

PART 1: GENERAL**1.01. DESCRIPTION AND SCOPE**

- A. Requirements contained within Division I (General Requirements) are applicable to the work required of this section. Provide labor, materials, equipment, and supervision necessary to complete the exterior wall and finish systems including:
1. Application of Total Wall adhesive and/or mechanical fasteners for attachment of insulation boards
 2. Application of a Total Wall One Coat Hard Coat Mix and Total Wall reinforcing mesh over the insulation boards
 3. Application of backer rod and caulk sealant
 4. Installation of trim accessories
- B. Related work specified elsewhere:
1. Masonry, Division 4
 2. Metals, Division 5
 3. Wood Construction, Division 6
 4. Sheathing, Division 9
 5. Caulking/Sealants, Division 7
 6. Portland Cement Plastering, Division 9
- C. Referenced Documents
1. Standards
 - (1) ASTM A526 Specification for Sheet Steel, Zinc Coated (Galvanized) by Hot-Dip Process, Commercial quality
 - (2) ASTM B69 Specification for Rolled Zinc
 - (3) ASTM B117 Test Method for Salt Spray (Fog) Testing
 - (4) ASTM C67 Mod. Test Method for Saturated Freeze/Thaw
 - (5) ASTM C150 Specification for Portland Cement
 - (6) ASTM C297 Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
 - (7) ASTM C578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
 - (8) ASTM C1135 Test Method for Determining Tensile Adhesion Properties of Structural Sealants
 - (9) ASTM D968 Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
 - (10) ASTM 1784 Specification for Rigid PVC
 - (11) ASTM D2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
 - (12) ASTM E84 Test Method for Surface Burning Characteristics of Building

- (13) ASTM E108 Materials
 Mod. Full Scale Structural Fire Testing of Wall Systems

- (14) ASTM E330 Test Method for Structural Performance by Uniform Static Air Pressure Difference
 - (15) ASTM E331 Test Method for Water Penetration by Uniform Static Air Pressure Difference
 - (16) ASTM E695 Method for Measuring Relative Resistance to Impact Loading
 - (17) ASTM G23/G53 Accelerated Weathering for Exposure of Nonmetallic Materials
 - (18) Fed Mil Spec 810D Test Method for Determining the Resistance to Mold and Fungus Growth
2. Building Code Standards
- (1) National Building Code, Building Officials and Code Administrators (BOCA), Section 1406.0
 - (2) Standard Building Code, Southern Building Code Congress International (SBCCI), Sections 717.4 and 717.5
 - (3) Uniform Building Code, International Conference of Building Officials (ICBO), UBC Standard 26-4
 - (4) International Building Code, International Code Council (ICC), Applicable IBC Standards
- D. Terms and Definitions
- 1. **Class PM System**
A class of EIFS where Total Wall reinforcing mesh is covered with Total Wall One Coat Hard Coat Mix from 3/16" to 3/8" thickness followed by a textured and colored finish coat. The Total Wall reinforcing mesh is a woven glass fiber fabric, coated with a protective plastic material.
 - 2. **Insulation Board**
A preformed rigid insulating foam plastic functioning to reduce heat flow through a wall while providing a surface for the base coat and reinforcing mesh. Typically, a 4' x 8' Extruded Polystyrene (XPS) foam board with an average density of 2 lb. per cubic foot is used in thicknesses varying from 1" to 4". The XPS board must meet specific performance and safety specifications.
 - 3. **Adhesive**
An optional material used in addition to mechanical fasteners to help attach the foam insulation board to the substrate. Typically, the adhesive is Total Wall Blue Mastic #11 Adhesive or Enerfoam.
 - 4. **One Coat Hard Coat Mix**
The material is applied to the face of the insulation board and used to cover the reinforcing mesh plus functions as an impact barrier, weather barrier, and finish coat.
 - 5. **Reinforcing Mesh**
An open weave fiberglass fabric coated with a protective plastic. Attached to the insulation board by mechanical fasteners and covered by the Total Wall One Coat Hard Coat Mix to strengthen the system.
 - 6. **Accessories**
Items such as weep bases, corner beads and casing beads may be utilized in the assembly of the system. Flashing for window and door treatments, decks, roof kick-out areas and dormers are utilized.
 - 7. **Mechanical Fastener**
A combination screw and plastic washer plate is used to attach foam plastic insulation boards to a wall.
 - 8. **Sealant**
A permanently flexible self-sticking compound used to seal seams in the system such as the seams occurring between the system and windows and doors.

1.02. DESIGN LIMITATIONS AND DETAILING

- A. The maximum allowable system deflection, normal to the plane of the wall is $L/360$.
- B. Design wind load must not exceed Total Wall, Inc.'s allowable wind load as stated in Total Wall, Inc. Code Evaluation Reports.
- C. All details must conform to Total Wall, Inc.'s recommendations and must be consistent with the project requirements.
 - 1. General
 - (1) The insulation board must be separated from the interior of the building by 1/2" gypsum wallboard or equivalent fire resistive barrier material, which will limit the average temperature rise of the unexposed surface to not more than 250°F after 15 minutes of fire exposure, when subjected to the ASTM E-119 time-temperature curve.
 - (2) The minimum thickness of XPS must be 1"; the maximum thickness must be 4", except for architectural enhancements.
 - (3) The length and slope of inclined surfaces must follow the guidelines listed below:
 - (a) Minimum slope: 6" of rise in 12" of horizontal projection
 - (b) Inclined surfaces must not be used for areas defined as roofs by building codes.
 - (c) Uses not meeting the above criteria must be approved in writing by Total Wall, Inc. prior to installation.
 - 2. Substrate System
 - (1) Must be engineered to withstand all applicable loads. Including live, dead, positive and suction wind; seismic activity; etc. Bond strength, fastener strength, and connection strength must be analyzed and engineered. Appropriate factors of safety must be used.
 - (2) The maximum deflection under positive or suction full designs loads of the substrate system must not exceed $L/360$.
 - 3. Substrates
 - (1) Application of the system must be to one of the following substrates:
 - (a) Sound brick
 - (b) Sound unit masonry
 - (c) Sound concrete
 - (d) Exterior grade gypsum sheathing
 - (e) DensGlass gypsum sheathing
 - (f) Sound stucco
 - (g) Oriented strand board (OSB)
 - (h) WR and MR gypsum sheathing, when acceptable to code authorities
 - (i) Exterior grade plywood
 - (j) Cement board
 - (2) Substrates other than those listed above must be approved in writing by Total Wall, Inc. prior to installation of the system.
 - (3) Sheathing substrates must be oriented with their strong axis perpendicular to the supporting framing.
 - (4) The applicator must verify that the proposed substrate is acceptable to the applicable regulatory authorities prior to the installation of the system.
 - (5) Painted substrates must have any loose paint removed using appropriate materials and methods. Layers of paint must be removed to the virgin substrate.
 - (6) The substrate must not have any planar irregularities greater than 1/4" in 10 lineal feet.
 - 4. System Joints
 - (1) Continuous expansion joints must be installed at the following locations:
 - (a) Where expansion joints occur in the substrate
 - (b) Where building expansion joints occur

- (c) At floor lines in wood-frame construction
 - (d) Where the system abuts other materials
 - (e) Where the substrate changes
 - (2) Control joints must be installed
 - (a) At changes in roofline
 - (b) To limit any wall areas to 144 sq. ft. and to limit any wall area length to width ration to 2.5:1.
 - (c) At changes in building shape and structural system.
 - (3) Expansion and contraction of the system and adjacent materials must be considered in the design of expansion joints, with proper consideration given to sealant properties, installation conditions, temperature range, coefficient of expansion of materials, joint width-to-depth ratios, etc.
 - (4) Isolation joints are required around all wall penetrations, including doors and windows.
5. Details
- (1) Total Wall, Inc.'s latest published information must be followed for standard detail treatments.
 - (2) Non-standard detail treatments must follow the recommendations of Total Wall, Inc.
 - (3) Corners must be reinforced by wrapping reinforcing fabric around the corner from both directions for a minimum of 8", or with corner mesh, or approved PVC accessory.
 - (4) Openings must be reinforced using a 9" x 12" wide strip of detail mesh placed at a 45° angle to the opening corner or have a surface mounted control joint running vertically or horizontally.
 - (5) System terminations must have either an approved PVC or metal 1/4" casing bead.
 - (6) The bottom system termination must have an approved PVC or metal weep base or starter strip.
- D. The use of dark colors must be considered in relation to estimated wall surface temperatures as a function of local climate conditions.

1.03. QUALITY ASSURANCES

- A. Contractor
- 1. The contractor must have a minimum of two years' experience in the wall construction trades.
 - 2. Be licensed by Total Wall, Inc. for application of PM systems.
 - 3. Demonstrate the ability to install the system based on projects of similar size and complexity.
 - 4. Meet the approval of the architect.
 - 5. Must provide:
 - (1) Completed projects
 - (2) Equipment
 - (3) Manpower
 - (4) Supervision necessary to install the system in compliance with the project plans and specifications.
- B. Insulation Board Manufacturer
- The insulation board manufacturer must be Dow Chemical Corporation or be recognized by Total Wall, Inc. as capable of producing insulation board to meet the system requirements. The insulation board manufacturer must be listed by an approved agency, and the board and packaging must be labeled as required by Total Wall, Inc. and the applicable building code.

1.04. SUBMITTALS

- A. Sample Panel
- The contractor must submit to the architect a sample panel of at least 12" x 12" demonstrating the texture and color of the One Coat Hard Coat Mix desired. The architect must review the panel and determine the suitability of the finish presented.

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- B. The contractor must submit a list of five projects which have been completed within the last five years, exhibiting the contractor's EIFS installation skills. The list must include project name, location, description of work and date completed.
- C. Total Wall, Inc.'s literature, including application instructions, specifications, and details.
- D. The insulation board manufacturer's documentation to show compliance with Total Wall, Inc. and code requirements.

1.05. PRODUCT DELIVERY AND STORAGE

- A. Delivery
Deliver all materials supplied by Total Wall, Inc. in original, unopened containers with legible manufacturer's identification intact.
- B. Storage
 - 1. Store all products off the ground, under cover and protected from dampness and sunlight.
 - 2. Warning: XPS rigid insulation is combustible and may constitute a fire hazard if improperly used or installed. XPS insulation must be adequately protected. Use only as directed by the specific instructions for those products. During shipping, storage, installation or use these materials must not be exposed to open flame or ignition sources. For proper protection of rigid insulation, consult the National Fire Protection Association (NFPA) standard or the authority having jurisdiction. Store XPS under cover, off the ground with full support, stacked horizontally.
 - 3. All liquid products must be stored at 40° F (4.4° C) or above and protected from freezing. Protect from exposure to direct sunlight during storage.

1.06. JOB CONDITIONS

- A. Install all materials in strict accordance with all safety and weather conditions required by the product literature, and in accordance with ASTM C926, paragraph 7, and as modified by the applicable standards of the authorities having jurisdiction.
- B. Apply all coatings when the ambient temperature is 40° F and rising. A minimum temperature of 40° F must be maintained 24 hours after completion of work. Supplementary heat must be provided if stated temperature conditions do not exist. Do not apply coatings to a frozen surface.
- C. Protect surrounding areas and surfaces during application of the wall system.
- D. Protect system from precipitation during application and for at least 24 hours after application.

1.07. COORDINATION AND SCHEDULING

- A. Closely coordinate work with related sections and trades.
- B. Protect the tops of walls to prevent water from entering behind the system. Any required cap flashing, overhangs or drip edges must be installed as soon as possible after the finish coat has been applied.
- C. Install all sealants in a timely fashion. Protect open joints from water intrusion with backer rod or other means until the sealant has been installed.
- D. When required by code or job requirements, contract with a certified independent EIFS inspector prior to Total Wall EIFS installation. The inspector must be EDI (Exterior Design Institute), AWCI (Association of the Wall and Ceiling Industry) or by another applicable certifying agency as approved by Total Wall, Inc. The inspector will make a minimum of 3 on-site inspections which include phases of rigid foam attachment, base coat and mesh application and finish and sealant application.

1.08. SYSTEM WARRANTY

- A. A Total Wall, Inc. warranty application form must be completed prior to the commencement of the EIFS installation.
- B. Upon completion of the EIFS installation in accordance with specifications, and payment of all monies due to Total Wall Inc., a system warranty will be issued.

PART 2: PRODUCTS

2.01. MANUFACTURERS

- A. All materials related to EIFS must originate from:
Total Wall, Inc.
PO Box 366
Rio, WI 53960
(888) 702-9915

2.02. EXTERIOR INSULATION SYSTEM COMPONENTS

- A. Rigid insulation board must be 4' x 8', 2' x 4', or 2' x 8' XPS, meeting ASTM C578 performance standards, an average density of 2 pound per cubic foot, cured for 6 weeks at 68° F or equivalent accelerated conditions, labeled with Total Wall and code markings, and with a minimum thickness of 1" and a maximum thickness of 4" as specified by drawings.
- B. Adhesive (optional) must be Total Wall Blue Mastic #11 Adhesive.
- C. One Coat Hard Coat Mix must be Total Wall, Inc.'s field mixed polymer modified Portland cement-based mixture. The mix ration must be as follows:
 - 1. Portland cement (white) 94 lb. bag
 - 2. Sand 150 lbs.
 - 3. Total Wall Liquid Acrylic Additive 5-gal pail
 - 4. Total Wall Matrix Additive 1 lb. (1 bag)
 - 5. Reinforcing mesh – a plastic coated fiberglass reinforcing fabric as required and supplied by Total Wall, Inc.: 4 oz. 38" open weave Hard Coat mesh.
- D. Sand – The sand must be dry, clean, iron free, quartz sand with a mean distribution averaging from 45 – 55 mesh by ASTM C136 and less than 0.5% organics by ASTM C40.
- E. Portland cement must be Type I, I-II or II meeting ASTM C150, fresh and free of lumps
- F. Water must be clear, potable, and free of foreign matter.
- G. Sealant Systems
 - 1. Must be one of the following:
 - (1) Tremco, Inc.
 - (a) Sealant: "Dymeric"
 - (b) Primer: use manufacturer's recommended primer
 - (c) Backer rod: Dow "Ethafoam"
 - (d) Bond breaker: 3M #226, 481, 710
 - (2) Pecora Corporation
 - (a) Sealant: "Dynatrol II" or 890 Silicone
 - (b) Primer: use manufacturer's recommended primer
 - (c) Backer rod: Dow "Ethafoam"
 - (d) Bond breakers: 3M #480 or Valley Industrial Products #90

- (3) Dow Corporation
 - (a) Sealant: Dow 790 series sealants (790, 791, 795)
 - (b) Primer: use manufacturer's recommended primer
 - (c) Backer rod: Dow "Ethafoam"
- (4) Sika
 - (a) Sealant: Sika LM15
 - (b) Primer: primer not required
 - (c) Backer rod: Dow "Ethafoam"
- (5) Alternate sealant as approved in writing by Total Wall
- 2. System materials must be dried prior to sealant installation.
- 3. Color must be selected by the architect.
- H. Accessories, if required by Total Wall, Inc. and job specifications, must be of proper size and configuration for their function and must be manufactured from rigid PVC, solid zinc alloy or galvanized steel.
- I. Fasteners, if required by Total Wall, Inc. and job specifications, must have the necessary pull-out strength, corrosion resistance, length and design as supplied by Total Wall, Inc. or Wind-Lock to meet the system design loads.

2.03. MIXING AND PREPARATION

- 1. Total Wall EIFS One Coat Hard Coat Mix
 - (1) Obtain a clean portable mortar mixer.
 - (2) Add 5-gallons of Total Wall Liquid Acrylic Additive.
 - (3) Begin low speed mixing and add 94 lb. (1 bag) of Portland cement (white).
 - (4) Add 150 lbs. of sand.
 - (5) Sprinkle in the Total Wall Matrix Additive.
 - (6) Add up to 1 quart of additional water to adjust the mixture to a creamy trowel grade consistency.
 - (7) Add specified colorant while mixing to achieve desired color.
 - (8) Allow mixture to stand for 2-3 minutes and mix again, on low speed for an additional minute. Again, clean water may be added to enhance workability.
 - (9) Begin using product immediately.
- 2. Total Wall Blue Mastic #11 Adhesive
 - (1) The Total Wall Blue Mastic #11 must be thoroughly stirred with a clean mixer until a uniform workable consistency is obtained.
 - (2) A small amount of water may be added to adjust workability. Maximum water addition must not exceed 8 oz. per 5-gallon pail.
 - (3) The Total Wall Blue Mastic #11 must be used immediately after mixing. The container must be kept closed when not in use.
 - (4) The mixing tool must be cleaned immediately after use.

2.04. PERFORMANCE REQUIREMENTS

The Total Wall system and its components must meet the following performance requirements:

ASTM E84 Surface Burning	FSI = 10, SDI = 35
ASTM E108 mod. Full Scale Fire Test	Pass (no flame spread)
MIL STD 810D Mildew Resistance (Method 508.3)	28 days - no growth
ASTM E695 Full Scale Impact Loading	No damage
ASTM D968 Sand Abrasion 500 liters, 260 L/ml	No deleterious effects
ATM D2247 Water Resistance	No deleterious effects
ASTM B117 Salt Spray (300 hours)	No deleterious effects
ASTM E96 Water Vapor Transmission	1.79 perms
ASTM C67 Mod. Saturated Freeze/Thaw (50 cycles)	No deleterious effects
ASTM C297 Tensile Adhesion	No failure in adhesive, base, or finish
ASTM E330 Modified by E72-80 Negative and positive wind load	(Pos.102, Neg. 118 psf)
ASTM E331 Wind Drive Rain (5 gal/sq. ft./hr. rain fall plus 65 mph wind)	No penetration
ASTM D2797 Impact resistance	42.5 in/lbs.
ASTM G23 Accelerated Weathering (2000 hours)	No deleterious effects
ASTM C209 Tensile Bond	85% failure in foam
ASTM C203 Flexural Strength	0.555 Deflection at 73.5 load
ASTM C109 Compressive Strength	4260 PSI

PART 3: EXECUTION

3.01. COMPLIANCE

- A. The installation must be performed strictly in accordance with Total Wall, Inc.'s current literature and current job specifications.

3.02. INSPECTION

- A. Examination of substrate
 - 1. Prior to installation of the system, the substrate must be examined by the applicator as follows:
 - (1) The substrate must be a type approved for the system (See Section 1.02.C.3. (1)).
 - (2) The substrate surface must be free of foreign materials such as oil, dirt, form-release agents, wax, glazing, water, moisture, frost, or any substance that may interfere with bond.
 - (3) The substrate must be examined for compliance with contract documents.
 - (4) The substrate must be examined for soundness, such as tightness of connections, crumbling or looseness of surface voids and projections.
 - (5) The substrate must be examined for dimensional correctness
 - 2. The architect and general contractor must be advised of all discrepancies. Work must not proceed until satisfactory conditions are addressed.

3.03. INSTALLATION

- A. Mixing

All materials requiring preparation must be labeled; accordingly, the contractor must follow all instructions.
- B. System Terminations

At all system terminations, the system must have approved accessories or corner mesh

 - 1. Reinforcing mesh must overlap the system accessory flange at least 2".
 - 2. System details may also be terminated with approved corner mesh.
- C. Installation of Rigid Insulation
 - 1. Extruded Polystyrene (XPS)
 - (1) XPS must be applied to the substrate surface starting from the bottom and must be supported by permanent means such as a weep base or starter strip fastened to the wall. NOTE: A drainable moisture barrier, such as Tyvek StuccoWrap, must be installed over moisture sensitive substrates. Additionally, the lower casing beads must have weeps to allow drainage.
 - (2) The XPS must be applied with the edges oriented with its joints offset with respect to the sheathing joints and with interlocking insulation boards at inside and outside corners.
 - 2. Total Wall Blue Mastic #11 Adhesive (optional) (not used over moisture barrier)
 - (1) Ribbon and Dab Method

Ribbons of Total Wall Blue Mastic #11 Adhesive must be applied with a trowel to one surface of the XPS. The ribbons must be 2" wide, 3/8" thick around the entire perimeter of the XPS. The adhesive must not be applied to the ends of the XPS. 8 dabs of adhesive 4" in diameter by 3/8" thick must be applied to the area within the perimeter ribbon. A minimum of 33% of the XPS surface must be in contact with the Total Wall Blue Mastic #11 Adhesive.

- (2) Notched Trowel Method

Beads of Total Wall Blue Mastic #11 Adhesive must be applied to one surface of the XPS using a notched trowel having an edge profile meeting Total Wall, Inc. requirement. The trowel must produce beads that stand out 3/8" from the surface of the XPS.

There must be a minimum of 8 beads per 12" of trowel. Each bead must be a minimum of 3/16" wide. The adhesive must not be applied to the ends of the XPS.
 3. Install approximately 4 mechanical fasteners per board to hold the XPS boards in place; the remaining fasteners will be installed through the reinforcing mesh. For frame construction fasteners must be of the type and configured to penetrate studs a minimum of 1/2". For masonry, fastener holes must be predrilled with an appropriate size masonry bit so the fastener must have a firm attachment to the substrate and sized for specified penetration into the substrate.
 4. If gaps in the XPS board occur, slivers of XPS must be cut and shaped to fit the gaps and inserted without using any adhesive or filler between XPS boards.
 5. Once the Total Wall Blue Mastic #11 adhesive has taken a set, all surfaces of the XPS boards must be sanded or rasped until flush. Low areas must not be filled with base coating to produce a level surface.
 6. Measure and cut run of Total Wall Hard Coat reinforcing mesh. The reinforcing mesh must cover the entire surface of the XPS insulation boards, with the only breaks in the mesh occurring at expansion joints. Overlap runs of reinforcing mesh by a minimum of 2.5". Temporarily tack the mesh in place by inserting roofing nails through the mesh and into the XPS. The roofing nails will be removed after the remaining mechanical fasteners are installed.
 7. Install all system accessories including casing beads at all system stops, surface mount v-joints, control joints and corner strips or mesh. The accessory flanges must overlap the reinforcing mesh by a minimum of 2". Miter the flange edges where they meet other accessories to make a level fit.
 8. Install the remainder of the mechanical fasteners to a density of 1 fastener per sq. ft. Remove the roofing nails which were holding the reinforcing mesh in place.
 9. Total Wall, Inc.'s latest published detailed instructions and special instructions for this project must be followed regarding installation of the XPS.
- D. Total Wall One Coat Hard Coat Mix
1. Damaged areas and foreign materials must be addressed prior to application of the One Coat Hard Coat Mix.
 2. For deterioration due to weathering or any other cause, refinish the XPS surface by sanding while maintaining the flatness of the surface.
 3. Using a stainless steel trowel, apply the Total Wall One Coat Hard Coat to the surface of the XPS to a uniform thickness of approximately 1/4". The Total Wall One Coat Hard Coat Mix must be applied continuously and in one operation to the entire wall surface, or to a logical breaking point.
 4. Apply additional Total Wall One Coat Hard Coat Mix as necessary to build out a minimum of 1/4" thickness over the surface. Immediately remove any One Coat Hard Coat Mix from control joints or expansion joints.
 5. Use a darby or slicker to level the surface of the Total Wall One Coat Hard Coat Mix.
 6. Apply the approved texture using a second pass of Total Wall One Coat Hard Coat Mix. It may be necessary to wait up to 30 minutes to apply the texture, depending on conditions.
 7. A period of 18 hours must lapse to allow the Total Wall One Coat Hard Coat Mix to cure. The coating must be protected from damage and weather while curing.
 8. Details of the installation of the base coat at the ends of walls, windows, insulation board edges, corners, etc., must be in accordance with Total Wall, Inc.'s latest detailed installation instructions and current job drawings.

E. Sealant

Ensure proper backer rod, primer and sealant are installed at all required locations, such as expansion joints and isolation joints, in accordance with Total Wall, Inc. details and the sealant manufacturer's specifications.

3.04. JOB SITE CLEANUP

- A. All excess Total Wall system material must be removed from job site by the applicator
- B. All surrounding areas where Total Wall EIFS has been applied must be left free of debris and foreign substances.

3.05. INSPECTION

- A. The Total Wall applicator, a representative of the property owner's team and a Total Wall representative must inspect the EIFS installation and prepare an inspection summary with a copy to Total Wall, Inc.
- B. If an independent EIFS inspector is used, a copy of the final report must be submitted to TotalWall, Inc.

END OF SPECIFICATION