

## 03 11 19 INSULATING CONCRETE FORMWORK

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Insulated panel permanent insulating formwork system for concrete foundations:

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***SPECIFIER NOTES:** Modify the header and the following to suit project requirements.*

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1. Insulating slab edge formwork for slab on grade foundations.
2. Insulating underslab formwork for slab on grade foundations.
3. Insulating formwork for grade beams and isolated footings inside the building perimeter.

#### 1.2 RELATED SECTIONS

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***SPECIFIER NOTES:** Modify the following to suit project requirements. Delete sections below that are not used in project and elements that are provided as J-Form System alternates.*

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- A. Division 01 General Requirements, submittal requirements, record documentation, construction waste management, sustainability requirements, envelope commissioning.
- B. Division 03 Cast-in-Place Concrete for underslab gravel bedding, and slab on grade tolerances when used in conjunction with the Build SMART X-Wall and I-Wall Systems.
- C. Division 04 Masonry for interfacing foundation cladding, if any.
- D. Division 07 Vapor Barriers for underslab vapor barrier membrane, penetration boots, and tape.
- E. Division 07 Acrylic Parging for cladding of exposed insulating formwork.
- F. Division 07 Fabricated Wall Panel Assemblies for interfacing Build SMART X-Wall and I-Wall Systems.
- G. Division 22 Plumbing for through-slab piping.
- H. Division 22 Facility Storm Drainage Piping for foundation drain.
- I. Division 23 Heating Air Conditioning and Ventilation for through-slab geothermal system.
- J. Division 26 Electrical for through-slab electrical conduit.

#### 1.3 REFERENCES

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***SPECIFIER NOTES:** Modify the following to suit project requirements.*

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- A. American Society of Civil Engineers Standard 32-01 (ASCE 32) Frost Protected Shallow Foundations.
- B. ASTM C 1389 (formerly ASTM E514) - Test Method for Water Penetrations and Leakage Through Masonry.
- C. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM E 119 - Test Methods for Fire Tests of Building Construction and Materials.
- E. ASTM C 303 Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
- F. ASTM C 518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- G. ASTM C 578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- H. ASTM D 1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- I. ASTM D 6817 Standard Specification for Rigid Cellular Polystyrene Geofoam.
- J. ASTM E 331 - Test Method for Water Penetrations of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- K. ACI 117 Specifications for Tolerances for Concrete Construction and Materials.

#### 1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Insulating concrete formwork shall be designed and installed in accordance with International Residential Code, International Building Code, and ASCE 32 requirements for frost protected shallow foundations, as applicable to project.
- B. Design Requirements: Insulating concrete forms shall provide permanent formwork for concrete slab on grade components.
- C. Performance Requirements: In accordance with manufacturer's "Installation Instructions" and Structural Notes on the Drawings.
- D. Resource Management:
  - 1. Jobsite waste, if any, shall be used for other project purposes or properly disposed of in licensed landfill.
  - 2. Post-industrial waste shall be returned to Geofoam manufacturer for recycling into subsequent product production.

#### 1.5 SUBMITTALS

- A. Submit shop drawings under provisions of Division 01 Submittal Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Third party inspection agency certificate demonstrating physical properties in compliance with ASTM D6817 type specified.
  - 2. Third party inspection agency certificate with flame spread and smoke developed indexes.
  - 3. UL or ICC-ES evaluation report covering ASTM D6817 type specified.

4. UL or ICC-ES evaluation report covering termite resistance in accordance with ICC-ES AC 239, Acceptance Criteria for Termite-Resistant Foam Plastics.
  5. Manufacturer's Installation Instructions.
- C. Shop Drawings: Submit drawings showing layout, dimensions, materials, and shapes. Indicated the following:
1. Pertinent dimensions, openings, materials compressive strength, joint arrangement, and details.

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***SPECIFIER NOTES:** Modify the following to suit project sustainability requirements.*

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- D. Sustainability Certification System Submittals: Provide compliance documentation as required in Division 01 Sustainability Requirements.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

#### 1.6 QUALITY ASSURANCE

- A. Design formwork under review of Professional Engineer experienced in design of this type of work.

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***SPECIFIER NOTES:** Modify the following to suit project sustainability requirements. Include a mock-up if the project size and/or quality warrant taking such a precaution.*

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- B. Pre-Installation Conference:
1. Convene a pre-installation conference to review specifications, details, and procedures with the Architect, Contractor, installer, manufacturer's representative (attending virtually via internet), and other trades relevant to the work.
  2. Notify Architect at least 48 hours prior to starting the Work.
- C. Mock-Up: Provide a mock-up for evaluation of materials, installation workmanship and accuracy within specified tolerances.
1. Construct mockup, \_\_\_\_x\_\_\_\_ feet in size.
  2. Locate mock-up where designated by Architect.
  3. Do not proceed with remaining work until mock-up is approved by Architect. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Approved mock-up may be incorporated into the Work if mock-up is undisturbed and undamaged at time of slab on grade concrete pour.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Unload onto dry, level surface with labels intact.
- B. Storage: Store off ground in ventilated manner, protected from moisture and sunlight.

- C. Protection: Adequately protect against damage during delivery, storage and handling at the jobsite.
- D. Handling: Handle in accordance with manufacturer's instructions.

## 1.8 COORDINATION

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**SPECIFIER NOTES:** *Coordinate paragraph below with other Sections specifying the products listed below. Preparation of coordination drawings requires the participation of each trade involved in installation. Delete paragraph if this added time and expense is not practical.*

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- A. Coordination Drawings: Contractor shall submit Coordination Drawings, drawn to scale, on which the following items are shown and coordinated with each other, using input from the trades involved:
  1. Compacted granular fill.
  2. Electrical, plumbing and mechanical systems penetrating the slab on grade.
  3. Vapor barrier and waterproofing materials.
  4. Vapor barrier, flashing, and trim.
  5. Foundation drainage.
- B. Verify that formwork, vapor barrier membrane, and concrete reinforcement is placed in a manner that will result in sufficient concrete cover over reinforcement before proceeding with the concrete pour. Notify Architect of satisfactory conditions before proceeding.

## 1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis of Design Product: J-Form System manufactured by Build SMART LLC located at: 3701 Greenway Circle, Lawrence, Kansas 66046; Tel: (888) 376 3424; Email: [info@BuildSMARTna.com](mailto:info@BuildSMARTna.com); [www.BuildSMARTna.com](http://www.BuildSMARTna.com).
- B. Substitutions: Alternate manufacturers not named above may be considered in accordance with provisions of Division 01 - Product Requirements. Alternate manufacturers shall provide documentation showing evidence of compliance with all specified quality, design, performance and fabrication requirements.

### 2.2 MATERIALS

- A. Insulating formwork
  1. Material: Geofoam expanded polystyrene (EPS) produced for use in permanent contact with moist earth.
  2. Physical Properties:

		Slab edge J-Form,	Underslab insulation
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		grade beam and isolated footing concentrated load locations	
a.	ASTM D6817 compliance type	EPS 46	NA
b.	ASTM C578 compliance type	NA	EPS Type II
c.	Density (ASTM C303)	2.85 lb/ft <sup>3</sup>	1.35 lb/ft <sup>3</sup>
d.	Compressive strength at 1% deformation (ASTM D1621)	18.6 psi	7.3 psi
e.	R-value per inch at 75° F (ASTM C518)	R-4.5	R-4.0
f.	Water absorption by total immersion, maximum	2%	4%
g.	Vapor permeance (1" thickness, max perm)	2.5 perms	3.5
h.	Flame Spread Index per ASTM E84	Less than 25	Less than 25
i.	Smoke-Developed Index per ASTM E84	Less than 450	Less than 450

3. Termite Resistance: Geofoam shall be manufactured of Perform Guard termite resistant EPS to meet or exceed requirements of IBC 2603.8, IRC 320.5, and complies with ASTM C578, and ICC ES AC239 "Acceptance Criteria for Termite-Resistant Foam Plastics. Use is not restricted in areas where the probability of termite infestation is defined as "very heavy" per IBC 2603.8 or IRC R316.7.
4. Vapor Permeability: EPS Geofoam shall be vapor permeable with mechanical properties unaffected by moisture.
5. Standard Dimensions: Comply with building code requirements. Dimensions are variable, per project drawings.
  - a. Slab-edge bearing width: 12 inches minimum.
  - b. Exterior J-Form thickness: 4 inches.
  - c. J-Form Length: 8 feet.
  - d. Underslab insulation thickness: 1-inch and 2-inch thicknesses. Can be layered to increase the overall thickness and R-value.
  - e. Underslab insulation size: 4 feet by 8 feet. Cut to size at jobsite by Contractor.

### 2.3 FABRICATION

- A. Tolerances: Fabricate slab edge Geofoam to shape within 1/16 inch of dimensions shown on project drawings and to within 1/8-inch length.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared in accordance with other specification sections, the drawings, and manufacturer's Installation Instructions.
- B. Verify lines, levels, and centers before proceeding with placement of insulating formwork. Verify that dimensions comply with drawings.

- C. If preparation of substrate gravel and deep lateral piping is the responsibility of another installer, notify Architect of unsatisfactory preparation. Do not proceed until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean surfaces of insulating formwork thoroughly prior to installation.

### 3.3 INSTALLATION

- A. Install insulating formwork in accordance with manufacturer's Installation Instructions.
- B. Carefully verify horizontal and vertical positions of forms. Correct any misaligned or misplaced forms before placing concrete to obtain a finished concrete slab installation within tolerances established in manufacturer's Installation Instructions.
- C. Coordinate with Work of other sections in forming and placing pipe penetrations, openings, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
  - 1. Verify that perforated drain pipe has been properly installed continuous to daylight.
  - 2. Insulating formwork is termite treated. Confirm that any additional pest and termite treatments required by the local building official are applied to sub-slab soils and gravel.
  - 3. Verify that underslab gravel and topping of pea gravel or fine leveling sand has been installed as specified under other sections and in compliance with manufacturer's Installation Instructions.
    - a. Verify that minimum 4-inch-thick #57 gravel is installed below insulating formwork.
    - b. Comply with installation tolerances indicated in manufacturer's Installation Instructions for finished straight, plumb, level, and crown limitations of the concrete slab on grade.
  - 4. Verify that deep plumbing and other laterals, utility conduits located under footers and underslab are properly placed prior to installing insulating formwork.
  - 5. Cut insulating formwork, install vapor barrier membrane, sleeves, vapor barrier boots, sealants, and tapes as specified under other sections where below slab pipes penetrated the slab on grade.
    - a. Seal vapor barrier membrane. Avoid gaps. Carefully seal joints to avoid moisture infiltration into building envelope.
  - 6. Coordinate work to avoid cutting and patching of concrete after placement.
- D. Insulating formwork installation sequence:
  - 1. Start at building corners, accurately securing insulating formwork corners in place with batter boards and stakes.
  - 2. Place straight run slab edge insulating forms.
  - 3. Apply adhesive for joining insulating formwork pieces using moisture cured polyurethane adhesive, per manufacturer's Installation Instructions.
  - 4. Install underslab insulation with tight joints. Fill joints that are greater than 1/8 inch with expanding foam insulation.
  - 5. If multi-layer underslab insulation is used, stagger joints by laying sheets perpendicular to the layer below with joints offset at least 12 inches from one another.
  - 6. Confirm that all insulating formwork pieces are secured in place to resist movement during concrete pour.

- E. Install vapor barrier (VB) membrane into insulating formwork with carefully folded joints such that the membrane will not be torn during the concrete pour.
  - 1. Overlap and seal all joints and VB accessories in compliance with VB installation instructions.
  - 2. Extend VB at least 12 inches beyond slab edge perimeter.
- F. Install 2x wood screed board around slab edge perimeter on top of the perimeter insulating formwork.
  - 1. Temporarily secure screed boards to insulating formwork with 6-inch course threaded screws.
  - 2. If screed boards are treated as required for sill plates, they can be removed and reused for this purpose after concrete is poured and cured.
- G. Ensure that insulating formwork is not displaced or broken, and vapor barrier membrane is not punctured or torn during concrete placement.

#### 3.4 FIELD QUALITY CONTROL

- A. Comply with Division 01 Quality Requirements.
- B. Inspect installed formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, adhered joints, batter boards, and stakes are secure and will resist movement during concrete pour.
- C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- D. Schedule concrete placement to permit formwork and reinforcement inspection before placing concrete by a qualified special inspector, if required by the Building Official.

#### 3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION 03 11 19