**SECTION 07 24 00 EXTERIOR INSULATION AND FINISH SYSTEMS** 10-10

## PART 1 - GENERAL

### 1.1 DESCRIPTION

Exterior Finish Systems specified in this section consist of a Direct Exterior Finish Systems (DEFS), Unit finishes such as Insulation and Finish System (EIFS) which are applied over cement board sheathing.

### 1.2 RELATED WORK

A. Cement Board: Section 06 16 63, CEMENTITIOUS SHEATHING.

### 1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples:

Two 300 mm (one-foot) square samples of the EIFS finishes over cement board identical to the proposed installation in thickness, color, texture, insulation and workmanship.

C. Test Reports and Manufacturer's Literature

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.

3. Statement by Exterior Finish System manufacturer that all components of the system proposed for use on this project are approved by that manufacturer.

4. 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.

### 1.4 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.

**1.5 ENVIRONMENTAL CONDITIONS**

Unless a higher temperature is required by the system manufacturer, the ambient air temperature shall be 7 degrees Celsius (45 degrees F) or greater and rising at the time of installation of the system and shall be predicted to remain at 7 degrees Celsius (45 degrees F) or greater for at least 24 hours after installation.

**1.6 WARRANTY**

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

**1.7 APPLICABLE PUBLICATIONS**

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

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

B117-09.....Operating Salt Spray (Fog) Apparatus

C67-09.....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

C297-10.....Flatwise Tensile Strength of Sandwich Constructions

C578-10.....Rigid, Cellular Polystyrene Thermal Insulation

C666-03(R2008).....Resistance of Concrete to Rapid Freezing and Thawing

C920-11.....Elastomeric Joint Sealants

D968-10.....Abrasion Resistance of Organic Coatings by Falling Abrasive

D2794-93(R2010).....Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

E84-10.....Surface Burning Characteristics of Building Materials

E96-10.....Water Vapor Transmission of Materials

E108-10.....Fire Tests of Roof Coverings

E330-02(R2010).....Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

E331-00.....Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

G90-10.....Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

C. Exterior Insulation Manufacturers Association (EIMA)

101.86-1992.....Resistance of Exterior Insulation and Finish Systems to the Effects of Rapid Deformation (Impact)

## PART 2 PRODUCTS

### 2.1 UNIT FINISH: THIN BRICK

A. Not Used.

### 2.3 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

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 shall 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 (Sample shall be cured. Finish, base coat and fabric over 25mm (1 inch) insulation typical of project application) | EIMA 101.86 (Hemispherical Head Test) | |
| | | High Impact Resistance 10.2 to 17J (90-150 inch-lbs) |
| 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 |
| 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. Age insulation a minimum of 6 weeks prior to installation.

3. Provide Type I Molded Expanded Polystyrene (MEPS) insulation board for Type PB systems, in sizes as required except no larger than 600 mm X 1200 mm (24 X 48 inches) boards, and not more than 100 mm (4 inches) in thickness.

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

F. All penetrations and terminations shall be flashed.

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.

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

J. Base Coat: For PB system, manufacturer's standard product. Minimum thickness of 1-1/2 times reinforcing fabric thickness but not less than 2.4 mm (3/32 inches) wet thickness.

K. Finish Coat: For PB system, manufacturer's standard product. Minimum thickness 1.6 mm (1/16 inch), complying with Performance Requirements in paragraph B.

L. Sealant: ASTM C 920; material having a minimum joint movement of 50% with 100% recovery. Type, grade and use shall be as recommended by the sealant manufacturer. When required, primer, bond breaker and backer rods shall be non-staining as recommended by the sealant manufacturer. Do not use absorptive materials as backer rods.

**PART 3 EXECUTION**

**3.1 INSPECTION**

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

**3.2 CONTROL JOINTS**

A. See drawings for location of building control joints and surface control joints. Install surface control joints as follows:

B. 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.

C. Unit Finish: Install at 5 meters (16 feet) o.c. maximum in either direction, or at a lesser spacing as recommended by tile and brick manufacturer, erecting the continuous vertical joints first. Leave at 13 mm (1/2") minimum, continuous gap between board panels to receive control joint or sealant backer and sealant.

D. 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.

**3.3 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.

**3.4 ACCESSORIES:**

Install according to manufacturer's recommendation.

**3.5 FINISH:**

A. Unit Finish

1. Joint Reinforcement: Pre-fill cement board joints and trim with latex fortified mortar mixed according to manufacturer's directions. Immediately embed reinforcing tape into wet mortar and tightly trowel to board surface to avoid crowning joints. Cure for a minimum of four hours before application of skim coat.

2. Skim Coat: Apply skim coat of latex fortified mortar a minimum of 3 mm (1/8") thick uniformly smooth and flat over entire surface. Dampen board surface as necessary under rapid drying conditions. Cure a minimum of 24 hours before application of bond coat for setting tile or thin brick.

3. Brick:

a. Bonding Coat: Install according to ANSI A 108.5 and manufacturer's directions. Apply latex fortified mortar bonding coat, using appropriate notched trowel for tile or thin brick finish. Dampen skim coat as necessary under rapid drying conditions. Back butter tile or brick for 100% mortar contact. Install tile by firmly pressing into freshly notched mortar. Use a sliding and twisting motion to embed units and obtain a 100% mortar contact. Maintain joint alignment and spacing. Best tiles into place with beating blocks to close up grooves in the mortar left by trowel teeth. For best results, a minimum 2.4 mm (3/32 inch) of mortar under tile is recommended.

b. Grout: Apply latex fortified grout in accordance with ANSI A 108.10 after tile mortar has firmly set for 24 hours. Fill and compress joins solidly with grout and tool to provide specified appearance. Clean any grout from finish surfaces. Cure as required by ANSI A108.10 and manufacturer's directions.

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. 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, backwrapping, and any other reinforcement recommended by EIFS manufacturer. The fabric shall not 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).

**3.6 CLEAN UP:**

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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