

SECTION 03 11 19

INSULATING CONCRETE FORMING

PART 1 GENERAL

1.01 SUMMARY

- A. Comply with the requirements for Division 1.
- B. Supply and installation of Insulating Concrete Forms (ICF), installation of reinforcing steel and placement of concrete within formwork.
- C. Adequate bracing and falsework shall be provided by the Installing Contractor to comply with all applicable Codes and construction document specifications.

1.02 SCOPE OF WORK

- A. Furnish all labor, materials, tools and equipment to perform the installation of Insulating Concrete Formwork system forms in accordance with all ICF manufactures recommended guidelines.
- B. Furnish all labor to include placement of reinforcing steel within forms, placement of concrete into forms, and final cleanup.

1.03 PRODUCTS SUPPLIED BUT NOT SPECIFIED OR INSTALLED UNDER THIS SECTION

- A. *EPS* compatible modified bituminous sheet waterproofing membrane.
- B. *EPS* compatible parge coat.

1.04 PRODUCTS INSTALLED BUT NOT SPECIFIED OR SUPPLIED UNDER THIS SECTION

- A. Sleeves
- B. Inserts
- C. Anchors
- D. Bolts
- E. Reinforcing Steel
- F. Window and Door Opening Bucks
- G. Concrete

1.05 RELATED SECTIONS

- A. Section 03 20 00 - Concrete Reinforcing
- B. Section 03 30 00 - Cast-In-Place Concrete
- C. Section 03 40 00 - Precast Concrete
- D. Division 04 00 00 - Masonry
- E. Division 05 00 00 - Metals
- F. Division 06 00 00 - Wood, Plastics and Composites
- G. Section 07 13 00 - Sheet Waterproofing
- H. Section 07 14 00 - Fluid Applied Waterproofing
- I. Section 07 24 00 - Exterior Insulation and Finishing Systems
- J. Section 07 46 00 - Siding
- K. Division 08 00 00 - Openings
- L. Section 09 20 00 - Plaster and Gypsum Board

1.06 ALTERNATES

- A. Materials shall be only as specified in Paragraphs 1.02 and 2.02 as per Manufacturer specified in Paragraph 2.01. No alternate materials shall be accepted for this Section.

1.07 REFERENCES

- A. ACI 318 Building Code Requirements for Reinforced Concrete
- B. ACI 332 Guide to Residential Cast-in-Place Concrete Construction
- C. ASTM C236 Steady State Thermal Performance of Building Assemblies
- D. ASTM C473 Physical Testing of Gypsum Board Products and Gypsum Lath
- E. ASTM D1761 Mechanical Fasteners in Wood
- F. ASTM E84 Surface Burning Characteristics of Building Materials
- G. UBC 26-3 Uniform Building Code Standard Room Fire Test

1.08 DEFINITIONS

- A. *ICF Bracing System* - a form alignment and scaffold system designed exclusively for use with Insulating Concrete Forms.
- B. *Contractor Installer*- An installation contractor, who has received instructional training in the installation of ICF wall system forms (as administered by ICF manufacturer)
- C. *Technical Advisor*- A technical representative, usually a staff member of a Distribution Firm, who has received instructional training in the installation of ICF wall system forms (as administered by ICF manufacturer) and is in the capacity of supervising an installation crew on site.
- D. *EPS*- Acronym for "Expanded Polystyrene" when referencing the insulating foam component of the ICF wall system form.
- E. *ICF* - Acronym for "Insulating Concrete Form".
- F. *Window or Door Opening Buck* - a pre-manufactured or site constructed frame assembly consisting of wood or plastic material used to frame a rough opening within the forming system that will retain concrete around the opening. The frame can also provide for subsequent anchorage of doors and windows within the wall assembly.

1.09 SYSTEM DESCRIPTION / PERFORMANCE REQUIREMENTS

- A. Insulating Concrete Form wall system shall consist of two opposing panels of flame resistant Expanded Polystyrene (*EPS*) connected by high-density polypropylene connectors.
- B. Wall system to provide min. 4", 6", 8" or 10" (100, 150, 200 or 250mm) wall sections (as required) at all locations throughout wall area.
- C. Wall system to provide min. 1" (25mm) wide fastening strips @ 8" (200mm) o/c recessed 3/8" (9.5mm) below the surface of the form, to facilitate fastening of interior and exterior finishes.
- D. Wall system to provide accurate positioning of steel reinforcement within form cavity to conform to reinforcing requirements of ACI 318. ICF system must provide a means of form

assembly at wall location requiring pre-fabricated and inspection of reinforcement as required by project engineer

- E. ICF forms to provide calculated minimum R-22 insulation value.
 - 4" (100 mm) Cavity Form Unit: R 22
 - 6" (150 mm) Cavity Form Unit: R 22
 - 8" (200 mm) Cavity Form Unit: R 22
 - 10" (250 mm) Cavity Form Unit: R 22
 - 12" (300 mm) Cavity Form Unit: R 22
- F. EPS foam to provide maximum vapor permeation of 3.5 Perm-in. (200 ng/Pa.s.m²)
- G. Finished wall assembly to provide min. rating of STC 50 sound attenuation performance.

1.10 SUBMITTALS

- A. Product Data: Submit relevant laboratory tests or data to validate product compliance with performance criteria specified prior to commencement of work under this Section.
- B. Code Compliance Data: Submit relevant code compliance data, to include current manufacturers ICC-ES Evaluation Report.
- C. Submit copy of Manufacturer's Product Manual and Installation Instructions.
- D. Shop Drawings: Submit drawings indicating dimensions of ICF form types and typical details required to complete the ICF installation, if not already specified with project drawings or specifications.

1.11 QUALITY ASSURANCE

- A. Contractor shall engage a trained ICF *Contractor Installer* or *Technical Advisor* for the duration of the work under this Section.
- B. *Contractor Installer/Technical Advisor* shall furnish proof of three years of experience in installing this product and meet Manufacturer's qualifying criteria. Installer shall furnish proof of training documentation to Contractor prior to commencement of work under this Section.
- E. Site Mock-up: If required, construct sample wall mock-up panel to include full wall system and details, located where directed by Consultant. Panel may form part of finished work if approved by Consultant.
- F. *Contractor Installer/Technical Advisor* to meet with Contractor prior to material delivery on site to co-ordinate provision of access, storage area, and protection of the ICF product and spatial requirements for form alignment placement steel storage and forming.
- G. Pre-installation meeting: Prior to starting ICF work, convene meeting at project site. Include Contract Installer and sub-trades responsible for installing work that requires interface or modification to the ICF wall system.
- H. Installation to comply with project drawings, specifications, governing building codes and regulations, and Manufacturer's installation manual or guide.

1.12 DELIVERY STORAGE and HANDLING

- A. Deliver products in original factory packaging, bearing identification of product, manufacturer and batch/lot number.
- B. Handle and store products in location to prevent damaging and soiling.
- C. Ensure that UV protection is provided for material, should on-site storage extend beyond 30 days.

1.13 PROJECT CONDITIONS

- A. Use appropriate measures for protection and supplementary heating when required to ensure proper curing conditions in accordance with manufacturer's recommendations if installation is carried out during periods of weather where temperatures are below minimum specified by governing Building Code for concrete and masonry.

1.14 COORDINATION

- A. Ensure those materials listed under Sub-Section 1.03 and 1.04 are provided to *Contractor Installer* prior to commencement of work under this Section.

1.15 WARRANTY

- A. Contact Manufacturer for supply of written copy of specific warranties of the product.

PART 2 PRODUCTS

2.01 MANUFACTURER'S

- A. ARXX Corporation
800 Division Street, Cobourg,
Ontario, K9A 5V2, Canada
Phone: (800) 293-3210 Fax: (905) 373-8301
E-Mail: info@arxx.com Web Page: www.arxx.com

- B. _____

- C. _____

2.02 MATERIALS

- A. Insulating concrete forms shall be supplied by an approved manufacturer listed in Sub-Section 2.01 above.
- B. Form units to be supplied through an authorized ICF Distributor.
- C. Substitutes and alternates will not be accepted. (See Section 1.06).

2.03 MANUFACTURED ICF COMPONENTS

- A. Contractor to provide dimension drawings for each ICF product, proposed for proper execution of the work: (List only ICF form units required)

For Example:

ARXX Corporation - ARXX Edge ICF system

| | | Metric mm |
|-----|---|------------------------|
| (a) | 4", 6", 8", 10" and 12" Standard Form Units and 305) | (102,153, 203,254 |
| (b) | 4" Corner Block: - 32" x 16" W x 16"H | (813x406x406) |
| | 6" Corner Block: - 32" x 16" W x 16"H | (813x406x406) |
| | 8" Corner Block: - 32" x 16" W x 16"H | (813x406x406) |
| | 10" Corner Block: - 32" x 16" W x 16"H | (813x406x406) |
| (c) | 6" 45 Degree Corner- 32" x 16" W x 16"H | (813x406x406) |
| (d) | 6", 8, and 10" Brick Ledge 48" x 16" x 7.5" | (1220x406x191) |
| (e) | Connectors: - 4", 6", 8" and 10" | (102,153, 203 and 254) |

2.04 CONCRETE

- A. Concrete supplied under Section 03 30 00 shall be of strength as specified by the design engineer (measured at 28 days). Recommended aggregate size to be 3/8" (10mm) aggregate for the 4" and 6" (100 and 150mm) forms and, 3/4" (19mm) aggregate for the 8" and 10" (200 and 250mm) forms.
- B. Recommended concrete slump is 5" to 6" +/- 1" (125 to 150mm +/- 25mm) (subject to design revision to suit application and ICF manufacturer specifications).

2.05 REINFORCING STEEL

- A. Reinforcing steel shall be as specified in Section 03 20 00 and shall be supplied under that Section for placement by the ICF Contractor Installer.
- B. Reinforcing steel grade, size, placement and spacing shall be as specified by the project design engineer of record in accordance with the project drawings or specifications or prescriptive reinforcement tables applicable to the specific project.

2.06 WALL ALIGNMENT SYSTEM

- A. As an integral installation component of an Insulating Concrete Form wall system and to aid in the construction of the wall system, to provide an adjustable device for ensuring plumbness of the wall during construction, an ICF Alignment Scaffold System shall be used.

- B. ICF Alignment Scaffold System to be used to be OSHA compliant.

2.07 WATERPROOFING

- A. Where called for on drawings, Waterproofing shall be Peel and Stick modified bituminous membrane or Fluid-Applied, water based waterproofing. Material to be specified under Section 07 13 00 (Sheet Waterproofing) and 07 14 00 Fluid-Applied Waterproofing).
- B. Waterproofing material shall be EPS foam compatible.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect all areas included in Scope of Work to establish extent of work and verify site access conditions.

3.02 SITE VERIFICATION OF CONDITIONS

- A. Verify that site conditions are as set out in Part 1- General Conditions.
- D. Examine footings installed under Section 03 30 00 are within +/- $\frac{1}{4}$ "(6mm) of level and that steps in footings are consistent with height of ICF forms.
- E. Ensure all required testing and verification of footings and/or foundation installed under Section 03 30 00 have been conducted and approved, prior to ICF installation.
- F. If specified, ensure reinforcing steel dowels are in place at specified centers along footing lengths.

3.03 PREPARATION

- A. Clean all debris from top of footings prior to commencing work.

3.04 INSTALLATION

- A. Installation of forms to be in strict accordance with Manufacturer's Product Manual as supplied in evidence to contractor under Sub Section 1.10 of this Section.
- B. The Installation Contractor shall ensure Manufacturer's procedures for the following work are employed on site (As outlined in the Manufacturer's Installation Manual):
 - (a) First Course Placement
 - (b) Horizontal Reinforcement Placement
 - (c) Successive Course Placement
 - (d) Door and Window Opening Construction
 - (e) Form Alignment and Scaffolding Installation
 - (f) Vertical Reinforcement Placement
 - (g) Pre-Concrete Placement Inspection
 - (h) Concrete Placement
 - (i) Alignment Assembly Removal

3.05 SERVICE PENETRATIONS, INSERTS, AND EMBEDDMENTS

- A. Service penetrations (e.g.- electrical service conduits, water service pipes, air supply and exhaust ducts etc.) shall be installed at the required locations as indicated by the appropriate trade.
- B. Service penetrations exceeding 16" x 16" (400mm x 400mm) in area shall be reinforced.
- C. Prior to concrete placement, install service penetration sleeves (supplied by others) at designated locations to create voids where services can be passed through at later date.
- D. Coordinate with work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, steel embeds and other components of other work.
- E. Locate and set in place items which will be cast directly into concrete.

3.06 FORM CLEANING

- A. Clean forms as installation proceeds, to remove foreign matter within forms.
- B. Clean form cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.07 CLEANUP

- A. Clean up and properly dispose of all debris remaining on job site related to the installation of the insulated concrete forms.

3.08 PROTECTION

- A. Provide temporary coverage of installation to reduce exposure to Ultra Violet light should final finish application be delayed longer than 60 days.

END OF SECTION