorporates a means of drainage applied over a water-resistive barrier.

3.15 Encapsulated: When the reinforcing mesh color is not visible in the dried or cured base coat.

3.16 Expansion Joint: A structural separation between similar and/or dissimilar building components that allows independent movement of the components while preventing damage to the assembly.

3.17 Factory Mix: A ready-to-use adhesive/base coat or finish coat material prepared by the manufacturer.

[1] Available from AATC, 1 Davis Drive, Research Triangle Park, NC 27709

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

3.18 Field Mix: A material prepared by the user in the field that is mixed with other components and/or water.

3.19 Finish Coat: A decorative and protective textured coating applied over the dry reinforced base coat.

3.20 Flash Set (Quick Set): The early hardening or stiffening in the working characteristics of a portland cement paste, mortar, or concrete; usually with the evolution of considerable heat. Stiffness cannot be dispelled nor the plasticity regained by further mixing without the addition of water.

3.21 Framing Member: Studs, joists, runners (tracks), bridging, bracing, and related accessories manufactured or supplied in wood or hot or cold-formed steel.

3.22 Initial Grab: The ability of a wet state material to remain in place initially after it has been applied.

3.23 Initial Set: A time-related set caused by the hydration process.

3.24 Insulation Board: A pre-formed insulating material of a specific type and density that functions to reduce the heat flow through the wall and provides the surface to receive the base coat.

3.25 Lamina: The layer comprised of the base coat, reinforcing mesh, and the finish coat.

3.26 Mechanical Fastener: A corrosion-resistant fastener with a specifically designed washer used to mechanically attach the insulation board to the structural framing and/or structural substrate.

3.27 Pot Life: The duration of time that the wet state material remains workable after it has been mixed.

3.28 Primer: A material used to prepare a surface for application of EIFS to the substrate or of the finish coat to the base coat.

3.29 Reinforced Base Coat: A base coat in which an open-weave glass-fiber fabric has been encapsulated to provide reinforcement.

3.30 Reinforcing Mesh: Open-weave glass-fiber fabric treated for compatibility with other materials of the system that functions to strengthen the system.

3.31 Running Bond: A pattern used when installing the insulation board, to offset the vertical insulation board joints from joints in previous rows of insulation.

3.32 Sealant: In building construction, a material that has the adhesive and cohesive properties to form a seal.

3.33 Substrate: The surface over which the EIFS or water-resistive barrier is applied.

3.34 Temper: To bring adhesive/base coat to a workable state by adding water.

3.35 Tactile: To not properly encapsulate the reinforcing mesh in the base coat, causing the mesh pattern to be felt after the base coat has cured.

3.36 Washer: A corrosion-resistant device used in conjunction with a mechanical fastener to attach the insulation board to the structural framing and/or structural substrate.

3.37 Water-Resistive Barrier: A sheet membrane or coating used to protect the structure from moisture intrusion.

3.38 Wet Edge: The leading edge of a continuously applied wet state material.

3.39 Wet State Materials: The adhesive, base coat, and finish coat components applied in their liquid or semi-liquid states.

4 Design Considerations

The EIFS or EIFS with Drainage shall be designed in accordance with this standard. System details shall be in accordance with the EIFS manufacturer's specification.

4.1 Wind-load resistance shall be determined by the design professional and meet the applicable building code requirements for the system.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

4.2 Expansion joints are required in an EIFS or EIFS with Drainage as follows:

a) where the system adjoins dissimilar construction,

b) where building expansion joints occur,

c) where prefabricated panels abut one another,

d) where the substrate changes,

e) where significant structural movement occurs due to changes in environmental conditions, roof line, building shape, or structural system,

f) at each floor level in multilevel wood frame construction.

EIFS and EIFS with Drainage shall terminate at expansion joints and a sealant joint shall be installed.

4.3 All areas requiring an impact resistance classification higher than Standard, as defined by ASTM E2486, shall be detailed in the drawings and specifically described in the contract documents (See 13.4 “Impact Performance”).

4.4 The use of dark finish colors may result in high surface temperatures, which can adversely affect foam plastic insulation. The use of dark finish colors shall be considered in relation to wall surface temperature as a function of local climatic conditions and EIFS manufacturer recommendations.

4.5 The EIFS or EIFS with Drainage shall comply with the minimum requirements of the applicable building code(s).

4.6 The substrate shall be recognized for the intended use and shall comply with the minimum requirements of the applicable building code.

5 Product Delivery, Storage, and Handling

5.1 All materials supplied by the system manufacturer shall be delivered in original, unopened, and undamaged packaging with legible manufacturer’s identification labels intact. Packaging and labeling shall comply with all applicable federal, state, and local packaging and labeling regulations.

5.2 All products supplied by the system manufacturer shall be stored on a level platform in a cool, dry place protected from direct sunlight, weather, and potentially damaging exposure.

5.3 All wet materials shall be stored at a temperature of not less than 40°F (4.4°C) at all times.

5.4 Portland cement shall be stored in a dry protected area until it is ready to use.

5.5 Safety Data Sheets (SDS) shall be supplied for the components of the EIFS or EIFS with Drainage and be available at the job site.

6 Quality Assurance

6.1 When specified in the contract documents, the manufacturer shall furnish written documentation of conformance with the material requirements in applicable contract documents.

6.2 Insulation boards shall be provided by a listed board molder, who complies with third-party quality control inspection requirements listed in the applicable building code.

6.3 Prior to installation, the insulation board shall be inspected by the EIFS contractor for conformance with construction documents. Non-conforming insulation board shall be removed from the job site.

6.4 The insulation board producer shall furnish, for each shipment, a written certificate confirming conformance with the EIFS manufacturer’s specifications.

7 EIFS Contractor Requirements

7.1 The contractor shall be knowledgeable in the proper installation of EIFS or EIFS with Drainage.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

7.2 The contractor shall be listed by the EIFS manufacturer.

7.3 Upon the determination of the designer, project owner, insurance company, or general contractor; the contractor shall demonstrate completion of a recognized industry training program.

8 Submittals

8.1 The EIFS manufacturer's literature, including specifications, application instructions, and details; shall be submitted as required.

8.2 The EIFS manufacturer's self-certification of compliance with this standard shall be submitted as required.

8.3 The insulation board manufacturer's certification shall be submitted as required in 6.4.

8.4 Samples

8.4.1 The contractor shall provide the owner/architect with samples for approval. The samples shall be of the EIFS or EIFS with Drainage to be applied, and of suitable size, as required, to accurately represent each color and texture to be utilized on the project.

8.4.2 If required, a mock-up wall construction shall be constructed to include the various details of the design and remain in place until construction is complete.

8.4.3 Each sample shall be prepared using the same tools, equipment, and techniques required for the actual application.

8.4.4 The sample shall be approved by the owner or his/her representative prior to the start of installation and shall remain available at the job site.

8.5 When required by construction documents, project-specific details shall be prepared and submitted by the contractor.

9 Environmental and Weather Conditions

9.1 Cold Weather Conditions

Wet materials shall not be applied when the surface and ambient temperatures are less than 40°F (4.4°C), unless appropriate protection and supplemental heat are provided to maintain material temperature a minimum of 40°F (4.4°C) during application and for a period of not less than 24 hours after application.

9.2 Protection

Surrounding areas and surfaces to receive EIFS or EIFS with Drainage shall be protected from inclement weather such as precipitation, excessive temperature, or humidity during the application of the EIFS or EIFS with Drainage.

10 Coordination/Scheduling

The work in this section requires close coordination with related sections and trades that are involved with the exterior envelope, such as roofing, flashing, etc.

10.1 After application of the EIFS or EIFS with Drainage, the tops of all walls shall immediately be covered with the final trim, or temporarily protected, to prevent water infiltration behind the system.

10.2 Open joints shall be protected from water intrusion during construction with closed cell backer rods, or temporary covering, until permanently sealed.

11 Manufacturers

11.1 All components of the EIFS or EIFS with Drainage shall be obtained from the selected system manufacturer or its recognized system component supplier.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

12 Materials

12.1 Adhesive

The adhesive shall be compatible with the water-resistive barrier, insulation board, substrate, and reinforcing mesh.

12.2 Portland Cement

Portland cement shall conform to ASTM C150, Type I or II.

12.3 Insulation Board

12.3.1 Expanded polystyrene insulation board shall conform to the requirements of ASTM C578, Type I; ASTM E2430; and as listed below:

Board Width, Maximum 24 in (610 mm)

Board Length, Maximum 48 in (1219 mm)

Board Thickness, Minimum ¾ in (19 mm)

12.3.2 Expanded polystyrene insulation board shall comply with the applicable building code.

12.3.3 Polyisocyanurate (Polyiso) insulation board shall conform to the requirements of ASTM C1289, Type II; and as listed below:

Board Width, Maximum, Class PB 48 in (1219 mm)

Board Length, Maximum, Class PB 120 in (3050 mm)

Board Thickness, Minimum, Class PB 5/8 in (16 mm)

12.3.4 Polyisocyanurate (Polyiso) insulation board shall comply with the applicable building code.

12.4 Reinforcing Mesh

The reinforcing mesh shall be balanced, open weave glass fiber fabric treated for compatibility with other materials of the system.

12.5 Water-Resistive Barrier

The water-resistive barrier shall be as required by the EIFS manufacturer and the applicable building code.

12.6 Drainage Medium

The drainage medium shall be as required by the system manufacturer or as specified in the construction documents.

12.7 Base Coat

The base coat shall be compatible with the insulation board and reinforcing mesh.

12.8 Primers

The primers shall be as required by the system manufacturer.

12.9 Finish Coat

The finish coat shall be of the type, color, and texture selected by the specifier.

12.10 Mechanical Fasteners

The mechanical fasteners shall be as required by the EIFS manufacturer; fabricated from corrosion-resistant materials; and shall have the necessary pull-out, tensile, and shear strength, when installed, to resist design loads imposed upon the system.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

12.11 Water

The water shall be clean and potable.

13 Performance Characteristics

The system and its components shall meet or exceed the performance standards described in 13.1 through 13.4.

13.1 Durability

Table 1 Air/Water-Resistive Barrier Requirements

Characteristic	Standard	Minimum Properties
Air Barrier Requirements		
Air Barrier Assembly	Test Method ASTM E2357	0.04 cfm/ft2 @ 1.57 psf (0.2 l/s/m^2 @ 75 Pa)
Air Leakage	Test Method ASTM E283	Report Value
Air Permeance	Test Method ASTM E2178	0.004 cfm/ft^2 @ 1.57 psf (0.02 l/s/m^2 @ 75 Pa)
Water Resistive Barrier Coating Requirements (per ASTM E 2570)		
Tensile Bond	Test Method ASTM C297/Test Method ASTM E2134	Minimum 15 psi (104 kPa)[a]
Freeze/Thaw	Test Method ASTM E2485, Proc. B	No deleterious effects[b] after 10 cycles [a]
Structural Performance	Test Method ASTM E1233, Proc. A	Minimum 10 positive cycles at 1/240 deflection; no cracking in field, at joints, or interface with flashing [a]
Racking	Test Method ASTM E72	No cracking in field, at joints, or interface with flashing at net deflection of 1/8 in (3.2 mm) [a]
Restrained Environmental	Test Method ASTM E2570, Sect. 8.5.3	5 cycles; no cracking in field, at joints, or interface with flashing [a]
Water Penetration	Test Method ASTM E331	No water penetration beyond the inner-most plane of the wall after 15 minutes at 2.86 psf (137 Pa) [a]
Water Resistance	Practice ASTM D2247	No deleterious effects[b] after 14 days exposure [a]
Water Vapor Transmission	Test Method ASTM E96, Proc. B	Vapor Permeable [a]

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

Weathering		
UV Exposure	ASTM D2898, Method B	210 hours of exposure [a]
Accelerated Aging	ASTM E2570, Sect. 8.6.2	25 cycles of wetting and drying [a]
Hydrostatic Pressure Test	AATCC Test Method 127	21.6 in (55 cm) water column for 5 h [a]
Vapor Permeable Flexible Sheet Water Resistive Barrier Requirements (per ASTM E2556)		
Dry tensile strength or dry breaking force (choose 1)	Test Method ASTM D828 for paper and felt materials	20 lb/in. [3500 N/m] minimum (machine and cross direction)
	Test Method ASTM D882 for polymeric materials	20 lb/in. [3500 N/m] minimum (machine and cross direction)
	Test Method ASTM D5034 (Grab Method)	40 lbf [178 N] minimum (machine direction)
		35 lbf [156 N] minimum (cross direction)
Water Resistance (choose 1)	Test Method ASTM D779	10 min minimum for Type 1 Specimens/60 min minimum for Type II Specimens
	Water Resistance Ponding Test (see A1.1 of ASTM E2556) (For Type I Specimens Only)	No water shall penetrate through the membrane in 120 min
	AATCC Test Method 127 (For Type II Specimens Only)	21.6 in (55 cm) water column for 5 h
Water Vapor Transmission	Test Method ASTM E96/E96M (Dessicant Method)	290 ng/(Pa · s · m2) (5 perms) minimum
Pliability	Pliability Test (see A1.3 of ASTM E2556)	The material shall not crack when bent over a 1⁄16-in. [1.6 mm] diameter mandrel at a temperature of 32 °F [0 °C]

[a] Required for fluid applied WRB as part of an EIFS or EIFS with Drainage; other barrier types, eg building paper, shall be code compliant.
[b] No deleterious effects; no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination

Table 2 Performance Tests

Characteristic	Standard	Minimum Properties
Accelerated Weathering	Practices ASTM G153[a] or ASTM G155[b,c]	No deleterious effects[d] after 2000 h when viewed under 5x magnification
Freeze/Thaw	Test Method ASTM E2485	No deleterious effects[d] when viewed under 5x magnification
Mildew Resistance	Test Method ASTM D3273	No growth during 28 day exposure period
Salt Spray Resistance	Practice ASTM B117	No deleterious effects[d] at 300 h exposure period

© 2017 EIFS Industry Members Association
WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

Tensile Bond Adhesion	Test Methods ASTM E2134 or ASTM C297/C297M	No failure in adhesive coat, base coat, or finish coat. The insulation board shall fail cohesively except that 25% adhesive failure is acceptable. For tested values of 15 psi (103 kPa) or greater, adhesive failure up to 100% is acceptable.
Water Penetration	Test Method ASTM E331	The exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings, or intersections of terminations with dissimilar materials after 2 h of water application at a pressure differential of 6.24 psf (299 kPa).
Water Resistance	Practice ASTM D2247	No deleterious effects[d] at 14 day exposure
Water Vapor Transmission	Test Method ASTM E96	Vapor Permeable
Drainage Efficiency[e]	Test Method ASTM E2273	Minimum Drainage Efficiency of 90%

[a] Formerly specified in Test Method ASTM G23
[b] Formerly specified in Test Method ASTM G26
[c] Due to differences in spectral power distribution, results from ASTM Practice G155 Cycle 1, and ASTM Practice G153 Cycle 1, cannot be directly compared.
[d] No deleterious effects; no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination.
[e] Test required for EIFS with Drainage

Table 3 Component Performance Tests

Characteristic	Standard	Minimum Properties
Physical properties and requirements of expanded polystyrene	Specifications ASTM C578 and ASTM E2430	Meets Type I per ASTM C578; dimensional requirements and aging per ASTM E2430
Physical properties and requirements for polyisocyanurate	Specification ASTM C1289	Meets Type II, Class 2 or Class 3
Alkali resistance of reinforcing mesh	Test Method ASTM E2098	120 pli (21dN/cm) retained tensile strength

© 2017 EIFS Industry Members Association
WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

13.2 Fire Performance

13.2.1 System Fire Performance shall be in accordance with Table 4.

Table 4 System Fire Performance Tests

Characteristic	Standard	Minimum Properties
Fire endurance	Test Method ASTM E119	Maintain fire resistance of known, rated wall assembly
Ignition Resistance	NFPA 268	No surface ignition when exposed to 3950 BTU-h/ft^2 (12.5 kW/m^2)
Full-scale multi-story fire test	NFPA 285	1. Resistance to vertical spread of flame within the core of the panel from one story to the next. 2. Resistance to flame propagation over the exterior face of the system. 3. Resistance to vertical spread of flame over the interior (room side) surface from one story to the next. 4. Resistance to lateral spread of flame from the compartment of fire origin to adjacent spaces.

13.2.2 Component Fire Performance shall be in accordance with Table 5.

Table 5 Fire Performance Tests

Characteristic	Standard	Minimum Properties
Surface Burning	Test Method ASTM E84	Water-resistive barrier, insulation board, and reinforced coating system shall each separately have a flame spread of 25 or less, and smoke developed of 450 or less

13.3 Structural Performance shall be in accordance with Table 6.

Table 6 Structural Performance Tests

Characteristic	Standard	Minimum Properties
Transverse Wind Load	Test Method ASTM E330	Report negative and positive wind load values

© 2017 EIFS Industry Members Association
WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

13.4 Impact Performance shall be in accordance with Table 7.

Table 7 Impact Performance Tests

Characteristic	Standard	Minimum Properties[a]
Impact Resistance	Test Method ASTM E2486	Standard: 25-49 in-lb (2.83-5.54 J) Medium: 50-89 in-lb (5.65-10.1J) High: 90-150 in-lb (10.2-17J) Ultra High: >150 in-lb (>17J)

[a] All systems shall comply with the Standard classification and other values are provided as guidance where higher impact resistance may be specified.

14 Execution

14.1 Installation

14.1.1 Installation shall be performed in accordance with this standard, the EIFS manufacturer's current published instructions, the applicable building code, and project requirements.

14.2 Substrate

14.2.1 Assess the condition of the substrate to receive EIFS or EIFS with Drainage in accordance with ASTM C1397.

14.2.2 Substrate temperature shall be a minimum of 40°F (4.4°C) during application and for 24 hours following the installation of the EIFS. Protection and supplemental heat shall be provided as necessary on both sides of the substrate to maintain this condition.

14.3 Application

14.3.1 Mixing

All materials requiring preparation in the field shall be accompanied by the EIFS manufacturer's complete mixing instructions. The contractor shall follow all instructions. No foreign materials shall be added.

14.3.2 System Terminations

At all system terminations, the insulation board shall be treated in one of the following methods:

a) The insulation board edges shall be wrapped with reinforcing mesh and base coat:

1) Reinforcing mesh of sufficient width shall be applied to the substrate so it will encapsulate the edge of the insulation board and extend a minimum of 2 in (51 mm) onto the substrate behind the insulation board and a minimum of 2-1/2 in (63.5 mm) onto the face of the insulation board.

2) The encapsulation of the edge of the insulation board with the base coat and the reinforcing mesh shall be completed after the installation of the insulation board and prior to the application of the mesh to the face of the insulation board.

3) The system shall be terminated a minimum of 6 in (150 mm) above finished grade.

b) Manufacturer's approved accessories shall be applied in accordance with the EIFS manufacturer's requirements.

14.3.3 EIF Systems with Drainage

a) A water-resistive barrier that complies with the applicable building code shall be installed over the substrate.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

b) If required by the system or as defined in construction documents, a drainage medium shall be applied.

c) Insulation board shall be applied adhesively or mechanically in accordance with the EIFS manufacturer's instructions (see 14.3.4).

d) The system shall be terminated a minimum of 6 in (150 mm) above finished grade.

e) The base coat and reinforcing mesh shall be applied (see 14.3.6).

f) The finish coat shall be applied (see 14.3.7).

14.3.4 Method of Attachment of Insulation Board

The method of attachment shall be in accordance with the applicable building code and approved by the EIFS manufacturer.

a) Adhesive Method: The adhesive shall be applied to the back of the insulation board by one of the following methods as specified by the manufacturer, design professional, or as dictated by local codes:

1) Notched Trowel Method: The adhesive shall be applied to the entire surface of the insulation board using a notched trowel as recommended by the EIFS manufacturer.

2) Ribbon and Dab Method: The adhesive shall be applied to the entire perimeter of the insulation board in a ribbon fashion 2 in (50.8 mm) wide x 3/8 in (9.5 mm) thick. Dabs of approximately 4 in (102 mm) in diameter, in the same thickness, are then applied 8 in (204 mm) on center over the remainder of the board.

b) Adhesive and Mechanical Fastener Method

1) Adhesive shall be applied in accordance with the EIFS manufacturer's requirements.

2) Type and spacing of mechanical fasteners and washers shall be in accordance with EIFS manufacturer's installation instructions and, where provided, as detailed in the construction documents.

3) Mechanical fasteners shall be installed with washers into the framing or other nailable surfaces.

4) Fasteners shall penetrate not less than 5/16 in (8 mm) into steel framing members, 1 in (25.4 mm) into wood framing members, and 1 in (25.4 mm) into masonry substrates, or in accordance with fastener manufacturer's recommendations.

5) Mechanical fasteners and washers shall be corrosion resistant.

c) Mechanical Fastener Method

1) Mechanical fasteners and washers shall be of a type and spacing in accordance with the EIFS manufacturer's current published instructions and shall be included in the project plans and specifications.

2) Mechanical fasteners shall be installed with washers into the framing or other nailable surfaces.

3) Fasteners shall penetrate not less than 5/16 in (8 mm) into steel framing members, 1 in (25.4 mm) into wood framing members, and 1 in (25.4mm) into masonry substrates, or in accordance with fastener manufacturer's recommendations.

4) Mechanical fasteners and washers shall be corrosion resistant.

5) Fastener type and spacing shall meet local wind load requirements.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

14.3.5 Installation of Insulation Board

a) The application of the insulation board shall commence at the base of the wall from a level line or support.

b) After the adhesive has been applied to the back of the insulation board, the board shall be installed per the manufacturer's requirements, tightly abutting the adjoining insulation board. Pressure shall be applied over the entire surface of the insulation board to achieve uniform contact and high initial grab. The insulation board shall be checked occasionally for proper contact to the substrate. Proper contact has been achieved when a piece of insulation board is removed and a similar amount of adhesive is adhered to both the substrate and the insulation board, or the insulation board cannot be removed without breaking.

c) Mechanical fasteners and washers shall be installed in the number and pattern as required by the EIFS manufacturer, the fastener manufacturer, and/or the design professional so as to comply with local wind load requirements. Care shall be taken to ensure proper seating, not overdriving or underdriving.

d) Where more than one course of insulation board is applied, the insulation boards shall be applied in a running bond pattern, with staggered vertical joints and interlocking insulation boards at the inside and outside corners. Insulation board joints shall be offset a minimum of 6 in (152.4 mm) from sheathing joints and corners of openings.

e) All insulation boards shall be butted tightly. Any gaps greater than 1/16 in (1.6 mm) between the insulation boards shall be filled with small pieces of insulation board cut to size or low-expanding spray polyurethane foam. Gaps shall not be filled with adhesive or any other non-insulating material.

f) Window corners and similar re-entrant corners shall be cut out of a single insulation board. Board joints shall not be aligned at corners with head, sill, or jambs of windows, doors, similar openings, and aesthetic reveals.

g) Aesthetic reveals shall be cut into the insulation board prior to application of the reinforcing mesh.

h) Insulation board thickness shall not be less than 3/4 in (19 mm) in the bottom of a reveal.

i) Positive drainage toward the building exterior shall be provided when horizontal configurations are used (minimum slope 1:2).

j) The adhesively applied insulation board shall remain undisturbed for 24 hours prior to proceeding with the installation of the base coat/reinforcing mesh, or as necessary for the adhesive to dry. Where mechanical fasteners are used, system manufacturer's current published instructions shall be followed.

k) Prior to base coat/reinforcing mesh application, all insulation board irregularities shall be rasped flat,[1] depending on the type of insulation board used.[2]

14.3.6 Applying Reinforcing Mesh and Base Coat

The application shall be in accordance with the EIFS manufacturer's current published instructions.

a) The surface of the insulation board shall be inspected to ensure that it is free of surface irregularities such as voids, projections, and trowel marks.

b) Back wrapping at all system terminations shall be completed by embedding the back wrap reinforcing mesh in the base coat or using EIFS manufacturer recommended trim accessories.

---

[1] Expanded polystyrene insulation board exposed to sunlight may develop a yellowing, powdery film on the surface. This film must be entirely removed by sanding or rasping prior to base coat application.

[2] Do not rasp Polyisocyanurate insulation board with glass fiber facers. Insulation board surface shall be free of deleterious material prior to base coat application.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

c) The field reinforcing mesh shall be embedded in the wet base coat, troweling from the center to the edge of the reinforcing mesh, to avoid wrinkles. The reinforcing mesh shall be continuous at all corners, overlapped a minimum 2-1/2 in (63 mm) at adjoining reinforcing mesh edges, including previously back wrapped mesh. The reinforcing mesh shall be embedded in the base coat in accordance with the EIFS manufacturer's recommendation, with no mesh color visible and the mesh shall not be tactile.

d) Multiple layers of reinforcing mesh shall be embedded when higher impact performance is required. Incorporating heavier weight reinforcing mesh provides higher impact performance as well. All areas requiring higher impact performance shall be detailed in the project plans and specifications.

e) Reinforcing mesh shall be doubled within 8 in (204 mm) of inside or outside corners.

f) Expanded polystyrene shapes installed with EIFS or EIFS with Drainage shall have reinforcing mesh embedded into the base coat as described in 14.3.6(c).

g) All edges of the insulation board at penetrations of the EIFS or EIFS with Drainage, such as at windows, doors, HVAC, pipes, ducts, electrical boxes, and at the base of a wall shall be terminated as described in 14.3.2 or as specified by the project plans and specifications. Wall openings such as doors, windows, and HVAC shall be diagonally reinforced at corners with mesh not less than 9 in (229 mm) by 12 in (305 mm).

h) The inside corners of adjoining returns to windows, doors, and similar wall openings shall have reinforcing mesh the full width of the return and shall extend not less than 2-1/2 in (63.5 mm) on both sides of the corner (i.e. where a head return meets a jamb return).

i) All edges of the insulation board at expansion joints shall be wrapped with the base coat and reinforcing mesh as specified by the EIFS manufacturer for the particular EIFS or EIFS with Drainage use. The reinforcing mesh shall be fully embedded so mesh color is not visible.

j) Where aesthetic reveals exist, the reinforcing mesh shall be continuous to ensure that the reinforcing mesh is fully embedded in the base coat and that the reinforcing mesh is not cut during application of the base coat.

k) The reinforcing mesh shall be fully embedded in the base coat throughout the field of the wall, at corners, edges, and joints to conceal color. The surface shall be free of voids, projections, trowel marks, and other surface irregularities.

l) Primer shall be installed in accordance with the EIFS manufacturer's recommendations, as required.

m) The base coat/reinforcing mesh application shall be cured prior to the application of the finish coat.

14.3.7 Applying Finish

a) The finish coat shall be mixed according to the specifications of the EIFS manufacturer. Only clean, potable water shall be added to achieve the desired workability. The same amount of water shall be added to each container of finish within a given lot.

b) Prior to application of the finish coat, surface irregularities in the base coat, such as trowel marks, board lines, and reinforcing mesh laps shall be corrected.

c) Application of the finish shall be with a stainless steel trowel or equipment specified by the EIFS manufacturer. Tools and equipment shall be kept clean at all times.

d) Finish coat shall be applied to the cured base coat maintaining a wet edge at all times to obtain a uniform appearance. Finish shall be applied continuously to a natural break such as corners, joints, or tape line. Sufficient manpower and scaffolding shall be provided to continuously finish a distinct wall area. Scaffolding shall be placed a distance from the wall, consistent with safety standards, which will allow uniform texturing of the finish. The thickness of the finish coat shall be in accordance with the EIFS manufacturer's current published instructions.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

e) Finish materials shall not be applied onto joint surfaces that will be the substrate for sealants, unless otherwise specified by the EIFS manufacturer.

f) The texture and color of the finish shall be as specified and in accordance with the approved sample. All mechanics applying and texturing the finish shall utilize the same tools, equipment, and techniques to achieve uniformity.

g) All finish work shall be protected from damage until fully cured.

14.4 Job Site Clean-Up

14.4.1 All excess EIFS materials shall be removed from the job site by the contractor in accordance with contract provisions.

14.4.2 All surrounding areas, where the EIFS has been applied, shall be left free of debris and foreign substances.

a) All expanded polystyrene rasped material shall be contained and removed.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

Annex

Accessories

1 Expansion joints, corner reinforcements, starter tracks, and similar items, when required by the EIFS manufacturer, shall be installed in accordance with the EIFS manufacturer's recommendations and shall be compatible with the sealant. Accessories shall be described as to the type of material, dimensions, thickness, corrosion-resistance treatment, or generic plastic.

2 Sealant material shall comply with ASTM C920 and be compatible with the EIFS manufacturer's materials. Sealant shall be recommended by the sealant manufacturer for use with the selected EIFS or EIFS with Drainage and shall be listed by the EIFS manufacturer.

> **2.1** The application of the finish coat into a joint is generally not recommended by the EIFS manufacturer. The test method described in ASTM C1382 allows the evaluation of a specific sealant to a specific EIFS or EIFS with Drainage substrate or accessory.

3 Joint backup shall be used to prevent three-sided adhesion, to control the depth of the sealant, and to form the sealant to the proper configuration. Select a backer rod of sufficient size to allow its compression when inserted into the joint. Where the depth of the joint will not permit the use of a backer rod, a bond breaker tape shall be installed to prevent three-sided adhesion. Joint back-up material shall be as recommended by the sealant manufacturer.

4 Flashing, while not an EIFS or EIFS with Drainage component, is used to ensure the integrity of the building envelope. Flashing shall be galvanized metal, zinc, PVC vinyl, stainless steel, or in sheet form such as bitumen tapes. Particular attention to openings, roof/wall intersections, crickets, wall deck intersections, and at some protrusions through the EIF system is recommended.

© 2017 EIFS Industry Members Association

WARNING: Unlicensed photocopying violates U.S. copyright laws and is subject to legal prosecution

EIMA EIFS INDUSTRY MEMBERS ASSOCIATION

© 2017 EIFS Industry Members Association