

**Crosstech Construction Products
Ultimate 'ICF' Finish System
CSI Section 09772**

Impact Resistant System for Insulated Concrete Form Walls

SPECIFICATION

INTRODUCTION

This Specification has been assembled to enable the design professional to select or delete sections to suit the project requirements.

Air Seals at any joints/gaps between adjoining components (penetrations, etc.) are of primary importance to maintain continuity of the air barrier system and must be considered by the design professional in the overall wall assembly design.

This specification is intended for applications on the following substrates: Insulated Concrete Forms

PART 1 - GENERAL

1.01 SECTION INCLUDES

Ultimate 'ICF' Finish System: Sealant, Insulation Board, Mechanical fasteners, Basecoat, Reinforcing mesh and Finish coat.

1.02 RELATED SECTIONS

- | | | |
|----|---------------|--|
| A. | Section 07195 | Air Barrier |
| B. | Section 07620 | Sheet Metal Flashing and Trim: Perimeter flashings |
| C. | Section 07900 | Sealants |
| D. | Section 09100 | Metal Support Systems |

1.03 REFERENCES

- | | | |
|----|-------------|---|
| A. | ASTM C150 | Standard Specification for Portland Cement |
| B. | ASTM E84 | Standard Test Method for Surface Burning Characteristics of Building Materials. |
| C. | ASTM C578 | Standard Specification for Rigid, Preformed Cellular Polystyrene Thermal Insulation. |
| D. | ASTM G23 | Standard Practice for Operating Light Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Non-metallic Materials. |
| E. | ASTM C67 | Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile. |
| F. | ASTM B117 | Standard Practice for Operating Salt Spray (Fog) Apparatus |
| G. | ASTM D 3273 | Standard Test Method for Resistance to Growth of Mold on the surface of Interior Coatings in an Environmental Chamber. |

| | | |
|----|-------------|--|
| H. | ASTM E331 | Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference. |
| I. | EIMA 101.86 | Standard Test Method for Resistance of EIFS to Effects of Rapid Deformation (Impact). |
| J. | ASTM E 96 | Standard Test Methods for Water Vapor Transmission of Materials. |
| K. | ASTM D 2247 | Standard Method for Testing Water Resistance of Coatings in 100% Relative Humidity. |
| L. | ASTM C1177 | Standard Specification for Glass Mat Gypsum Substrate for use as sheathing. |
| M. | ASTM C79 | Standard Specification for Treated Core and Non-treated Core Gypsum sheathing board. |
| N. | ASTM D1784 | Standard Specification for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds. |
| O. | ASTM C297 | Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions. |
| P. | ASTM D968 | Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive. |

1.04 DEFINITIONS

- A. 'ICF' stands for Insulated Concrete Forms.
- B. Edge wrapping is defined as mesh embedded in basecoat wrapped into rough opening.

1.05 SYSTEM DESCRIPTION

Performance Requirements: System shall meet or exceed the following performance standards when tested in accordance with the following methods:

- A. Accelerated Weathering ASTM G23: testing period of 1000 hours; No disintegration, crazing, cracking, flaking, or adverse effects.
- B. Moisture Resistance ASTM D2247: 14 day exposure; No adverse effects.
- C. Salt Spray Resistance ASTM B117: 14 day exposure; No adverse effects.
- D. Mold Resistance ASTM D3273: 28 day exposure; No mold growth supported after 28 days.
- E. Surface Burning Characteristics ASTM E84: Test specimen consists of Insulation board, basecoat, reinforcing mesh and finish coat; Flame spread less than 25 and smoke developed less than 450.

| | | | | |
|----|--|---|---------------|-------------------|
| F. | Freeze-Thaw Resistance | ASTM C67: No visible damage and negligible weight gain after 50 cycles. | | |
| G. | Impact Resistance | EIMA Impact Standard 101.86: | | |
| | Standard Impact | Medium Impact | High Impact | Ultra High Impact |
| | 2.83-5.54 J | 5.65-10.1 J | 10.2-17.0 J | over 17.0 J |
| | 25-49 in-lbs | 50-89 in-lbs | 90-150 in-lbs | over 150 in-lbs |
| H. | Tensile Strength of Sandwich Constructions | ASTM C297: Average strength using a textured finish was 156 psi. | | |
| I. | Water Vapor Transmission | ASTM E96: Average perms of 1.92. | | |
| J. | Abrasion Resistance | ASTM D968: Passed, no deleterious effects. | | |

1.06 SUBMITTALS

- A. Product Data: Provide data on *Ultimate 'ICF' materials*, product characteristics, performance criteria, limitations and durability.
- B. Shop Drawings: Indicate wall joint pattern and joint details, thickness, and installation details.
- C. Samples: Submit [] samples of [x] minimum size samples of *Ultimate 'ICF' System* illustrating Finish Coat [custom] color and [select] texture.
- D. Certificate: System manufacturer's approval of applicator.
- E. Letter: System manufacturer's letter that materials meet or exceed specified requirements.
- F. System manufacturer's installation instructions: Indicate preparation required, installation techniques, jointing requirements and finishing techniques.
- G. Manufacturer's standard warranty.

1.07 QUALITY ASSURANCE

- A. Applicator: Approved by Crosstech Construction Products in performing work of this Section.
- B. Regulatory Requirements: Conform to applicable code requirements for finish system.
- C. Field Samples:
 1. Construct one field sample panel for each color and texture, [x] in size of system materials illustrating method of attachment, surface finish, color and texture.
 2. Prepare each sample panel using the same tools and techniques to be used for the actual application.
 3. Locate sample panel where directed.
 4. Accepted sample panel [may] [may not] remain as part of the work.
 5. Field sample approval must be documented by signing (Owner, GC, Architects or owner's designated representative) the completed 'Field Sample Approval Form'.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver *Ultimate 'ICF' System* materials in original unopened packages with manufacturer's labels intact.
- B. Protect *Ultimate 'ICF' System* materials during transportation and installation to avoid physical damage.
- C. Store *Ultimate 'ICF' System* materials in cool, dry place protected from freezing. Do not store at less than 4°C/40°F
- D. Do not store Crosstech Finish Coat or Crosstech Basecoat in direct sunlight.
- E. Store *Ultimate 'ICF' System*; reinforcing mesh, accessories, and Crosstech flexible flashing in cool, dry place protected from exposure to moisture and sun exposure.

1.09 PROJECT/SITE CONDITIONS

- A. Do not apply *Ultimate 'ICF' System* in ambient temperatures below 4°C/40°F. Provide supplementary heat during installation and drying period when temperature is less than 4°C/40°F
- B. Do not apply *Ultimate 'ICF' System* materials to frozen surfaces.
- C. Maintain ambient temperature at or above 4°C/40°F during and at least 24 hours after *Ultimate 'ICF' System* installation and until dry.
- D. Protect wet finish from blowing or settling dust and debris.

1.10 SEQUENCING AND SCHEDULING

- A. Coordinate and schedule installation of *Ultimate 'ICF' System* with related work of other sections.
- B. Coordinate and schedule installation of trim, flashing, and joint sealers to prevent water infiltration behind the system.
- C. Coordinate and schedule installation of secondary moisture barrier, windows, doors, A/C units, air seals, etc.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Ultimate 'ICF' System is manufactured by Crosstech Construction Products, 4436 W. Manufacturers Street Springfield, MO 65803, (417) 862-9511.

2.02 MATERIALS

- A. Crosstech Construction Products: Basecoats
 - 1. Crosstech 500, Polymer Modified Bagged Base Mix: Dry-mix basecoat containing Portland cement; manufactured by Crosstech Construction Products.
 - 2. Crosstech 600, Polymer Modified Bucket Base Mix: Liquid basecoat, field-mixed with Portland cement; manufactured by Crosstech Construction Products.
- B. Portland cement: Conform to ASTM C150, Type I, II, or I/II, grey or white; fresh and free of lumps.
- C. Water: Clean and potable without foreign matter.

- D. EPS insulation board: expanded polystyrene; ASTM C578, Type I; 1" thickness minimum as indicated on drawings, 3/4" thickness minimum at aesthetic grooves, meeting the following:
 - 1. Air-dried (aged) six weeks prior to installation.
 - 2. Edges: Square within 1/32" (using diagonal measurement comparison).
 - 3. Thickness: Tolerance of plus or minus 1/16".
 - 4. Size: 2' x 4'.
 - 5. Length and width: Tolerance of plus or minus 1/16".
 - 6. Flame spread less than 25; smoke developed less than 450 per ASTM E84.
 - 7. Nominal density 1.0 lb / cubic ft. Minimum density of .90 lb / cubic ft.
 - 8. Minimum thickness of 1", maximum thickness of 4".
 - 9. Material must be manufactured from 100% virgin materials.

- E. Reinforcing Meshes: Balanced, open weave glass fiber reinforcing mesh; twisted multi-end strands treated for compatibility with Ultimate 'MA' components.
 - 1. CrossFlex 4: Standard weight.
 - 2. CrossFlex 10: Intermediate weight.
 - 3. CrossFlex 20: Ultra High Impact weight.
 - 4. CrossFlex [] & []: Combination.

- F. Crosstech 100, Textured Finish Coat: 100% acrylic polymer finish; air cured, compatible with Basecoat; Finish color factory-mixed; color [] as selected; Finish texture [Medium Sand] [Ozark Sand] [Natural Sand] [Clear Sand] [Medium Worm] [Big Worm] [Random].

2.03 ACCESSORIES

- A. Flexible Membrane Flashing Tape: Demand 30-mil thick, self-sealing, self-healing rubberized asphalt membrane or equivalent.
- B. Dow Corning Series 790 or 795 sealant, - or - BASF Sonolastic 150 VLM and their associated primers as per manufacturer's specifications.

PART 3 - EXECUTION

3.01 INSPECTION OF SUBSTRATE

- A. Inspect substrate for; soundness, contamination, and moisture content.
- B. There should not be any planar irregularities greater than 1/4 inch in 10 feet. Do not proceed with installation until all discrepancies or unsatisfactory conditions have been corrected.
- C. The surface shall be free of foreign materials such as oil, dust, dirt, form-release agents, paint, wax, water repellents, moisture, frost, etc.
- D. The substrate shall be sound and installed according to manufacturers guidelines. There should be no major surface voids or projections.
- E. Reporting: Unsatisfactory conditions shall be reported to the General Contractor and/or builder and to Crosstech management. Do not proceed until all unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect all surrounding areas and surfaces from damage and staining during application of the Crosstech Ultimate 'ICF' System.
- B. Protect finished work at the end of each day to prevent moisture penetration.
- C. Prepare substrate in accordance with Crosstech Construction Products instructions and specifications.
- D. Utilities – The system must be properly terminated (sealed, flashed) at all lighting fixtures, electrical outlets, hose bibs, dryer vents, etc.
- E. Decks – Wood Decks must be properly flashed prior to system application. For proper application, refer to details. The system must be terminated a minimum of 1" above all decks, patios, etc.
- F. Roof – Verify that all roof flashings have been installed in accordance with the guidelines set by the Asphalt Roofing Manufacturer's Association. Kick out flashing must be leak-proof and angled (min. 105 degrees) to allow for proper drainage and water diversion.
- G. Air Seals – Install air seals where required between the wall system and other wall components (penetrations, etc.) in order to maintain continuity of the air barrier system.
- H. Reporting – Unsatisfactory conditions shall be reported to the appropriate building site supervisor and Crosstech management. Do not proceed until all unsatisfactory conditions have been corrected.
- I. Basecoat and finish must terminate at minimum 8" above grade. From the termination line to below grade, follow ICF manufacturer's specifications for parge coat and water-proofing.

3.03 INSTALLATION OF DETAIL MESH

- A. Apply detail mesh and basecoat around the perimeter of all openings, penetrations, expansion joints, and other system terminations.
- B. Position the detail mesh so that a minimum of 2 1/2" will extend onto the face of the ICF block.

3.04 MECHANICAL FASTENERS

- A. Mechanical fasteners are used to attach the insulation board to the ICF's webbing structure when required and consist of a polypropylene plastic washer with a corrosion resistant screw.
- B. The washer is 2" in diameter with a recessed thermal chamber and key openings.
- C. Screws should be a minimum number 6 bugle head corrosion resistant screw and should be of sufficient length to penetrate ICF's webbing (or where required, into the framing, a minimum of 5/8").

3.05 INSTALLATION OF INSULATION BOARD: AESTHETIC BANDS AND ACCENTS

- A. Make certain that corners are straight and plumb. If the insulation board joints are not abutted tightly, slivers of insulation board or foam filler must be installed to fill any gaps greater than 1/16".
- B. Expansion joints require a minimum of 1" gap in order to accommodate base and mesh on both sides and still allow for a minimum of 3/4" space for backer

rod and sealant. Refer to building plans for location of and exact width of expansion joints.

- C. Use an 8' straight edge to identify planar irregularities in the wall and to ensure an overall flat surface. Irregularities in the insulation board surface must be sanded flat or be built with basecoat and mesh. Sanding is accomplished with a light circular motion. Use grade 16 grit sandpaper or coarser in conjunction.

3.06 EMBEDDING THE DETAIL MESH

- A. At appropriate points, using a stainless steel trowel, apply basecoat to the edge and face of the insulation board to a uniform thickness. Embed the detail mesh with a trowel such that no mesh is visible. Feather base onto face of wall to facilitate the overlapping of mesh.
- B. Detail mesh should be pulled tight to surface with no 'hooping' of mesh.

3.07 CONSTRUCTION OF AESTHETIC REVEALS

- A. Snap a straight line using a caulk line. Position a straight edge against the insulation board in the proper location to guide the appropriate cutting tool such as a router, hot knife, or hot groover. The insulation board at the bottom of the reveal shall in no case be less than $\frac{3}{4}$ ".
- B. The reinforcing mesh must be continuous through the aesthetic reveal. To ensure the mesh is continuous, the reveals must be meshed with detail mesh. The detail mesh must lap a minimum of $2\frac{1}{2}$ " on each side of the aesthetic reveal.
- C. Apply the basecoat on one side of the reveal only. Using a sled or special tool for the reveal, embed the detail mesh into the reveal being careful not to cut the mesh. Embed the detail mesh on the other side of the reveal. Ensure the mesh is fully embedded and that all excess material is removed from the reveal. Use a dry brush to clean out any irregularities in the basecoat. If the mesh is cut in the reveal, a new piece of mesh must be installed over the cut to ensure a $2\frac{1}{2}$ " overlap exists.

3.08 INSTALLATION OF CORNER MESH

- A. When corner mesh is specified for additional impact resistance at outside corners, the corner mesh should be embedded into the basecoat and allowed to set until firm (at minimum 4 hours) prior to installing the overall reinforced basecoat over the face of the wall.

3.09 REINFORCEMENT OF CORNER OPENINGS

- A. Openings shall be reinforced using 9.5" wide by 12" long strips of detail mesh laid at a 45 degree angle to each corner over the existing backwrapped detail mesh. Apply basecoat and embed the mesh using a stainless steel trowel.

3.10 SPOT MECHANICAL FASTENERS WITH BASECOAT

- A. Pre-spot all mechanical fasteners with basecoat and allow to thoroughly dry.

3.11 CONSTRUCTION OF INCLINED SURFACES

- A. The slope of inclined surfaces shall have a minimum slope of 6" of rise in 12" of horizontal run and a maximum thickness of 12".

- B. Inclined surfaces shall not be used for areas defined as roofs or floors by building codes.

3.12 INSPECTION OF INSULATED CONCRETE FORM SURFACE

- A. Check for flatness of the surface using an 8' straight edge. If areas are out of plane, sand until flat or build out with basecoat and mesh.
- B. Surface degradation due to weathering or UV exposure and any visible discoloration must be corrected as necessary. Sand effected areas to remove deterioration while maintaining the flatness of the surface.
- C. After sanding, remove all loose pieces of insulation board and dust using a broom, brush or compressed air.
- D. Always wear an approved particulate mask while sanding.

3.13 INSTALLATION OF REINFORCING MESH

- A. Using a stainless steel trowel, apply the basecoat over the entire surface of the insulation board, to an area slightly larger than the width and length of a piece of reinforcing mesh, in a uniform thickness of approximately 3/32".
- B. Immediately place the reinforcing mesh against the wet basecoat. With the curve of the mesh against the wall, trowel from the center to the edges avoiding wrinkles, until the mesh is fully embedded and no mesh pattern is visible. The mesh should float with the basecoat and should not be in contact with the wall.
- C. The reinforcing mesh shall be continuous at corners and mesh edges lapped not less than 2 1/2". Corners and edges may require light strokes with a small dry brush to smooth irregularities.
- D. Where higher impact mesh is installed, edges should be butted, not overlapped. Standard mesh must then be applied over the high impact mesh.
- E. Additional layers of reinforcing mesh and basecoat may be applied as required. In addition, a thin coat of basecoat may be applied for added strength and smoothness as required. If the thickness of the additional basecoat exceeds 1/16", reinforcing mesh must be embedded as described in section 3.13 A thru C.
- F. Protect completed work from rain, runoff or other water penetration. Allow the basecoat to dry a minimum of 24 hours before proceeding with application of finish coat. Longer drying times are required if the conditions are cool or damp. Finish should not be applied to a wet or damp basecoat.

3.14 INSPECTION OF BASECOAT

- A. Prior to applying the finish, the basecoat shall have dried a minimum of 24 hours and shall be dry and hard. Drying time may be longer depending on environmental conditions.
- B. Inspect the basecoat for any irregularities such as trowel marks, rough corners and edges, proper reinforcing mesh embedment and presence of any foreign substances. Correct all irregularities prior to applying the finish coat.

3.15 APPLICATION OF FINISH COAT

- A. Mix the finish coat thoroughly according to the specific mixing instructions provided with the Finish Coat product.

- B. To ensure color consistency, the finish must be “boxed” prior to application. Boxing is accomplished by pouring ½ of a pail of Finish Coat into a clean container, opening another pail of Finish Coat and pouring ½ of its contents into the half filled first container. Continue this process for each pail of Finish Coat.
- C. While a small amount of clean water may be added to aid workability, if water is added, measure and add the same amount to all pails of finish to assure uniform color.
- D. Finishes must be applied continuously to a natural break such as corners or expansion joints. Sufficient personnel and scaffolding must be provided to continuously finish a distinct wall area or cold joints will result. Scaffolding must be placed a minimum of 18” from the wall to prevent staging lines.
- E. On hot windy days, the wall may be fogged with clean potable water to cool the wall and facilitate finish application. Application work should precede the sun. For example, work the shady side of the building. If this is not possible, scaffolding should be shaded with tarp and nursery shade cloth. Do not introduce water to the Finish Coat once it is applied to the wall. This will cause color variations.
- F. Each mechanic must use the same type tool and hand motion to ensure a consistent texture throughout the wall. Use Finish Coat from a single production batch where possible.
- G. Finish materials shall not be applied in the rain and the basecoat must be dry prior to applying the finish.
- H. Using a clean stainless steel trowel, apply the Finish Coat in a uniform thickness tight to the wall. The Finish Coat must be leveled and textured to a uniform thickness no greater than the thickness of the largest aggregate in the Finish Coat.
- I. The texture is achieved by uniform hand motion and/or tool that produce the texture to match the approved sample.

3.16 INSTALLATION OF BACKER ROD AND SEALANT

- A. Use only approved sealant. Clean joints of all materials and dust.
- B. For joints over 3/8” deep, insert nonabsorbent closed cell skin backer rod of the correct diameter such that an hour-glass bead of sealant may be applied to the joint.

3.17 MAINTENANCE AND CLEANING

- A. To clean, wet the soiled area with clean water and wash with a solution of 1 gallon of clean water and 8 ounces of Trisodium Phosphate (TSP).
- B. Apply the cleaning solution using a soft bristle brush. The finish will be damaged by hard scrubbing action or by a hard bristle brush. With power washing equipment, do not exceed 500 PSI at the spray tip and keep power washer tip 2 feet from surface being cleaned.
- C. Solvent based cleaners should never be used as they will cause severe damage to the finish.
- D. Rust stain may be removed by using a commercial rust stain remover that is approved for use on acrylic finishes. Always clean an inconspicuous area first to insure the cleaner will not stain or damage the finish.

3.18 DAMAGE REPAIR PROCEDURE

- A. Cut through and remove the lamina with a sharp utility knife, exposing a uniform sized area of insulated concrete form that is slightly larger than the area damaged. With an aluminum oxide disk grinder or 20 grit belt grinder, remove 6" of finish around the cut-out area. With the grinder, feather the edge of the finish to approximately ½".
- B. Cut out the remaining insulation board.
- C. Precisely fit a piece of insulation of same material into the damaged area, sanding the edges as required to form a tight fit. Ensure the new insulation board is flush with the surrounding insulation. Fasten the insulation board to the substrate in the same manner as described earlier in these instructions.
- D. Mask the existing surrounding area with masking tape. Cut reinforcing mesh 2 ½" larger than the inserted insulation board.
- E. Taking care to keep the basecoat off the original finish edge, apply the basecoat to the face of the insulation board. Embed the reinforcing mesh in the wet basecoat, smoothing wrinkles and irregularities. Allow the basecoat to dry for a minimum of 24 hours or until dry.
- F. Mask the existing surrounding finish coat with marking tape. Apply new finish over the area to be patched being sure to match the texture of the surrounding area.
- G. Allow the finish to dry for a short period of time, such that it has firmed, but is still slightly workable. Remove the masking tape. Feather the new finish into the existing finish using a float and a paintbrush.
- H. Environmental conditions will blend the two finishes together over time.