

SECTION 03 11 19
INSULATING CONCRETE FORMING

PART 1 GENERAL

SUMMARY

- A. Comply with the requirements for Division 1 – General Requirements
- B. Supply and installation of **TF System** Insulating Concrete forms for structural cast-in-place concrete walls, installation of reinforcing steel bars and placement of concrete within the insulating concrete forms.
- C. Adequate bracing and scaffolding shall be provided by the installing contractor and shall comply with applicable codes.

1.01 WORK SCOPE

- A. Furnish all labor, materials, tools, and equipment to perform the installation of **TF System** insulating concrete forms as manufactured by TF System – The Vertical ICF, Inc.; 185 East Walnut Street; Sturgeon Bay, WI 54235 – USA; phone – 800-360-4634; fax 920-746-9975
- B. Furnish all labor to install the steel reinforcing bars, placement of concrete into the insulating concrete forms and final cleanup.

1.02 PRODUCTS INSTALLED BUT NOT SPECIFIED OR SUPPLIED UNDER THIS SECTION

- A. Reinforcing Steel
- B. Concrete
- C. Window and door opening bucks
- D. Anchor bolts, inserts, sleeves
- E. Penetrations

1.03 RELATED SECTIONS

(Specifier Note: ADD/DELETE/MODIFY the section Numbers and Titles to correspond with the specific project requirements. Related Sections to be added may include exterior wall finish, doors, windows, and other sections specific to the project)

- A. Section 01 50 00 – Temporary Facilities and Controls
- B. Section 03 05 00 – Common Work Results for Concrete
- C. Section 03 10 00 – Concrete Forming and Accessories
- D. Section 03 20 00 – Concrete Reinforcement
- E. Section 03 30 00 – Cast-in-Place Concrete
- F. Section 03 40 00 – Precast Concrete
- G. Section 04 00 00 – Masonry
- H. Section 05 10 00 – Structural Metal Framing
- I. Section 05 50 00 – Metal Fabrications
- J. Section 06 00 00 – Wood, Plastics, and Composites
- K. Section 07 10 00 – Dampproofing and Waterproofing
- L. Section 07 11 00 – Dampproofing
- M. Section 07 12 00 – Built-Up Bituminous Waterproofing
- N. Section 07 13 00 – Sheet Waterproofing
- O. Section 07 24 00 – Exterior Insulation and Finish Systems
- P. Section 07 46 00 – Siding
- Q. Section 07 60 00 – Flashing and Sheet Metal
- R. Section 08 00 00 – Openings
- S. Section 09 20 00 – Plaster and Gypsum Board
- T. Section 09 70 00 – Wall Finishes

1.04 REFERENCES

- A. American Concrete Institute (ACI)
 - 1. ACI 301 – Standard Specification for Structural Concrete
 - 2. ACI 318 – Building Code Requirements for Reinforced Concrete
 - 3. ACI 332 – Guide to Residential Cast-in-Place Concrete Construction
 - 4. ACI 347 – Guide to formwork for Concrete
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Insulation.
 - a. ASTM C518 – Steady-State Thermal Transmission
 - b. ASTM C165 – Compressive Strength
 - c. ASTM C203 – Flexural Strength
 - d. ASTM C303 – Density
 - e. ASTM E96 – Water Vapor Transmission
 - f. ASTM C272 – Water Adsorption
 - g. ASTM E84 – Surface Burning Characteristics
- C. Code Approvals and Tests:
 - 1. Underwriter’s Laboratory (UL)
 - a. UL 1715 – Corner Room Burn
 - 2. International Code Council (ICC)
 - a. ICC ES EG 239 – Termite Exposure

1.05 SYSTEM DESCRIPTION

- A. TF System is an Insulating Concrete Forming system with a vertical orientation similar to conventional pan forms.
- B. TF System is comprised of four separate components.
 - 1. Galvanized Steel C-channel
 - 2. Expanded Polystyrene (EPS) Panels
 - 3. Galvanized Steel OR Polyvinyl Chloride (PVC) “I-beams”
 - a. I-beams are not a structural component of the finished wall system with the exception of providing attachment for interior or exterior finishes.
 - 4. Pre-molded EPS Corner Sets
- C. Galvanized Steel C-channel is placed on a footing or slab and acts as a track for the wall forms.

- D. EPS Corners, EPS Panels, and I-beams are erected and held together primarily by the friction fit design. I-beams are spaced every 12 inches along the perimeter.
- E. Galvanized Steel C-channel is installed on top of the EPS Panels to act like a cap.

1.06 SUBMITTALS

- A. Coordinate with Division 1, Section 01330 – Submittal Procedures and with Division 1, Section 01780 – Closeout Submittals
- B. Product Data: Submit manufacturer’s literature describing system components including product installation manual.
- C. Shop Drawings: Submit detail drawings indicating layout, dimensions, cross sections, and form type or size to be used
- D. Test Reports: Submit when requested supporting reports to ensure performance as specified
- E. Steel Reinforcement: Submit steel reinforcement schedule
- F. Concrete: Submit concrete mix design to be used
- G. Engineering Calculations: Submit structural calculations sealed by a Professional Engineer licensed in the governing jurisdiction

1.07 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installers shall have demonstrated the experience necessary to complete the work as specified considering the scope and scale of the project.
- B. Certifications
 - 1. Manufacturer’s signed certification that the product meets the requirements of this section
- C. Pre-Installation Meetings
 - 1. Prior to the installation of TF System, a meeting on the project site shall be coordinated. This meeting shall include those responsible for the installation of the formwork, installation of steel reinforcing, placement of concrete, and trades that require modification of the formwork.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Product shall be delivered in original factory packaging.
- B. PVC I-beams shall be stored on pallets as received from the factory.
- C. PVC I-beams shall be protected from direct exposure to sunlight at all times.
- D. EPS panels shall be protected from extended periods of direct exposure to sunlight.
- E. All materials shall be stored in a suitable location to prevent physical damage or excessive soiling.

1.09 WARRANTY

- A. Contact TF System for a written copy of the product warranty, OR
- B. Refer to the requirements of the project contract for warranty information.

PART 2 PRODUCTS

2.01 MANUFACTURERS

TF System – The Vertical ICF, Inc.

185 E. Walnut St.
Sturgeon Bay, WI 54235
800-360-4634 - toll free
920-746-9975 - phone
920-746-9975 - fax
<http://www.tfsystem.com>
info@tfsystem.com

ACH Foam Technologies, LLC

90 Trowbridge Drive
P.O. Box 669
Fond du Lac, WI, USA, 54936
920-924-4050 - phone
920-924-4042 - fax
800-236-5377 - toll free
info@achfoam.com
<http://www.achfoam.com>

Pro Ex Extrusion, Inc.

3015 N. Main St.
Oshkosh, WI 54901
920-232-0970 - phone
920-232-0971 - fax

2.02 CONCRETE

- A. Concrete supplied under section 03 30 00 shall be normal weight 3/8 to 3/4 inch aggregate size having a minimum 28-day compressive strength of 2500 psi or as specified by the structural engineer.
- B. Concrete slump shall be between 4.5 to 5.5 inch slump with a water to cement ratio of less than 0.50.
- C. Reinforcing steel size, grade, placement, and spacing under section 03 21 00 shall be as specified by the structural engineer or prescriptive tables applicable to the project.

2.03 COMPONENTS

(Specifier Note: ADD/DELETE/MODIFY the section Numbers and Titles to correspond with the specific project requirements. Related Sections to be added may include exterior wall finish, doors, windows, and other sections specific to the project)

A. Galvanized Steel C-channel

- 1. Galvanized steel C-channel is utilized on both the bottom and the top of the wall story being constructed. The C-channel acts as a guide to keep the wall in the proper alignment.
- 2. Corner C-channel is available with a pre-cut section to aid in bending for corners.

B. EPS Panels

- 1. Standard EPS planks are 12 in. wide, 2.5 in. thick, and height may vary from 3 ft. to 12 ft. EPS planks are available in thicknesses up to 4 in. EPS planks are grooved along edge to receive the flange of the I-beams.
- 2. Perform Guard[®] treated termite resistant EPS panels are available (ICC ES EG 239)
- 3. Type IV with a minimum density of 1.95 lb/ft³ per ASTM C303
- 4. Flame spread rating of 20 and smoke density of 150-300 as tested per ASTM E 84

5. Compressive strength of 25 lb/in² @ 10% deformation per ASTM C165
6. Flexural strength of 55 lb/in² per ASTM C203
7. Water adsorption of 2% max. by volume per ASTM C272
8. Water vapor transmission of 2 perm max. per inch of thickness per ASTM E96
9. Steady State Thermal Transmission (R-value) (minimum per inch of thickness) 4.2 @ 75° F and 4.6 @ 40° F per ASTM C518
10. UL virgin certified material (no recycled content)
11. Dimensional tolerance of 1/16 in. in width and thickness
12. Once assembled, there is 5/8 in. of EPS cover over the face of the I-beams

C. I-beams

1. Steel I-beams

- a. Available from 4 to 24 inch nominal concrete cavity widths (2 inch increments)
- b. Actual cavity width is ¼ inch less than nominal
- c. Rolled (doubled) 26 gauge galvanized steel
- d. 12 inch vertical tie spacing

2. Polyvinyl Chloride (PVC) I-beams

- a. Available in 4, 6, 8, & 10 inch nominal concrete cavity widths
- b. Actual cavity width is ½ inch less than nominal
- c. 1/8 inch minimum uniform thickness
- d. 100% post industrial or post consumer content
- e. 6 inch vertical tie spacing
- f. Cradles in the cross ties aid in rebar positioning

D. Pre-molded EPS Corner Sets

1. Corners can be made to any custom angle necessary
2. Corners dimensions vary to compensate for different cavity widths

2.04 ACCESSORIES

- A. Bracing and Scaffolding
- B. Door and Window Bucks
- C. Anchor Bolts
- D. Water proofing or Dampproofing

- E. Sleeves for penetrations
- F. Exterior finishes
- G. Interior finishes

PART 3 EXECUTION

3.01 EXAMINATION

- A. Site Verification of Conditions: Before erection of formwork, verify all lines, elevations, alignments, levels, and centerlines to ensure compliance with the project drawings and specifications.
- B. Examine formwork before erection to ensure it is free of damage and/or excessive soiling.

3.02 PREPARATION

- A. Steel dowels shall be cast into the footing as specified by structural engineer.
- B. Footings shall be uniformly smooth and flat on the top to ensure the galvanized C-channel lies flat.
- C. Surfaces of footings shall be clean and free of debris prior to installation of TF System.

3.03 INSTALLATION - GENERAL

- A. Install Insulating Concrete Forming in accordance with manufacturer's recommendations and/or Installation Manual.
- B. Install formwork, shoring and bracing in accordance with ACI 301.
- C. Install formwork to meet project requirements.
- D. Rip splice or filler panels as required.
- E. Provide adequate bracing to ensure alignment and stability of the formwork. Provide shoring to formwork subject to construction loads. Reinforce corners, short offsets, and tees.
- F. Install window and door bucks.
- G. Install brick or stone ledges as specified
- H. Install all reinforcing steel as specified.
- I. Install penetrations, sleeves, beam pockets as required.
- J. Place concrete as specified.

3.04 INSTALLATION - FORMS

- A. Fasten outside steel C-channel to the footing using one inch round masonry nails powder driven pins at approximately three feet on center and within six inches in each direction of a corner.
 - 1. Start in the corners
 - 2. Inside steel C-channel does not need to be fastened to the footing.
- B. Install Pre-molded corner
 - 1. Install corner rebar.

2. Install I-beams and planks 8-10 feet in each direction of the corner
 3. Brace corner according to manufacturer recommendation.
- C. Install straight wall sections according to manufacturer recommendations.
- D. Rip splice or filler panels as required.
- E. Install window and door bucks.
- F. Install horizontal reinforcing as specified.
- G. Install vertical reinforcing as specified.
- H. Install lintel reinforcing as specified.
- I. Install top C-channel.
- J. Plumb, square, level, straighten and brace forms as required.

3.05 CONSTRUCTION

- A. Interface with Other Work
1. Provide sleeves or formed openings as required.
 2. Install anchors, dowels, or other items to be cast directly into concrete as specified.
 3. Coordinate with other trades when placing and installing bolts, anchors, sleeves or other inserts.
 4. Install system components in accordance with manufacturer recommendations.
 5. Install floor connections and/or floor system.
- B. Site Tolerances
1. Construction of formwork shall maintain tolerances as required by ACI 301.

3.06 FIELD QUALITY CONTROL

- A. Site Tests: To be specified as required.
- B. Inspection: Inspect all erected formwork, bracing, and shoring to ensure compliance with all applicable codes, design criteria, and safety requirements.

3.07 CLEANING

- A. Clean foreign matter from the system components while the formwork is being installed.
- B. Clean the form cavity prior to placement of concrete.
1. Remove any ice or snow from the form cavity.

3.08 PROTECTION

- A. Protect Against Freezing
1. Cover the top of the formwork after pouring with rigid insulation to protect against freezing.

2. Cold weather concreting shall be in accordance with ACI 306.1-90 – Standard Specification for Cold Weather Concreting.

B. Protection Against Wind

1. The bracing shown in the TF System installation manual is the minimum required for successful placement of concrete. Additional bracing may be required to temporarily protect against damage from high winds or construction loads.