

**SECTION 07 24 00
EXTERIOR INSULATION AND FINISH SYSTEMS**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Detail wall section, base edge, expansion and control joint conditions for each system. Show locations of expansion and control joints on drawings. Show water management details including barrier membrane, flashing, weeps etc.
3. Specify one or more of the finishes, delete the others.
4. Verify if compliance with local codes is required for EIFS.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Exterior Finish Systems specified in this section consist of a Direct Exterior Finish Systems (DEFS), simulated synthetic stucco finish // and // Exterior Insulation and Finish System (EIFS) // all of which are applied over cement board, or glass fiber reinforced gypsum board sheathing.

1.2 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // _____// requirements.

1.3 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT

- A. Products and Materials with Post-Consumer Content and Recovered Materials Content:
1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conserves/tools/cpg/products/>.
 2. Materials or products specified by this section may be obligated to satisfy this Federal mandate and Comprehensive Procurement Guidelines program.
 3. The EPA website also provides tools such as a Product Supplier Directory search engine and product resource guides.

- B. Fulfillment of regulatory requirements does not relieve the Contractor of satisfying sustainability requirements stipulated by Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, as it relates to recycled content; additional product and material selections with recycled content may be required, as determined by Contractor's Sustainability Action Plan.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
 - 1. Two 300 mm (one-foot) square samples of the // EIFS // simulated synthetic stucco // finishes over sheathing board identical to the proposed installation in thickness, color, texture // insulation // and workmanship.
- C. Product Data:
 - 1. Manufacturer's literature and instructions for installation of the system. Include manufacturer's recommended details for corner treatment, sills, soffits, dentils, quoins, lintels, openings and other special applications.
 - 2. Summary of test results by the Exterior Finish System manufacturer to substantiate compliance with the specified performance requirements. Furnish complete test reports as required.
- D. Certificates: Statement by Exterior Finish System manufacturer that all components of the system proposed for use on this project are approved by that manufacturer.
- E. Qualifications: Statement by the Installer of the Exterior Finish System that they are experienced with the installation, having done at least three (3) projects using this system and can furnish names and locations of these projects if required.

1.5 DELIVERY AND STORAGE

- A. Deliver materials in unopened packages with manufacturer's labels intact, legible and grade seals unbroken.
- B. Store and handle in strict compliance with manufacturer's instructions. Protect from damage.
- C. Remove from premises any damaged or deteriorated material.

1.6 ENVIRONMENTAL CONDITIONS

- A. Unless a higher temperature is required by the system manufacturer, the ambient air temperature must be 7 degrees Celsius (45 degrees F) or

greater and rising at the time of installation of the system and be predicted to remain at 7 degrees Celsius (45 degrees F) or greater for at least 24 hours after installation.

1.7 WARRANTY

- A. Exterior Finish system must be warranted against water leakage past the weather resistive barrier and other defects in materials and workmanship, and be subject to the terms of Article "Warranty of Construction", FAR clause 52.246-21, except that the warranty period to be ten years.

1.8 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

- B. American Society for Testing and Materials (ASTM):

B117-11	Operating Salt Spray (Fog) Apparatus
C67-12	Sampling and Testing Brick and Structural Clay Tile
C177-10	Steady-State Heat Flux measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
C297/C297M-04(2010)	Flatwise Tensile Strength of Sandwich Constructions
C578-12b	Rigid, Cellular Polystyrene Thermal Insulation
C666/C666M-03(2008)	Resistance of Concrete to Rapid Freezing and Thawing
C920-11	Elastomeric Joint Sealants
D968-05(2010)	Abrasion Resistance of Organic Coatings by Falling Abrasive
D2794-93(2010)	Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

E84-12c	Surface Burning Characteristics of Building Materials
E96/E96M-12	Water Vapor Transmission of Materials
E108-11	Fire Tests of Roof Coverings
E330-02 (2010)	Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
E331-00 (2009)	Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
E2486/E2486M-13	Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS)
E2511-09	Standard Guide for Detailing of EIFS-Clad Wall Assemblies
G90-10	Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

PART 2 - PRODUCTS

SPEC WRITER NOTES:

1. Select one or more of the following finishes delete others.
2. A water resistant membrane such as 15 lbs. Asphalt felt or equivalent is required behind the cement board sheathing.

//2.1 SYNTHETIC STUCCO

- A. Description: Reinforced cement board joints, synthetic stucco base coat and simulated stucco finish coat applied directly to the cement board.
- B. Source Limitations: Obtain finish materials from single source from single manufacturer and from sources approved by finish coat manufacturer as tested and compatible with finish components.
- C. Joint Reinforcement:
 1. Reinforcing tape: Minimum 100 mm (4 inch) wide, polymer coated, open mesh glass fiber tape.
 2. Tape embedding material: Ready-to-mix Portland cement mortar base coat containing dry latex polymers.
- D. Primer/Sealer: Finish manufacturer's standard substrate conditioner designed to protect substrates from moisture penetration and to improve the bond to substrate.
- E. Flexible-Membrane Flashing: Cold-applied, self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and

primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

F. Accessories:

1. Trim, control joints and corner beads as recommended by Exterior Finish System manufacturer.

G. Stucco Finish:

1. Base Coat: Ready-to-mix, Portland cement mortar containing dry latex polymers.
2. Finish Coat: Pre-colored, ready-mixed, polymeric coating.
3. Performance Requirements:

<u>Property</u>	<u>As Required Test Method</u>	<u>Requirement</u>
Surface Burning Characteristics	ASTM E84	Class A
Abrasion Resistance	ASTM D968	500 liters of light smoothing. No loss of film integrity.
Bond Strength (with cement board)	ASTM C297	50 psi
Salt Spray Resistance	ASTM B117	300 hours exposure. No deleterious effects
Freeze/Thaw Resistance (with cement board)	ASTM C666 proc. B	100 Cycles. No deterioration, no delamination
Accelerated Weathering	ASTM G90	2000 hours. No deterioration
Rapid Deformation	ASTM D2794	No cracking or impact failure

- H. Sealant: ASTM C920, material having a minimum joint movement of 50 percent with 100 percent recovery; type, grade and use as recommended by the sealant manufacturer.//

//2.2 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

SPEC WRITER NOTES:

1. The great variety of EIFS systems offered, even within the same type, make it imperative that the Architect substantiate compliance with the performance requirements of these specifications.
2. Do not specify EIFS in areas subject to physical abuse such as, loading areas, work areas, high traffic areas,

etc. Use the Direct Exterior Finish System (DEFS).

3. Do not specify EIFS on horizontal surfaces exposed to the weather.
4. Joint reinforcement of substrate under EIFS is not necessary.
5. Follow manufacturer's directions for mechanical fasteners for PB system.
6. Select color and texture of finish.
7. Check local building codes for additional requirements.

A. Description: The PB system consists of Type I molded rigid polystyrene insulation adhesively adhered to the sheathing and finished with a glass-fiber-mesh reinforced based-coat and a textured finish coat.

B. Performance Requirements:

TEST	TEST METHOD	REQUIREMENT
Flame Spread (Test samples include base coat, fabric, finish mounted on non-combustible substrate)	ASTM E84	Flame spread of 25 or less. Smoke developed rating 450 or less
Full Scale Wall Fire Test	ASTM E108	No significant surface flaming or propagation of vertical or lateral flames
Impact Resistance	ASTM E2486	//Standard Impact Resistance// 2.83 to 5.54J (25-49 inch-lbs) Medium Impact Resistance// 5.65 to 10.1J 50-89 inch lbs High Impact Resistance// 10.2 to 17J (90-150 inch-lbs) Ultra High Impact Resistance// Over 17.1J (Over 150 inch-lbs.) - No broken reinforcing fabric
Structural Performance (Test panels 1200 mm x 1200 mm (4 feet by 4 feet) typical of project application)	ASTM E330	No permanent deformation, delamination or deterioration for positive and negative pressures as required.
Water Penetration	ASTM E331	No Water penetration
Abrasion Resistance	ASTM D968	500 liters of sand-slight smoothing - no loss of film integrity
Accelerated Weathering	ASTM G90	2000 hours. No deterioration

TEST	TEST METHOD	REQUIREMENT
Salt Spray Resistance	ASTM B117	Withstand 300 hours. No deleterious effects.
Water Vapor	ASTM E96	Not more than 18 grains an hour per square foot.
Absorption-Freeze-Thaw (Pre-weighed 100 mm x 200 mm (4" by 8") specimens; 25 mm (1") insulation, faced with finish coat cured and stored in air; tested with edges and back open.)	ASTM C67 50 Cycles: 20 hrs. at - 9 deg C ; 4-hr. thaw in water	After 50 cycles - Total weight gain of not more than 6.2 grams. No checking splitting, or cracking.

C. Adhesive: Manufacturers standard product including primer as required compatible with sheathing.

D. Insulation:

1. Thermal Resistance: Thermal resistance (R-value), as indicated, measured by ASTM C177.
2. Insulating Material: ASTM C578, as recommended by EIFS manufacturer and treated to be compatible with EIFS components.
3. Provide Type I Molded Expanded Polystyrene (MEPS) insulation board for Type PB systems.

E. Create means of drainage between the insulation board and sheathing.

F. Flash and seal all penetrations and terminations.

G. Mechanical Anchors: As recommended by the EIFS manufacturer.

H. Accessories: Conform to the recommendations of the EIFS manufacturer, including trim, edging, anchors, expansion joints, and other items required for proper installation of the EIFS. All metal items and fasteners to be corrosion resistant.

SPEC WRITER NOTES:

1. Reinforcing fabric weight varies greatly by manufacturer, type of system and Impact Resistance requirements.

I. Reinforcing Fabric:

1. Balanced, open weave, glass fiber fabric made from twisted multi-end strands specifically treated for compatibility with the other materials of the system.
2. Minimum weight: 4.3 oz/sq. yd.

J. Base Coat:

1. Provide manufacturer's standard product for PB system.
2. Minimum thickness: 1-1/2 times reinforcing fabric thickness but not less than 2.4 mm (3/32 inches) wet thickness.

K. Finish Coat:

1. Manufacturer's standard product for PB system.
2. Minimum thickness: 1.6 mm (1/16 inch), complying with Performance Requirements.

- L. Sealant and Backer Rod: ASTM C920; Type, grade and use as recommended by the sealant manufacturer.

2.3 MIXING

- A. Comply with manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by finish system manufacturer. Mix materials in clean containers. Use materials within time period specified by manufacturer or discard.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with ASTM E2511.

3.2 INSPECTION

- A. Examine substrate, opening supports and conditions under which this work is to be performed. Notify RE/COR in writing of conditions detrimental to the proper completion of this work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.3 CONTROL JOINTS

- A. See drawings for location of building control joints and surface control joints. Install surface control joints as follows:
1. Direct Exterior Finish: Install at 6 meters (20 feet) o.c. maximum in either direction, erecting the continuous vertical joints first at building expansion joints, intersection of dissimilar substrates or finishing materials where concentrated stresses or movement is anticipated. Leave a 13 mm (1/2") minimum continuous gap between board panels to receive control joint.

SPEC WRITER NOTES:

1. EIFS Class PB systems can often be installed with continuous surfaces interrupted only where expansion and control joints occur in the building.
2. Follow EIFS manufacturer recommendation for locating control joints.

//2. Exterior Insulation and Finish System: Install at 15 meters (50 feet) maximum in both directions and at building expansion joints, floor lines and where EIFS intersects other materials per manufacturer's recommendations.//

3.4 SEALANTS

A. Apply according to manufacturer's recommendations and the following:

//B. Direct Exterior Finish System/Unit Finish/: Caulk all intersections of cement board with windows, doors, control joints, other openings and locations as shown on drawings. Do not caulk locations intended for water drainage.//

//C. Exterior Insulation and Finish System: Apply sealant per EIFS manufacturer's recommendation. Do not seal locations intended for water drainage.//

3.5 ACCESSORIES

A. Install according to manufacturer's recommendation.

3.6 SUBSTRATE PROTECTION APPLICATION

A. Primer/Sealer: Apply substrates for improving adhesion of insulation to substrate.

B. Flexible-Membrane Flashing: Apply and lap to shed water; seal at openings, penetrations, terminations, and where required by finish system manufacturer. Prime substrates if required and install flashing to comply with finish system manufacturer's written instructions and details.

3.7 FINISH

//A. Synthetic Stucco Finish:

1. Joint Reinforcement: Pre-fill cement board joints and trim with synthetic stucco Base Coat mixed according to manufacturer's directions. Immediately embed reinforcing tape into wet Base Coat and tightly trowel to board surface to avoid crowning joints. Cure for a minimum of four hours before application of base coat.
2. Base Coat: Apply base coat a minimum of 1.6 mm (1/16") uniformly smooth and flat over the entire surface including joints and trim. Dampen board surface as necessary under rapid drying conditions. Embed reinforcing fabric in basecoat while wet and cover with basecoat material so pattern of fabric is not visible.
3. Finish: Trowel apply ready-mixed exterior finish to base coat texturing surface as specified to a uniform thickness of 1.6 mm to 4.8 mm (1/16" to 3/16"). Dampen base coat as necessary under rapid

drying conditions. Joining between batches must occur at surface breaks such as corners, control joints, windows, etc.//

//B. Exterior Insulation and Finish System:

1. Insulation Board: Place horizontally from level base line. Stagger vertical joints and interlock at corners. Butt joints tightly. Provide flush surfaces at joints. Offset insulation board joints from joints in sheathing by at least 200 mm (8 inches). Do not align joints with corners of doors, windows and other openings. Do not leave insulation board exposed longer than recommended by insulation manufacturer.
- //2. Adhesive: Apply directly to entire back surface of the insulation board as recommended by the system manufacturer and immediately apply to cement board substrate. Apply firm pressure over entire board to ensure uniform contact and level surface. Allow adhesive to cure for a minimum of 24 hours before sanding.//
- //2. Mechanical Fasteners: Fasten with manufacturer's standard anchors, spaced as recommended by manufacturer, but not more than 600 mm (2 feet) horizontally and vertically.//
3. Sanding: Sand entire surface of insulation before application of base coat to improve bonding of basecoat, level high joints and remove dirt and weathering damage. Do not pre-fill low areas with basecoat.
4. Base Coat and Reinforcing Fabric: Trowel apply to the insulation a uniform thickness of base coat as recommended by the system manufacturer but not less than 1-1/2 times the reinforcing fabric thickness with a minimum of 2.4 mm (3/32 inch). Install reinforcing fabric in accordance with manufacturer's instructions. Provide diagonal reinforcement at opening corners, back-wrapping, and any other reinforcement recommended by EIFS manufacturer. The fabric cannot be visible beneath the surface of the basecoat after installation. Cure the basecoat for a minimum of 24 hours before application of the finish coat.
5. Finish: Inspect basecoat for damage or defects and repair prior to application of finish coat. Trowel apply finish coat according to manufacturer's recommendations but a minimum of 1.6 mm (1/16 inch). Texture finish as required. Provide finish surfaces that are plumb and plane with no greater deviation than 1:500 (1/4 inch in 10 feet).

3.8 CLEAN UP

- A. Upon completion, remove all scaffolding, equipment, materials and debris from site. Remove all temporary protection installed to facilitate installation of system.

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