



commerce.wi.gov

**Wisconsin**  
Department of Commerce

Evaluation #

200809-I

Safety & Buildings Division  
201 West Washington Avenue  
P.O. Box 2658  
Madison, WI 53701-2658

## Wisconsin Building Products Evaluation

Material

Insulated Concrete Forms

Manufacturers

Plymouth Foam, Inc.  
1800 Sunset Drive  
P.O. Box 407  
Plymouth, WI 53073

Phil-Insul Corporation  
735 Arlington Park Place, Unit 11U  
Kingston, Ontario, Canada K7M 8M8

### SCOPE OF EVALUATION

**GENERAL:** This report evaluates the use of the IntegraSpec insulating concrete form wall system, manufactured by Plymouth Foam, Inc. for Phil-Insul Corp. dba IntegraSpec. The wall system was evaluated as permanent form work and insulation system for reinforced concrete load-bearing and non-load bearing exterior and interior walls; beams and lintels; and foundation and retaining walls. The IntegraSpec insulating concrete form wall system was evaluated for fire safety requirements of the foam plastic and structural requirements for the codes listed below.

This review includes the cited **Comm** code requirements below in accordance with the current **Wisconsin Uniform Dwelling Code for 1 & 2 family dwellings (UDC):**

- **Foam Plastic:** The IntegraSpec insulating concrete form wall system was evaluated in accordance with the fire safety requirements of **s. Comm 21.11.**
- **Structural:** The IntegraSpec insulating concrete form wall system was evaluated in accordance with the structural requirements of **ss. Comm 21.02, and 21.02(3)(c).**

The **IBC** requirements below in accordance with the current **Wisconsin Amended ICC Code:**

- **Foam Plastic:** The IntegraSpec insulating concrete form wall system was evaluated in accordance with the fire safety requirements **ss. IBC 2603.1, 2603.2, and 2603.3.**
- **Structural:** The IntegraSpec insulating concrete form wall system was evaluated in accordance with the requirements of **IBC Chapter 16.**

**Note: Structural calculations shall be submitted (job-to-job basis) in accordance with IBC Chapter 16 for Live, Ground Snow, Roof, Wind, and Seismic Loads.**

### **DESCRIPTION AND USE**

**General:** The IntegraSpec insulating concrete forms consist of two dovetailed expanded polystyrene (EPS) panels connected with plastic cross spacers perpendicular to the EPS boards, forming a hollow-core ICF form. The spacers slide into plastic support tracks molded into the interior dovetail face of the EPS panels.

The forms are available in a standard length of 48 inches, an interlocked height of 12 ¼ inches and five standard overall widths, of 9-, 10-, 11-, 13-, 15- and 17-inches. The six widths have concrete core widths of, respectively, 4-, 5-, 6-, 8-, 10- and 12-inches. The EPS panels have bi-directional and reversible (flippable) interlocking edges at the top, bottom and both ends. The IntegraSpec forms are filled with concrete to provide a solid monolithic reinforced (when required) concrete wall system.

**Materials:** The IntegraSpec insulating concrete form wall system:

- **Concrete:** Normal-weight concrete complying with **s. Comm 21.02(3)(b)**, and **s. IBC 1903.1** with maximum aggregate size of ½-inch for 4-, 5- and 6-inch-thick concrete walls and a maximum ¾ inch aggregate size for 8-, 10- and 12-inch-thick concrete walls. Concrete shall have a minimum compressive strength of 2,500 psi at 28 days.
- **Reinforcement:** The concrete is reinforced with Nos. 3, 4, 5, and 6 deformed steel reinforcing bars, Type A615, Grade 60 steel, with minimum yield strength of 60,000 psi. All steel reinforcement shall be in accordance with **s. IBC 1903.5**.
- **EPS Foam:** The EPS foam panels are molded with Type II, EPS, 2 ½ inches thick and have a nominal density of 1.5 pcf.
- **Spacer Material:** The web spacers, manufactured by A&J Industries, of Uxbridge, Massachusetts [5-, 6-, 8- and 10-inch spacers] and by PPD Thermoplastiques, of Waterville Quebec, Canada [4-, 6-, 8-, and 12-inch spacers], are injection-molded from high-impact polystyrene resin. The **spacers**, which slide into the plastic form channels (inserts), are available in 4-, 5-, 6-, 8-, 10- and 12-inch widths, and can be combined for increased concrete core thicknesses.
- **Channel Inserts:** The channel inserts, manufactured by A&J Industries, of Uxbridge, Massachusetts, and PPD Thermoplastiques, of Waterville Quebec, Canada, are injection-molded from high-impact polystyrene resin. The channel inserts into which the web spacers are inserted are embedded and fusion-bonded inside the EPS panels during the EPS injection/expansion process. The vertical channels are on the dovetailed side of the panels, 8 inches on center, and additionally serve as 1 5/8-inch furring/fastening strips/studs.
- **Other Components:** Wood members, if not protected from the concrete, must be preservative-treated with an approved wood preservative and attached with anchor bolts complying **s. IBC 2304.9.5**.
- **Standard Forms and Accessories:** Standard and accessory forms include the Standard Form Unit, 90° Corner Unit, 45° Corner Unit, Taper Top Panel, Intergrabuck, SantaFE bucks, T-wall Panel, Brickledge Panel, Header Panel and H-Clip spacer connections.

Each pallet of IntegraSpec insulating concrete forms shall bear a label with the manufacturer's name, and the quality control inspection agency, Intertek Testing Services NA Ltd. Additionally, the spacer packaging shall identify the product manufacturer (A&J Industries or PPD Thermoplastiques).

### **TESTS AND RESULTS**

EPS used to make the IntegraSpec insulating concrete form panels shall be molded Type II, 2 ½ inches thick and have a nominal density of 1.5 pcf. The EPS foam shall have a maximum flame-spread rating of 25 and a maximum smoke-developed rating of 450. Testing was done in accordance with **ASTM E 84**.

### **LIMITATIONS OF APPROVAL**

The limitations below are in accordance with the current **Wisconsin Uniform Dwelling Code (UDC), for 1 & 2 family dwellings:**

- **Foam Plastic:** The IntegraSpec insulating concrete form wall system is approved for use with an approved thermal barrier to separate the blocks from interior spaces in accordance with **s. Comm 21.11(1)**. Where a 1-inch thickness of masonry does not separate the polystyrene blocks from the building interior, including at the top of the wall, a thermal barrier, which has a finish rating of at least 15 minutes, shall be provided.
  1. IntegraSpec insulating concrete form wall system is approved for use in combustible non-rated construction in accordance with **s. Comm 21.11**. In one- or two-family dwellings, thermal barriers shall be provided to separate the forms from the occupied space of the dwellings per **s. Comm 21.11**.
  2. The exterior face of the blocks shall be finished with an approved weather covering and must be protected from ultraviolet light.
  
- **Structural:** The IntegraSpec insulating concrete form wall system is approved as a structural building element.
  1. The units are approved for use as concrete forms for basement walls and above grade exterior walls when the resulting concrete core thickness satisfies **Table 21.18-A** for one- or two-family dwellings, or when structural calculations for the product are submitted for review.
  2. Walls shall be anchored to all floors and roofs. Walls shall be interconnected at corners by embedding and lapping the reinforcement.
  3. Structures are **limited** to two stories in height.
  4. Structural calculations are submitted to the department by a Wisconsin registered professional engineer or architect.
  5. Below grade walls shall be damp-proofed when required by the local building department.
  6. Damp proofing and waterproofing materials shall be approved by IntegraSpec and the local building official, and shall be free of solvents that will adversely affect the EPS foam.

**NOTE:** The IntegraSpec insulating concrete form wall system was not evaluated for compliance with the thermal requirements of Subchapter VI, ss. **Comm 22.20, 22.21, 22.23, 22.25, 22.27, 22.28, and 22.31** of the current UDC.

The forms are approved for use as concrete forms for basement walls, exterior walls and retaining walls when The **IBC** limitations below are in accordance with the current **Wisconsin Amended IBC Code**:

- **Foam Plastic:** The IntegraSpec insulating concrete form wall system is approved for use with an approved thermal barrier to separate the blocks from interior spaces in accordance with **s. IBC 2603.4**.
  1. In accordance with **s. IBC 2603.4.1.6**, IntegraSpec insulating concrete form wall system when used within the attic, crawl space or, where entry is made only for service utilities, the foam plastic insulation shall be protected against ignition by 1-1/2" thick mineral fiber insulation, a 1/4" thick wood structural panel, particleboard or hardboard, gypsum wallboard, corrosion-resistant steel or other approved material installed so that the foam plastic is not exposed.
  2. The protective covering shall be consistent with the requirements for the **Type V Construction**.
  3. The exterior face of the blocks shall be finished with an approved weather covering and must be protected from ultraviolet light.
  4. The crawl space shall not be used for storage or air handling purposes, there are no interconnected basement areas and entry to the crawl space is only for service of utilities.
  
- **Structural:** Design of concrete formed by IntegraSpec insulating concrete form wall system shall comply with **IBC Chapter 19** with the following requirements:
  1. The forms are approved for use as concrete forms for basement walls, exterior walls and retaining walls when structural calculations are submitted to the department by a Wisconsin registered professional engineer or architect.
  2. Design calculations of walls shall comply with **s. IBC 1901.2**. Use of the empirical design approach specified in **s. 2109.1 [Comm 62.2109(1)]** is prohibited.
  3. Design of lintels shall comply with the applicable provisions of **IBC Chapter 16**.
  4. Wall loading shall be in accordance with **IBC Chapter 16**.
  5. Walls shall be anchored to floors and roofs in accordance with **s. IBC 1604.8.2**.
  6. Minimum wall reinforcement shall conform to **s. IBC 1901.2**. When the code requires that vertical and horizontal reinforcement be spaced no further apart than 18 inches or three times the wall thickness, whichever

is less, the maximum concrete wall thickness along the length of the wall is permitted to be used to determine rebar spacing.

7. Walls shall be anchored to floors and roofs in accordance with **s. IBC 1604.8.2**. Walls shall be interconnected at corners by embedding and lapping reinforcement in accordance with the code.
8. Design of shear walls shall be in accordance with **ss. IBC 1901.2** and **1910**.
9. Structures are **limited** to two stories in height plus a basement.
10. Below grade walls shall be damp-proofed when required by the local building department, water-proofed in accordance with **s. IBC 1806**.
11. Damp proofing and waterproofing materials shall be approved by IntegraSpec insulating concrete form wall system and the local building official, and shall be free of solvents that will adversely affect the EPS foam.
12. Special inspection is required as noted in **s. IBC 1704**, for placement of reinforcing steel and concrete, and for concrete cylinder testing, except that special inspection is not required for foundation stem walls conforming to **Table 1805.4.2** of the **IBC**. Additionally, when the building official approves, special inspection is not required when all of the following conditions are met:
  - a) Wall systems are a maximum of 8 feet high and are limited to use in single-story construction of Group R3, or Group U Occupancies.
  - b) Maximum height of a concrete pour is 48 inches. Succeeding lifts must be placed in accordance with **s. IBC 1905.10**.
  - c) Installation is by properly trained installers approved by IntegraSpec.
  - d) The installation instructions indicate methods used to verify proper placement of concrete.
13. Walls constructed with IntegraSpec insulating concrete blocks are considered **Type V Construction**.
  - e) **Alternate Design:** In lieu of calculations, the structural design of reinforced concrete forms by IntegraSpec for residential construction shall comply with the *Prescriptive Method for Insulating Concrete Forms in Residential Construction* publication No. EB118, dated May 1998, and published by the Portland Cement Association (PCA). Buildings constructed with the IntegraSpec insulating concrete form wall system and designed in accordance with the alternate design, shall not exceed a height of two stories plus a basement, where the maximum unsupported wall height is 10 feet.

**NOTE: The IntegraSpec insulating concrete form wall system was not evaluated for compliance with the thermal requirements of s. Comm 63.1018.**

**Identification:** Each package of IntegraSpec insulating concrete forms shall bear a label specifying the name and address of the manufacturer. Additionally, product labels shall indicate the Wisconsin Building Product Evaluation Number (**200809-I**), and the name and logo of the quality control agency.

This approval will be valid through December 31, 2013, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

### **DISCLAIMER**

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date:

Approval Date: July 22, 2008 By: \_\_\_\_\_

Lee E. Finley, Jr.  
Product & Material Review  
Integrated Services Bureau