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. Inspection and preparation of Insulated Concrete Form (ICF) substrate
2. Application of Total Wall Self-Sticking reinforcing mesh over the ICF substrate
3. Application of Total Wall Tuff II coating.
4. Application of backer rod and caulk sealant

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 B117	Test Method for Salt Spray (Fog) Testing
(2)	ASTM C67	Mod. Test Method for Saturated Freeze/Thaw
(3)	ASTM C297	Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
(4)	UBC 26-9	Intermediate Scale Multistory Fire Test (ISMA)
(5)	ASTM C1135	Test Method for Determining Tensile Adhesion Properties of Structural Sealants
(6)	ASTM D968	Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
(7)	ASTM 1784	Specification for Rigid PVC
(8)	ASTM D2247	Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
(9)	ASTM E84	Test Method for Surface Burning Characteristics of Building Materials
(10)	ASTM E108	Mod. Full Scale Structural Fire Testing of Wall Systems
(11)	ASTM E330	Test Method for Structural Performance by Uniform Static Air Pressure Difference
(12)	ASTM E331	Test Method for Water Penetration by Uniform Static Air Pressure Difference
(13)	ASTM E695	Method for Measuring Relative Resistance to Impact Loading
(14)	ASTM G23/G53	Accelerated Weathering for Exposure of Nonmetallic Materials
(15)	Fed Mil Spec 810D	Test Method for Determining the Resistance to Mold and Fungus Growth

(16) NFPA Standard Test Method 268 Radiant Heat Fire Test

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
   (5) International Residential Code (IRC).

D. Terms and Definitions

1. Reinforced Full Synthetic System Over ICF

A class of exterior cladding where Total Wall Self-Sticking reinforcing mesh is pressed onto the ICF surface followed by a 1/8" (3.2 mm) thickness of Tuff II coating. Typically, one layer of Tuff II and reinforcing mesh are used; however, an additional layer of Tuff II and reinforcing mesh may be used to increase the impact resistance of the system. The Total Wall reinforcing mesh is a woven glass fiber fabric, coated with a protective plastic material. Tuff II is a 100% Acrylic combination base coat and finish coat available in a chosen color and textured as specified in the field by the applicator.

2. ICF Substrate

A preformed rigid insulating foam plastic block functions to reduce heat flow through the wall and to provide a surface for the Total Wall Tuff II and Total Wall reinforcing mesh followed by the Tuff II coating. Typically, an Expanded Polystyrene (EPS) foam block will have an average foam density of 1.5 lb. per cubic foot (24.03 g/liter) is used with outer EPS thickness from the concrete core will not exceed 4" (101.6 mm). The ICF block must meet specific performance and safety specifications as outlined in the ICF manufacturer's specifications.

3. Total Wall Reinforcing Mesh

An open weave fiberglass fabric coated with a protective plastic. The mesh is covered with a layer of Total Wall Tuff II to strengthen the system.

4. Total Wall Tuff II

A premixed, synthetic plaster material functioning to provide a durable base coat, a decorative color, and texture coat.

5. Accessories

Items such as 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.

V- buck tape may be used to transition from window bucks to the ICF, especially in the absence of EIFS trim bands.

6. 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/240.

B. All details must conform to Total Wall, Inc. recommendations and must be consistent with the project requirements.

1. General
   (1) At all areas, the ICF must be completely encapsulated by the lamina.

(2) The ICF must be separated from the interior of the building by 1/2” (12.7 mm) 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 (119° C) after 15 minutes of fire exposure, when subjected to the ASTM E-119 time-temperature curve.

(3) The minimum thickness of EPS must be 1/4” (6mm); the maximum thickness must be 4” (101.6 mm), except for architectural enhancements.

(a) Exception: minimum thickness of EPS over plastic does not apply.

(b) Minimum thickness of EPS used for trim, extensions or laminations must be 1" (25.4 mm)

(4) 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. ICF Substrate

(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/240.

(3) The substrate must not have any planar irregularities of greater than 1/4" (6.35 mm) in 10 lineal feet (2.43 m).

3. 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) Where the system abuts other materials

(2) Expansion and contraction of the system and adjacent materials must be taken into account 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.

(3) Isolation joints are required around all wall penetrations, including doors and windows.

4. 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”. Tuff II must be applied to the first layer of mesh before the second layer of mesh is applied.

(4) Openings must be reinforced using a 9” x 12” wide strip of detail mesh placed at a 45° angle to the opening corner embedded as a separate layer of mesh.

(5) Commercial and residential window opening must be trimmed if necessary, with EPS foam lamina to cover dissimilar adjoining materials and to facilitate construction of either a standard isolation joint or fillet bead of approved sealant and backer.

C. All areas requiring higher than standard impact resistance must be detailed in the drawings and described in the contract documents.

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

The contractor must have a minimum of two years' experience in the wall construction trades, be licensed by Total Wall, Inc. for application of PB or ICF systems, demonstrate the ability to install the system based on projects of similar size and complexity, and meet the approval of the architect. The contractor must provide a list of completed projects, equipment, manpower and supervision necessary to install the system in compliance with the project plans and specifications.

B. ICF Manufacturer

The ICF manufacturer must be:

1. Reward Wall
2. BuildBlock
3. Polysteel
4. ARXX
5. Keeva
6. Dow
7. Eco Block
8. Owens Corning
9. Amvic
10. Other manufacturer upon written approval by Total Wall, Inc. and as recognized by Total Wall, Inc. as capable of producing ICF's to meet the system requirements.

1.04. SUBMITTALS

A. Sample Panel

The contractor must submit to the architect a sample panel of at least 12" x 12" (30 cm x 30 cm) of Total Wall lamina over EPS board to exhibit the texture and color of finish desired. The General Contractor must review the panel and determine the suitability of the finish presented.

B. The contractor must submit a list of 5 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 ICF manufacturer's systems documentation.

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: EPS rigid insulation is combustible and may constitute a fire hazard if improperly used or installed. EPS insulation must be adequately projected. 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 EPS 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 state 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 an 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 the following examinations as applicable:

1. Material storage and environmental application conditions
2. Trim EPS lamina or trim accessory installation
3. ICF Substrate – type and condition
4. ICF Preparation – washing off UV degradation
5. ICF Preparation – planar adjustments
6. ICF Preparation – area rasping as required, proper filling of gaps between blocks, proper block joint alignment
7. Trims and architectural enhancements – configuration and installation (if required)
8. Mesh – type, labeling, back wrapping, corner reinforcement, general installation
9. Coating – type, labeling, mixing and application
10. Sealant and backer rod – type, labeling, joint dimensions, joint preparation, joint placement, sealant application

The inspector must provide a minimum of 3 interim text reports and one final report which will include photographs. The inspected items must be compared with job documents and Total Wall, Inc. specifications and reported accordingly. Report copies must be issued to the GC within 3 days of each inspection phase. Report copies will be made available to ICF manufacturer and Total Wall, Inc. The payment of monies for the inspection process will be allocated prior to the bidding process.

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. MANUFACTURER

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

B. The ICF substrate must be supplied by an approved ICF manufacturer

2.02. EXTERIOR INSULATION SYSTEM COMPONENTS

A. Any trim accessories must be UV resistant PVC as manufactured by either Vinyl Corporation or Plastic Components. The trim accessories may consist of the following:
1. Window trim
2. Casing bead or corner bead
3. Sloped sill wedge

B. Rigid insulation board use for lamination, trim, or repairs must be 2' x 4' (0.6096 m x 1.2192 m) Grade 1 EPS, meeting ASTM C578 performance standards, an average density of 1 pound per cubic foot, cured for 6 weeks at 68° F (20° C) or equivalent accelerated conditions, labeled with Total Wall and code markings, and with a minimum thickness of 3/4" (19.05 mm) and a maximum thickness of 4" (101.6 mm) as specified by drawings.

C. Adhesive must be Total Wall Blue Mastic Adhesive, a ready-to-use water based acrylic adhesive designed to adhere polystyrene to various substrates or EnerFoam Urethane Foam.

D. Coating must be Tuff II, a premixed ready to use base coat and finish coat. The selected mixture is used to coat over the Total Wall self-stick reinforcing fabric.

E. Reinforcing mesh must be plastic coated fiberglass reinforcing fabric as required and supplied by Total Wall, Inc.:
1. 4.3 oz – Standard, 25 – 35 in/lbs. impact

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) Sonneborn
      (a) Sonnolastic 150
      (b) Primer: use manufacturer's recommended primer

(c) Backer Rod: Dow “Ethafoam”

(5) Sika Inc.

(a) Sealant: Sika LM15

(b) Primer: primer not required

(c) Backer rod: Dow “Ethafoam”

(6) Alternate sealant as approved in writing by Total Wall, Inc.

2. System materials must be dried prior to sealant installation.
3. Color must be selected by the architect or owner.

2.03. MIXING AND PREPARATION

A. Tuff II

1. The Total Wall Tuff II must be stirred for 1 minute with a low speed mixer until a uniform workable consistency is obtained
2. A small amount of water may be added to adjust workability.
   (1) Maximum water addition not to exceed 6 oz. (.0177 Liters) per 5-gal (18.92 Liter) pail.
   (2) The water must be clean, potable, and free of foreign matter.
3. No additives or material of any kind, such as rapid binders, antifreeze, accelerators, fillers, pigments, etc., must be added unless specified by Total Wall, Inc.
4. The Total Wall Tuff II container must be kept closed when not in use. Pot of life of product in closed pail is 48 hours. After that, product must be remixed. Shelf life of product in closed pails is 18 months.
5. 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	1.5 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.0.079, Neg. 0.079 Kg/cm²)

ASTM E331 Wind Drive Rain (5 gal/sq.ft./hr. rain fall plus 65 mph wind)	No penetration
ASTM D2797 Impact resistance	2.5 Newton-Meters
ASTM G23 Accelerated Weathering (2000 hours)	No deleterious effects
ASTM C209 Tensile Bond	26 PSI (1.846 Kg/cm²)
ASTM C203 Flexural Strength	1.41 cm deflection at 33.4 Kg load
Radiant Heat Fire Test, NFPA 268	Pass
R) ISMA Fire Test (UBC-26-9)	Pass

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. INSTALLATION

A. Requirements of substrate
   1. Any planar deflections or irregularities in the ICF substrate must not exceed 1/4" in 10 lineal feet. Deflections exceeding this value must be correct by ICF manufacturer in accordance with their specifications or procedures
   2. Any UV degradation of the EPS must be removed by washing or rasping. Washing the EPS must be done with a controlled pressure fan spray of water solutions of Sodium Metaborate and surfactant as recommended by Total Wall, Inc.
   3. Any small areas of concrete seepages or spatters must be removed by rasping or other suitable mechanical means.
   4. Any gaps in block joints of 1/8" or greater must be filled with EnerFoam and rasped level after drying.
   5. Any block joint misalignments of exceeding 1/16" must be rasped to a tolerance of 1/16" or less. Rasping must be performed in those areas in a manner which will not tend to produce picture framing of the ICF block
   6. Any localized deflections, protrusions or dents exceeding 1/16" must be repaired using a combination of EnerFoam, 1 lb. density EPS foam and rasping as required.
   7. Items 2 – 6 above are the responsibility of the EIFS applicator.

B. Windows and other penetrations
   1. At window jambs, sills and heads, the EPS abutments must be constructed to receive proper wrapping of reinforcing mesh and base coat to allow for a proper 1/2" sealant joint or alternatively a fillet bead joint. The EPS abutments may require trimming of existing EPS or lamination of additional EPS using approved adhesive or use of PVC accessory. In addition, the use of trim bands or reveals with properly beveled edges is permitted to aid in design aesthetics and construction of proper sealant joints.
   2. At window heads, a 3/8" grove cut drip edge must be constructed into the EPS if possible. Determination must be made by the applicator and Total Wall, Inc.

3. Customized details for specific penetrations and terminations must be provided by Total Wall, Inc. as deemed necessary by the applicator, the General Contractor, ICF Manufacturer and Total Wall, Inc.

3.03. INSTALLATION OF Total Wall LAMINA (Mesh and Tuff II coating)

A. Mixing
   1. All materials requiring preparation must be labeled accordingly.
   2. The contractor must follow all instructions.

B. System terminations
   1. At all system terminations, the system must be terminated with the proper wrapping of reinforcing mesh and basecoat or PVC accessory.

C. Installation of rigid EPS insulation for repair or trim or extension
   1. Grade 1 EPS
      (1) Grade 1 EPS must be applied to the substrate using EnerFoam or Total Wall #11 Mastic.
      (2) Grade 1 EPS Pieces must be precut to fit openings, corners or projections prior to application of the back wrapping and approved adhesive.
   2. Grooves which may be required as design feature must be routed into the outside surface of the Grade 1 EPS, using a high-speed router, hot groover or hot knife and proper blade. The remaining thickness of the Grade 1 EPS at any point in the routed groove or feature must not be less than 1/4" (6 mm).
   3. Foam shapes of Grade 1 EPS, if used, must be applied directly to the substrate or surface of the Grade 1 EPS.
   4. Total Wall, Inc.'s latest published detailed instructions and special instructions for this project must be followed regarding installation of the Grade 1 EPS

D. Application of self-sticking mesh
   1. Surface of the Grade 1 EPS must be inspected and repaired, as necessary.
   2. Apply Total Wall Self-Stick Reinforcing Mesh to the ICF surface in horizontal runs.
      (1) Press the mesh onto the surface using a trowel or other suitable tool.
      (2) Avoid sags or bulges.
      (3) Overlap runs of mesh at least 1/2".
      (4) For larger area overlaps, such as at corners, apply Tuff II to the first layer before applying the second layer of mesh.

E. Application of Tuff II
      (1) Apply Tuff II over the reinforcing mesh, allowing the mesh to gage the coating thickness.
      (2) Apply additional Tuff II as necessary so that the pattern of the reinforcing mesh is not visible beneath the surface of the base coating and a 1/8" (3.17 mm) average thickness is achieved.
      (3) This may require two passes with the Tuff II in order to achieve the proper thickness.
      (4) Apply texture to the tuff II as required to achieve the desired result.
      (5) Textures may be smooth, brush, freestyle, knock-down or spatter.
      (6) Tuff II may also be spray-applied with a hopper gun to achieve a greater variety of appearances.
      (7) The Tuff II must be applied continuously and in one operation to the entire wall surface, or to a logical breaking point.
      (8) A wet edge must be maintained.
      (9) Work must proceed toward natural wall stops and corners.
      (10) A clean steel trowel must be used.
      (11) The Tuff II must be protected from contamination, weather, and damage for a minimum of 24 hours.
   2. Sealant

(1) Ensure proper backer rod, primer and sealant is installed at all required locations, such as expansion joints and isolation joints, in accordance with Total Wall, Inc. details and the sealant manufacturer specifications.
(2) Sealant and backer rod must be of the type and brand as specified in this document or as approved in writing by Total Wall, Inc. for this application.
(3) Primer must be used when specified by the sealant manufacturer.
(4) Sealant must be bonded to cured base coat, not to the finish coat.
(5) Sealant joint preparation, installation must be performed by an experienced applicator.

3.04. JOB SITE CLEANUP

A. All excess Total Wall, Inc. 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 Total Wall, Inc.

END OF SPECIFICATION