

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

SPEC WRITER NOTE: Delete text between
// // not applicable to project. Edit
remaining text to suit project.

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Direct exterior finish systems (DEFS).
 - 2. Exterior insulation and finish systems (EIFS).
 - 3. Unit finishes as accent trim within DEFS.

1.2 RELATED WORK

SPEC WRITER NOTE: Update and retain
references only when specified elsewhere
in this section.

- A. Section 09 06 00, SCHEDULE FOR FINISHES Color.
- B. Section 09 29 00, GYPSUM SHEATHING: Gypsum Board Sheathing.
- C. Section 09 30 13, CERAMIC/PORCELAIN TILING: Ceramic Tile.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American National Standards Institute (ANSI):
 - A108/A118/A136-19.....Installation of Ceramic Tile.
 - A137.1-19.....Ceramic Tile - Version 1.
- C. ASTM International (ASTM):
 - B117-19.....Operating Salt Spray (Fog) Apparatus.
 - C67/C67M-20.....Sampling and Testing Brick and Structural Clay
Tile.
 - C177-19.....Steady-State Heat Flux Measurements and Thermal
Transmission Properties by Means of the
Guarded-Hot-Plate Apparatus.
 - C297/C297M-16.....Flatwise Tensile Strength of Sandwich
Constructions.
 - C578-19.....Rigid, Cellular Polystyrene Thermal Insulation.
 - C666/C666M-15.....Resistance of Concrete to Rapid Freezing and
Thawing.
 - C920-18.....Elastomeric Joint Sealants.
 - D968-17.....Abrasion Resistance of Organic Coatings by
Falling Abrasive.

- D2794-93(2019).....Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- E84-20.....Surface Burning Characteristics of Building Materials.
- E96/E96M-16.....Water Vapor Transmission of Materials.
- E119-20.....Fire Tests of Building Construction and Materials.
- E330/E330M-14.....Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- E331-00(2016).....Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Wall by Uniform Static Air Pressure Differences.
- E2486/E2486M-13(2018)...Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS).
- G90-17.....Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight.

1.4 PREINSTALLATION MEETINGS

- A. Conduct preinstallation meeting // at project site // minimum 30 days before beginning Work of this section.

SPEC WRITER NOTE: Edit participant list to ensure entities influencing outcome attend.

1. Required Participants:

- a. Contracting Officer's Representative.
- b. // Architect/Engineer. //
- c. // Inspection and Testing Agency. //
- d. Contractor.
- e. Installer.
- f. // Manufacturer's field representative. //
- g. Other installers responsible for adjacent and intersecting work, including air barriers and sealants.

SPEC WRITER NOTE: Edit meeting agenda to incorporate project specific topics.

- 2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.

- a. Installation schedule.

- b. Installation sequence.
 - c. Preparatory work.
 - d. Protection before, during, and after installation.
 - e. Installation.
 - f. Terminations.
 - g. Transitions and connections to other work.
 - h. Inspecting and testing.
 - i. Other items affecting successful completion.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 - 1. Show size, configuration, and fabrication and installation details.
 - 2. Show details for corner treatment, sills, soffits, dentils, quoins, lintels, openings, penetrations, flashing, and other special applications.
- C. Manufacturer's Literature and Data:
 - 1. Description of each product.
 - 2. Installation instructions.
 - 3. Warranty.
- D. Samples: Two 300 mm (1 foot) square samples of // EIFS // simulated synthetic stucco // finishes over cement board identical to proposed installation in thickness, color, texture // insulation // and workmanship.
- E. Test reports: Certify each product and complete system complies with specifications.
- F. Qualifications: Substantiate qualifications comply with specifications.
 - 1. Installer // with project experience list //.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Regularly installs specified products.
 - 2. Installed specified products with satisfactory service on five similar installations for minimum five years.
 - a. // Project Experience List: Provide contact names and addresses for completed projects. //

1.7 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.8 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight // conditioned // facility.
- B. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

- A. Environment: Unless greater temperature is required by system manufacturer, install products only when ambient air temperature is minimum 7 degrees C (45 degrees F) and rising and predicted to persist for 24 hours after installation.

1.10 WARRANTY

SPEC WRITER NOTE: Always retain construction warranty. FAR includes Contractor's one year labor and material warranty.

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

SPEC WRITER NOTE: Specify extended manufacturer's warranties for materials only.

- B. Manufacturer's Warranty: Warrant EIFS system materials against material and manufacturing defects.

SPEC WRITER NOTE: Specify customarily available warranty period for specified products.

- 1. Warranty Period: 10 years.

PART 2 - PRODUCTS

2.1 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide system components from one manufacturer // and from one production run //.

SPEC WRITER NOTES:
Select one or more of the following finishes.

2.2 DIRECT EXTERIOR FINISH SYSTEMS (DEFS)

- A. Description: Reinforced cement board joints, synthetic stucco base coat and simulated stucco finish coat applied directly to gypsum board sheathing.
- B. Stucco Finish:
 - 1. Base coat: Ready-to-mix, Portland cement mortar containing dry latex polymers.
 - 2. Finish coat: Pre-colored, ready-mixed, polymeric coating.
- C. Performance Requirements:
 - 1. Surface Burning Characteristics: When tested according to ASTM E84.
 - a. Flame Spread Rating: 25 maximum.
 - b. Smoke Developed Rating: 450 maximum.
 - 2. Abrasion Resistance: ASTM D968; 500 liters of light smoothing sand with no loss of film integrity.
 - 3. Bond Strength (with gypsum board sheathing): ASTM C297/C297M, 345 kPa (50 psi).
 - 4. Salt Spray Resistance: ASTM B117; 300 hours exposure with no deleterious effects.
 - 5. Freeze/Thaw Resistance (with gypsum board sheathing): ASTM C666/C666M; 100 Cycles with no deterioration, no delamination.
 - 6. Accelerated Weathering: ASTM G90; 2000 hours with no deterioration.
 - 7. Rapid Deformation: ASTM D2794; No cracking or impact failure.
- D. Accessories:
 - 1. Trim, control joints and corner beads as recommended by DEFS manufacturer.
 - 2. Joint Reinforcement:
 - a. Reinforcing tape: Minimum 100 mm (4 inch) wide, polymer coated, open mesh glass fiber tape.
 - b. Tape embedding material: Ready-to-mix Portland cement mortar base coat containing dry latex polymers.
 - 3. Sealant: ASTM C920, Class 50 with 100 percent recovery. Type, grade and use as recommended by the sealant manufacturer.

2.3 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

SPEC WRITER NOTES:

- 1. The great variety of EIFS systems offered, even within same type, make it imperative that Architect substantiate compliance with

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 Direct Exterior Finish System (DEFS).
3. Do not specify EIFS on horizontal surfaces exposed to 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.

A. Description: Polymer-Based (PB) system consists of Type I molded rigid polystyrene insulation adhered to sheathing and finished with glass-fiber-mesh reinforced based-coat and textured finish coat.

B. Performance Requirements:

1. Surface Burning Characteristics: When tested according to ASTM E84.
 - a. Flame Spread Rating: 25 maximum.
 - b. Smoke Developed Rating: 450 maximum.
2. Full Scale Wall Fire Test: No significant surface flaming or propagation of vertical or lateral flames when tested according to ASTM E119.
3. Impact Resistance (Sample to be cured. Finish, base coat and fabric over 25 mm (1 inch) insulation typical of project application), ASTM E2486/E2486M:
 - a. // Standard Impact Resistance - 2.83 to 5.54 J (25-49 inch-pounds). //
 - b. // Medium Impact Resistance - 5.65 to 10.1 J (50-89 inch-pounds). //
 - c. // High Impact Resistance - 10.2 to 17J (90-150 inch-lbs.). //
 - d. // Ultra High Impact Resistance - Minimum 17.1 J (150 inch-pounds) - No broken reinforcing fabric. //
4. Structural Performance: (Test panels 1200 mm x 1200 mm (4 feet by 4 feet) typical of project application): ASTM E330/E330M, no permanent deformation, delamination or deterioration for positive and negative pressures as required.

SPEC WRITER NOTE: Indicate pressures on Drawings.

- a. Wind Loads: Uniform pressure as indicated on Drawings.

5. Water Penetration: ASTM E331, no water penetration minimum 720Pa (15 psf) for windows and 300 Pa (6.24 psf) for curtain wall assembly.
 6. Abrasion Resistance: ASTM D968, 500 liters of sand with slight smoothing and no loss of film integrity.
 7. Accelerated Weathering: ASTM G90; 2000 hours with no deterioration.
 8. Salt Spray Resistance: ASTM B117; Withstand 300 hours with no deleterious effects.
 9. Water Vapor: ASTM E96/E96M; Maximum 12 grains/hour/square meter (18 grains/hour/square foot.).
 10. Absorption-Freeze-Thaw (Pre-weighed 100 mm x 200 mm (4 inch by 8 inch) specimens; 25 mm (1 inch) insulation, faced with finish coat cured and stored in air; tested with edges and back open), ASTM C67.
 - a. 50 Cycles: 20 hours at 9 degrees C (4 degrees F); 4-hour thaw in water.
 - b. After 50 cycles; total weight gain of maximum 6.2 grams. No checking splitting, or cracking.
- C. Adhesive: Manufacturers standard product including primer 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 minimum of 6 weeks before installation.
 3. Provide Type I Molded Expanded Polystyrene (MEPS) insulation board for Type PB systems, in sizes as required except maximum 600 mm X 1200 mm (24 X 48 inches) boards, and maximum 100 mm (4 inches) thick.
- E. Mechanical Anchors: As recommended by EIFS manufacturer.
- F. Accessories:
1. Trim, control joints, weep screed, edging, anchors, expansion joints, and other items required for proper installation as recommended by EIFS manufacturer.
 2. Metal Items and Fasteners: Corrosion resistant.

SPEC WRITER NOTE: Reinforcing fabric weight varies greatly by manufacturer, type of system and Impact Resistance requirements.

- G. Reinforcing Fabric: Balanced, open weave, glass fiber fabric made from twisted multi-end strands specifically treated for compatibility with the other materials of system.
 - 1. Minimum weight 100 grams/square meter (4.3 ounces/square yard).
- H. Base Coat: Manufacturer's standard.
- I. Finish Coat: Manufacturer's standard. Minimum thickness 1.5 mm (1/16 inch), complying with performance requirements.
- J. Sealant: ASTM C920; Class 50 with 100 percent recovery. Type, grade and use as recommended by sealant manufacturer.
 - 1. When required, provide non-staining primer, bond breaker, and backer rods as recommended by sealant manufacturer.
 - 2. Do not use absorptive materials as backer rods.

2.4 UNIT FINISH

SPEC WRITER NOTE: Where unit finish is used as feature with stucco, specify stucco base coat over entire surface of gypsum board sheathing. Then apply skim coat, bond coat and unit finish as specified below.

- A. Description: Reinforced gypsum board joints, skim coat and bonding coat applied directly to gypsum board sheathing ready to receive // ceramic tile // thin brick // _____ // finish and grout.
- B. Joint Reinforcement:
 - 1. Reinforcing tape: Minimum 100 mm (4 inches) wide, polymer coated, open mesh glass fiber tape.
 - 2. Tape Embedding Material: ANSI A118.4; ready-to-mix Portland cement latex fortified mortar containing dry latex polymers.
- C. Accessories: Trim, control joints and corner beads as recommended by exterior finish system manufacturer.
- D. Tile: ANSI A137.1; Exterior grade ceramic, quarry or thin stone tiles approved by manufacturer for exterior use. See Section 09 30 13, CERAMIC TILING.
 - 1. Weight: Maximum 50 kilogram/square meter (10 pound square foot).
 - 2. Size: Maximum 19 mm X 450 mm x 450 mm (3/4 inch by 18 inches by 18 inches).
- E. Brick: Kiln-fired brick approved by manufacturer for exterior use.
 - 1. Weight: Maximum 50 kilogram/square meter (10 pound square foot).
 - 2. Thickness: Maximum 19mm (3/4 inch).

F. Grout: ANSI A118.6; ready-to-mix, Portland cement based latex fortified grout containing dry latex polymers.

G. Sealant: ASTM C920; Class 50 with 100 percent recovery. Type, grade and use recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Notify Contracting Officer's Representative in writing of conditions detrimental to proper completion of work.
- D. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions // and approved submittal drawings //.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

3.3 CONTROL JOINT INSTALLATION

- A. See drawings for location of building control joints and surface control joints.
- B. Install surface control joints as follows:
 - 1. Direct Exterior Finish: Install at 6 meters (20 feet) maximum on center, both directions, erecting continuous vertical joints first at building expansion joints, intersection of dissimilar substrates or finishing materials where concentrated stresses or movement is anticipated. Leave 13 mm (1/2inch) minimum continuous gap between board panels to receive control joint.
 - 2. Unit Finish: Install at 5 meters (16 feet) maximum on center, both directions, or at lesser spacing as recommended by // tile // and // brick // manufacturer, erecting continuous vertical joints first. Leave 13 mm (1/2 inch) minimum, continuous gap between board panels to receive control joint or sealant backer and sealant.

SPEC WRITER NOTE:

- 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.

3. 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 SEALANT INSTALLATION

- A. // Direct Exterior Finish System: // Unit Finish: // Apply sealant at intersections of gypsum board with windows, doors, control joints, other openings and locations as shown on drawings.
- B. Exterior Insulation and Finish System: Apply sealant according to EIFS manufacturer's recommendation.
- C. Do not apply sealant in locations intended for water drainage.

3.5 SYNTHETIC STUCCO FINISH INSTALLATION

- A. Joint Reinforcement: Pre-fill gypsum board joints and trim with synthetic stucco base coat mixed according to manufacturer's directions.
 1. Immediately embed reinforcing tape into wet base coat and tightly trowel to board surface to avoid crowning joints.
 2. Cure for four hours minimum before applying base coat.
- B. Base Coat: Uniformly apply base coat minimum 1.6 mm (1/16 inch) thick, smooth and flat over entire surface including joints and trim. Dampen board surface as necessary under rapid drying conditions.
 1. Embed reinforcing fabric in basecoat while wet and cover with basecoat material so fabric pattern is not visible.
- C. Finish: Trowel apply exterior finish to base coat texturing surface as specified to uniform thickness of 1.5 mm to 5 mm (1/16 inch to 3/16 inch).
 1. Dampen base coat as necessary under rapid drying conditions.
 2. Extend finish so breaks between batches occur at surface breaks such as corners, control joints, windows, and other interruptions.

3.6 UNIT FINISH INSTALLATION

- A. Joint Reinforcement: Pre-fill gypsum board joints and trim with latex fortified mortar mixed according to manufacturer's instructions.
 1. Immediately embed reinforcing tape into wet mortar and tightly trowel to board surface to avoid crowning joints.
 2. Cure for four hours minimum before applying skim coat.
- B. Skim Coat: Uniformly apply skim coat of latex fortified mortar a minimum of 3 mm (1/8 inch) thick, smooth and flat over entire surface.
 1. Dampen board surface as necessary under rapid drying conditions.

2. Cure 24 hours minimum before applying bond coat for setting
// ceramic tile // thin brick //.
- C. // Ceramic Tile: // Thin Brick: //
1. Bonding Coat:
 - a. Install according to ANSI A108.5. Apply latex fortified mortar bonding coat, using notched trowel to suit applied finish to produce minimum 2.4 mm (3/32 inch) thick mortar under installed finish.
 - b. Dampen skim coat as necessary under rapid drying conditions.
 - c. Back butter // ceramic tile // thin brick // for 100 percent mortar contact.
 - d. Install tile by firmly pressing into freshly notched mortar.
 - 1) Use sliding and twisting motion to embed units and obtain a 100 percent mortar contact.
 - e. Maintain joint alignment and spacing.
 - f. Beat tiles into place with beating blocks to close up grooves in mortar left by notched trowel.
 2. Grout: Apply grout according to ANSI A108.10 after tile mortar has firmly set for 24 hours.
 - a. Fill and compress joints solidly with grout and tool to provide specified appearance.
 - b. Clean any grout from finish surfaces.
 - c. Cure as required by ANSI A108.10.

3.7 EXTERIOR INSULATION AND FINISH SYSTEM INSTALLATION

- A. Insulation Board Layout: 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 minimum 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.
- B. Adhesive: Apply directly to entire back surface of the insulation board as recommended by the system manufacturer and immediately apply to gypsum board substrate. Apply firm pressure over entire board to ensure uniform contact and level surface. Allow adhesive to cure for 24 hours minimum before sanding.
- C. Create means of drainage between insulation board and gypsum board sheathing.
- D. Flash penetrations and terminations to discharge water to exterior.

- E. Mechanical Fasteners: Fasten with manufacturer's standard anchors, spaced as recommended by manufacturer, maximum 600 mm (24 inches) on center horizontally and vertically.
- F. Sanding: Sand entire surface of insulation before applying base coat, level high joints and remove dirt and weathering damage. Do not pre-fill low areas with basecoat.
- G. Base Coat: Trowel apply uniform thickness of base coat to insulation with minimum thickness of 1-1/2 times reinforcing fabric thickness and minimum 2.4 mm (3/32 inches) wet thickness.
- H. Install reinforcing fabric embedded in base coat. Provide diagonal reinforcement at opening corners, back wrapping, and other reinforcement recommended by EIFS manufacturer. Ensure fabric pattern is not visible beneath the surface of the basecoat after installation. Cure basecoat 24 hours minimum before applying finish coat.
- I. Finish Coat:
1. Inspect basecoat for damage or defects and repair before applying finish coat.
 2. Trowel apply finish coat minimum 1.6 mm (1/16 inch) thick.
 3. Texture finish as required.
 4. Surface Tolerance: Maximum 1/500 (1/4 inch in 10 feet) deviation from plumb and plane.

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