SECTION 07242 - EXTERIOR INSULATION AND FINISH SYSTEMS - CLASS PM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior insulation and finish system (EIFS) applied over the following:
   1. Masonry surfaces.
   2. Exterior cement board.
   3. Gypsum sheathing.

B. Related Sections include the following:

   1. Division 7 Section "Joint Sealants" for sealing joints in EIFS with elastomeric joint sealants.
   2. Division 9 Section "Gypsum Sheathing" for gypsum sheathing.

1.3 DEFINITIONS

A. EIFS: Exterior insulation and finish system(s).

B. Class PM EIFS: Exterior wall cladding systems consisting of an inner layer of board insulation mechanically fastened to supporting substrates, a layer of glass-fiber-mesh-reinforced base coat applied directly to exterior face of board insulation, and a textured protective finish coat as based on the classification developed by EIMA.

1.4 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with the following:

   1. Bond Integrity: Free from bond failure within EIFS components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
   2. Weathertightness: Resistant to water penetration from exterior into EIFS and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other degradation of EIFS and assemblies behind it, including substrates, supporting wall construction, and interior finish.

B. Class PM EIFS: Provide EIFS having physical properties and structural performance that comply with the following when tested per methods referenced:

1. Abrasion Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS; cured for a minimum of 28 days; and showing no cracking, checking, or loss of film integrity after exposure to 528 quarts (500 L) of sand when tested per ASTM D 968, Method A.
2. Accelerated Weathering Characteristics: Sample of size suitable for test equipment and consisting of 1-inch- (25.4-mm-) thick EIFS; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 2000 hours when viewed under 5 times magnification per ASTM G 23, Method 1.
3. Absorption-Freeze Resistance: Sample, 3 by 5 inches (76 by 127 mm) in size, consisting of 1-inch- (25.4-mm-) thick EIFS coated on 1 side with base and finish coats, including reinforcing mesh; cured for 28 days; and showing no visible change and negligible weight loss when subjected to 50 cycles of 20 hours of freezing at 16 deg F (minus 8.9 deg C) and 4 hours of thawing in water at 75 deg F (23.9 deg C), plus or minus 10 deg F (5.5 deg C) per ASTM C 67.
4. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch (50.8-by-50.8-mm) glass slides according to manufacturer's written instructions; cured for 28 days; and showing no growth when tested per DOD MIL-STD 810F, Method 508.4 or per ASTM D 3273.
5. Salt-Spray Resistance: Sample, minimum of 4 by 6 inches (102 by 152 mm) in size, consisting of 1-inch- (25.4-mm-) thick EIFS; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 300 hours per ASTM B 117.
6. Water Penetration: Sample, 24 by 48 inches (609 by 1220 mm) in size, consisting of 1-inch- (25.4-mm-) thick EIFS; cured for 28 days; and showing no water penetration when tested per ASTM E 331.
7. Water Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.
8. Impact Resistance: Sample consisting of 2-inch- (50.8-mm-) thick EIFS applied to 1/2-inch- (12.7-mm-) thick gypsum sheathing; showing no cracking or denting with 12 impacts by 30-lb (14-kg) impact mass, swung as a pendulum, from 6 inches (152 mm) to 6 feet (1.8 m) at 6-inch (152-mm) increments when tested per ASTM E 695.
9. Positive and Negative Wind-Load Performance: Sample assembly, 48 by 48 inches (1220 by 1220 mm) in size, consisting of studs, sheathing, and 1-inch- (25.4-mm-) thick EIFS; and showing capability to withstand wind loads indicated when tested per ASTM E 330.

1.5 SUBMITTALS

A. Product Data: For each type and component of EIFS indicated.

B. Shop Drawings: For EIFS. Include plans, elevations, sections, details of components, details of penetration and termination, flashing details, joint locations and configurations, fastening and anchorage details including mechanical fasteners, and connections and attachments to other work.

C. Samples for Initial Selection: For each type of finish-coat color and texture indicated.

1. Include similar Samples of joint sealants involving color selection.

D. Samples for Verification: 24-inch- (600-mm-) square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work including a typical control joint filled with sealant of color selected.

1. Include sealant Samples to verify color selected.

E. Manufacturer Certificates: Signed by manufacturers certifying that EIFS and sealants comply with requirements.

F. Qualification Data: For Installer and testing agency.

G. Material Test Reports: For each insulation, reinforcing mesh, joint sealant, and coating.

H. Compatibility and Adhesion Test Reports: For joint sealants from sealant manufacturer indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

I. Field quality-control test reports.

J. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for EIFS.

K. Maintenance Data: For EIFS to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.

B. Source Limitations: Obtain EIFS through one source from a single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with system components.

C. Fire-Test-Response Characteristics: Provide EIFS and system components with the following fire-test-response characteristics as determined by testing identical EIFS and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.

1. Fire-Resistance Characteristics: Provide materials and construction tested for fire resistance per ASTM E 119.
2. Surface-Burning Characteristics: Provide insulation board, adhesives, base coats, and finish coats with flame-spread index of 25 or less and smoke-developed index of 450 or less, per UBC Standard 8-1.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

1. Stack insulation board flat and off the ground.
2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Maintain ambient temperatures above 40 deg F (4.4 deg C) for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

A. Coordinate installation of EIFS with related Work specified in other Sections to ensure that wall assemblies, including sheathing, flashing, trim, joint sealants, windows, and doors, are protected against damage from the effects of weather, age, corrosion, moisture, and other causes. Do not allow water to penetrate behind flashing and EIFS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bonsal, W. R. Co.
2. Dryvit Systems, Inc.
3. Finestone - Simplex Products Division..
4. Senergy Inc.; SKW-MBT Construction Chemicals.
5. Sto Corp.

2.2 MATERIALS

A. Compatibility: Provide substrates, fasteners, board insulation, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and approved for use by EIFS manufacturer for Project.

B. Colors, Textures, and Patterns of Finish Coat: Match Architect's samples.

C. Water-/Weather-Resistive Barrier: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), without perforations.
2. Kraft Waterproof Building Paper: UBC Standard 14-1, Grade D paper; vapor permeable.

D. Extruded, Rigid Cellular Polystyrene Board Insulation: ASTM C 578, Type IV; approved by EIFS manufacturer for material qualities, including corner squareness and other dimensional tolerances.

1. Flames-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, per ASTM E 84.
2. Dimensions: Provide insulation boards not more than 24 by 48 inches (610 by 1219 mm) and in thickness indicated but not more than 4 inches (102 mm) thick or less than that allowed by EIFS manufacturer.

E. Reinforcing Mesh: Balanced, alkali-resistant, open-weave glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. (21 dN/cm) per EIMA 105.01, complying with ASTM D 578, and with minimum weight not less than **4.2 oz./sq. yd. (142 g/sq. m)**.

F. Base-Coat Materials: EIFS manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:

1. Job-mixed formulation of portland cement complying with ASTM C 150, Type I, natural color; clean, washed, silica sand complying with ASTM C 897 and EIFS manufacturer's requirements; alkali-resistant chopped glass fibers; and polymer-emulsion admixture for base-coat use.

G. Polymer-Modified Portland Cement Finish-Coat Materials: Factory-blended formulation of portland cement, lime, natural color or white; natural sand aggregate and EIFS manufacturer's requirements; color-fast mineral pigments; and EIFS manufacturer's standard polymer-emulsion admixture for finish-coat use.

H. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with enhanced mildew resistance complying with the following requirements for material composition and method of combining materials:

1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.

2. Sealer: Manufacturer's waterproof, clear acrylic-based sealer for protecting finish coat.

I. Water: Potable.

J. Mechanical Fasteners: EIFS manufacturer's standard corrosion-resistant fasteners complete with standard washer attachments; selected for properties of pullout, tensile, and shear strength required to resist design loads of application indicated; capable of pulling fastener head below surface of insulation board; and of the following description:

1. For attachment to steel studs from 0.033 to 0.112 inch (0.84 to 2.84 mm) in thickness, provide steel drill screws complying with ASTM C 954.
2. For attachment to light-gage steel framing members not less than 0.0179 inch (0.45 mm) in thickness, provide steel drill screws complying with ASTM C 1002.
3. For attachment to masonry and concrete substrates, provide hammer-driven pin and predrilled expandable nylon sheath.
4. For attachment, provide manufacturer's standard fasteners suitable for substrate.

K. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written requirements, manufactured from zinc alloy and complying with ASTM C 1063. Coordinate depth of accessories with thickness of base and finish coats required.

1. Control Joints: Prefabricated one-piece type manufactured with expanded metal flanges, formed to provide double-keying action with protective coating, extending only to face of insulation, with removable tape on plaster face, and 1/4-inch (6.4-mm) joint sightline and bellows configuration as indicated below:

   a. Shallow Configuration: Bellows extends to face of insulation only..

2. Corner Bead: Prefabricated small-nosed corner bead with expanded metal flanges extending a minimum of 2-7/8 inches (73 mm) from corner.
3. Casing Bead: Prefabricated one-piece type for attachment to surface of insulation or behind insulation, of depth required to suit thickness of coating and, where attached behind insulation, thickness of insulation.

2.3 ELASTOMERIC SEALANTS

A. Elastomeric Sealant Products: Provide EIFS manufacturer's listed and recommended chemically curing, elastomeric sealant that is compatible with joint fillers, joint substrates, and other related materials, and complies with requirements for products and testing indicated in EIMA's "EIMA Guide for Use of Sealants with Exterior Insulation and Finish Systems, Class PB" and with requirements in Division 7 Section "Joint Sealants" for products corresponding to description indicated below:

1. Low-modulus, multicomponent, nonsag urethane sealant.
2. Low-modulus, nonacid-curing silicone sealant.

B. Preformed Foam Sealant Products: Provide sealant compatible with adjacent materials and complying with requirements in Division 7 Section "Joint Sealants."

C. Sealant Color: As selected by Architect from manufacturer's full range.

2.4 MIXING

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of EIFS.

B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind EIFS and deterioration of substrates.

3.3 EXTERIOR CEMENT-BOARD INSTALLATION

A. Water/Weather-Resistive Barrier: Wrap into wall openings, such as for windows, doors, and mechanical equipment; lap with flashing to drain in the direction of flow. Overlap upstanding vertical flashing/trim a minimum of 4 inches (100 mm) to shed water, unless otherwise indicated. Do not make holes, breaks, or tears in the barrier except by fasteners.

1. Asphalt-Saturated Organic Felt: Install a layer between exterior cement board and studs according to requirements of authorities having jurisdiction. Overlap to drain in the direction of flow. Apply horizontally with 2-inch (50-mm) overlap and 6-inch (150-mm) end lap; fasten to sheathing with galvanized staples or roofing nails.
2. Kraft Waterproof Building Paper: Install a layer between exterior cement board and studs according to manufacturer's written instructions and requirements of authorities having jurisdiction. Overlap to drain in the direction of flow.

B. Exterior Cement Board: Install on metal framing to comply with cement-board manufacturer's written instructions and research/evaluation report acceptable to authorities having jurisdiction. Install board with steel drill screws spaced no more than 8 inches (203 mm) o.c. along framing with perimeter fasteners at least 3/8 inch (9.6 mm) but less than 5/8 inch (15.9 mm) from edges of boards.

3.4 EIFS INSTALLATION

A. General: Comply with EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

B. Board Insulation: Mechanically attach to substrate by method complying with EIFS manufacturer's written requirements. Install top surface of fastener heads flush with plane of insulation.

1. Install fasteners into or through substrates with the following minimum penetration:

   a. Steel Framing: 5/16 inch (8 mm).
   b. Wood Framing: 1 inch (25 mm).
   c. Concrete and Masonry: 1 inch (25 mm).

2. Space fasteners as indicated below:

   a. Vertically: Not more than 12 inches (305 mm) o.c. or more than 12 inches (305 mm) from bottom edge of starting course of insulation board.
   b. Horizontally: Not more than **16 inches (406 mm)** o.c.

3. Apply insulation over dry substrates in courses with long edges of boards oriented horizontally. Begin first course from a level base line and work upward.
4. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches (300 mm) wide or 6 inches (150 mm) high. Offset joints not less than 6 inches (150 mm) from corners of window and door openings.

   a. Offset joints of insulation boards not less than 4 inches (100 mm) from joints in sheathing.
   b. Offset joints of insulation boards not less than 4 inches (100 mm) from aesthetic reveals.

5. Interlock ends at internal and external corners.
6. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch (1.6 mm) occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
7. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
8. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/16 inch (1.6 mm) from surface of insulation and to remove yellowed areas due to sun exposure; smooth surface film created by extrusion process; do not create depressions deeper than 1/16 inch (1.6 mm).
9. Interrupt insulation for expansion joints where indicated.
10. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
11. Treat exposed edges of insulation board to comply with EIFS manufacturer's written instructions.

12. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and EIFS protective coating lamina.

C. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:

1. Where expansion joints are indicated in substrates behind EIFS.
2. Where EIFS adjoin dissimilar substrates, materials, and construction.
3. At floor lines in multilevel wood-framed construction.

D. Control Joints: Install at locations indicated or, if not indicated, at locations complying with the following criteria and approved by Architect:

1. For wall areas defined by placement of control joints; area not to exceed 150 sq. ft. (13.9 sq. m).
2. At a maximum spacing of 12 feet (3.7 m) in any direction, with no panel exceeding 144 sq. ft. (13.4 sq. m) in area.
3. Where required so no panel has a width-to-length ratio of more than 2-1/2:1.
4. Where panels formed by EIFS change in size, extend joints full width or height of protective coating.
5. Above and below window and door openings.

E. Trim Accessories: Mechanically fasten accessories to framing members, masonry, or concrete at locations indicated.

1. Corner beads and control joints may be attached to insulation with threaded plastic fasteners when approved by EIFS manufacturer.

F. Reinforcing Mesh: Cover insulation with reinforcing mesh and fasten through insulation to framing members, masonry, or concrete.

G. Base Coat: Apply over and into reinforcing mesh in thickness recommended in writing by EIFS manufacturer to produce a flush, uniform surface with mesh fully embedded and prepared to receive finish coat.

H. Finish Coat: Apply over dry base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

I. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

3.5 INSTALLATION OF JOINT SEALANTS

A. Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements in Division 7 Section "Joint Sealants" and in EIMA's "EIMA Guide for Use of Sealants with Exterior Insulation and Finish Systems, Class PB."

1. Clean surfaces to receive sealants to comply with indicated requirements and EIFS manufacturer's written instructions.
2. Apply primer recommended in writing by sealant manufacturer for surfaces to be sealed.
3. Install sealant backing to control depth and configuration of sealant joint and to prevent sealant from adhering to back of joint.
4. Apply masking tape to protect areas adjacent to sealant joints. Remove tape immediately after tooling joints, without disturbing joint seal.
5. Recess sealant sufficiently from surface of EIFS so an additional sealant application, including cylindrical sealant backing, can be installed without protruding beyond EIFS surface.
6. Apply joint sealants after base coat has cured but before applying finish coat.

3.6 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

B. Provide final protection and maintain conditions, in a manner acceptable to Installer and EIFS manufacturer, that ensure that EIFS are without damage or deterioration at time of Substantial Completion.

END OF SECTION 07242