ESR-1147
Issued May 1, 2004
This report is subject to re-examination in one year.

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DIVISION: 03—CONCRETE
Section: 03130—Permanent Forms

REPORT HOLDER:

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EVALUATION SUBJECT:

INTEGRASPEC INSULATING CONCRETE FORMS (ICF)

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2000 *International Building Code*® (IBC)
- 2000 *International Residential Code*® (IRC)
- *2002 Accumulative Supplement to the International Codes*™

Properties evaluated:

- Formwork for structural concrete
- Surface burning characteristics
- Crawl space fire evaluation

2.0 USES

Integraspec Insulating Concrete Forms are used as permanent formwork for reinforced concrete load-bearing and nonload-bearing exterior and interior walls; beams and lintels; and foundation and retaining walls. The forms are limited to buildings of combustible construction. The forms are used in construction of exterior and interior walls, and foundation and retaining walls. The forms remain in place after setting of concrete and shall be protected by an approved interior and exterior finish material as described in Sections 4.1.1 and 4.1.2 of this report.

3.0 DESCRIPTION

3.1 General:

Integraspec Insulating Concrete Forms consist of two dovetailed expanded polystyrene (EPS) face boards 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 face of the EPS boards. See Figure 1 of this report.

The forms are available in a standard length of 48 inches (1219 mm), an interlocked height of $12^{1}/_{4}$ inches (311mm) and five standard overall widths, of 9 inches (229 mm), 11 inches (279 mm), 13 inches (330 mm), 15 inches (381mm), and 17 inches (432 mm). The five widths have concrete core widths of, respectively, 4 inches (102 mm), 6 inches (152 mm), 8 inches (203 mm), 10 inches (254 mm), and 12 inches (305 mm). The forms have interlocking edges at the top, bottom and sides. The forms are filled with concrete to provide a solid monolithic concrete wall, which complies with the flat ICF wall system requirements specified in Section R611.3 of the IRC.

3.2 Materials:

3.2.1 Polystyrene: The EPS foam plastic boards are expanded from polystyrene beads, identified as BASF BFL 327 (evaluation report ER-3401), and comply with the requirements of ASTM C 578. The boards are nominally 2.5 inches (64 mm) thick, with a 1.50 pcf (20.1 kg/m^3) density, and a flamespread index of less than 25 and a smoke-development index of less than 450 when tested in accordance with ASTM E 84.

3.2.2 Concrete: The concrete is normal-weight concrete, complying with the applicable code, with a maximum $^{1}/_{2}$-inch (12.7 mm) aggregate size for 4-inch- and 6-inch-thick (101 and152 mm) concrete walls and a maximum $^{3}/_{4}$-inch (19 mm) aggregate size for 8-inch- (203 mm), 10-inch- (254 mm) and 12-inch-thick (203, 254 and 305 mm) concrete walls. Concrete shall have a minimum compressive strength of 2500 psi (17.24 MPa) at 28 days. If construction of the ICF wall system is based on the IRC, the concrete shall comply with Sections R404.4.5 and R611.6.1.

3.2.3 Web Spacers: The web spacers, manufactured by United Plastics, of Leominster, Massachusetts [6- and 10-inch (152 and 254 mm) webs] and by PPD Thermoplastiques, of Waterville, Quebec, Canada [4-, 6-, 8-, and 12-inch (102, 152, 203, 305 mm) webs], are injection-molded from high-impact polystyrene resin. The spacers, which slide into the form channels, are available in 4-inch (102 mm), 6-inch (152 mm), 8-inch (203 mm), 10-inch (250 mm) and 12-inch (305 mm) widths, and can be combined for increased concrete core thicknesses.

3.2.4 Channel Inserts: The channel inserts, manufactured by United Plastics, of Leominster, 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 process. The vertical channels are on the dovetailed side of the boards, 8 inches (203 mm) on center, and additionally serve as $1^{5}/_{8}$-inch (41 mm) furring strips/studs.

3.2.5 Integra-Buck: Integra-Buck, which is used to form the rough opening sides for windows and doors, is an EPS component that slides perpendicularly inside the EPS board's vertical dovetail grooves.

3.2.6 Reinforcement: Deformed steel reinforcing bars shall be Grade 60 steel, depending on the structural design, and shall comply with Section 1903 of the IBC. If construction of the ICF wall system is based on the IRC, reinforcing steel shall comply with Sections R404.4.6 and R611.6.2 of the IRC.

3.2.7 Other Components: When required by the building official, wood members in contact with concrete for plates or windows and door framing, shall be pressure-treated in accordance with the applicable code, and shall be attached with galvanized steel fasteners in accordance with Section 2304.9.5 of the IBC. Materials other than wood, such as vinyl, are permitted for window and door framing if approved by the building official.

3.2.8 Standard and Accessory Forms: Standard and accessory forms include the Standard Form Unit; 90° Corner Unit; 45° Corner Unit; Taper Top Panel; Integrabuck; and IntegraT-wall.

4.0 INSTALLATION

4.1 General:

The Integraspec ICF wall system shall be supported on concrete footings complying with Chapter 18 of the IBC or Chapter 4 of the IRC. Vertical rebars, embedded in the footing, shall extend a minimum of 24 inches (610 mm) into the wall system. Installation of Integraspec Insulating Concrete Forms shall comply with this report, the applicable code and the manufacturer's published installation instructions. The manufacturer's published installation instructions shall be available at the jobsite at all times during installation.

4.1.1 Interior Finish: Integraspec Insulating Concrete Forms exposed to the interior of the building shall be finished with an approved 15-minute thermal barrier, such as minimum $^1/_2$-inch-thick (12.7mm) regular gypsum wallboard. The gypsum wallboard shall be attached to the channels with minimum $1^5/_8$-inch-long (41 mm), No. 6, Type W, coarse-thread gypsum wallboard screws spaced 12 inches (305mm) on center horizontally and 16 inches (406 mm) on center vertically. The screws have a minimum allowable pullout capacity of 153 pounds (680 N) and a lateral capacity of 34 pounds (150 N).

4.1.2 Exterior Finish:

4.1.2.1 Above Grade: Integraspec Insulating Concrete Forms above grade shall be covered on the exterior face with a weather-resistive barrier and an approved wall covering complying with the applicable code or listed in an ICC-ES evaluation report. The wall covering shall be attached to the channels with coarse-thread screws. The screws shall be corrosion-resistant and have sufficient length to penetrate beyond the back side of the embedded channels a minimum of $^3/_8$ inch (9.5 mm). The screws have a minimum allowable pullout capacity of 153 pounds (680 N) and a lateral capacity of 34 pounds (150 N).

4.1.2.2 Below Grade: The exterior below-grade surface of the Integraspec Insulating Concrete Forms shall be damp-proofed or waterproofed in accordance with Section 1806 of the IBC or Section R406 of the IRC, as applicable. The damp-proofing and waterproofing materials shall be approved by authorized Phil-Insul Corporation representatives and the code official, and shall be free of solvents, hydrocarbons, ketones and esters that will adversely affect the EPS foam plastic.

4.1.3 Crawl Space Installation: Integraspec Insulating Concrete Forms are permitted to be installed in a crawl space only under the following conditions:

- Entry to the crawl space is limited to service of utilities, and heat-producing appliances are not permitted.
- There are no interconnected basement areas.
- Air in the crawl space is not circulated to other parts of the building.
- Ventilation of the crawl space is provided in accordance with the applicable code.

4.1.4 Foundation Walls: The wall system is permitted to be used as a foundation stem wall when supporting wood-framed construction and when the structure is supported on concrete footings complying with the applicable code. For jurisdictions adopting the IRC, compliance with Section R404 is required.

4.1.5 Foam Plastic Protection: In jurisdictions that have adopted the IRC, compliance with Section R324.4 shall be required. Areas of very heavy termite infestation shall be determined in accordance with Figure R301.2(6) of the IRC, as applicable.

4.2 Design:

4.2.1 General: Structural analysis and design of the concrete shall be prepared in accordance with Chapter 19 of the IBC, assuming a monolithic concrete wall of uniform thickness. Design loads shall comply with Chapter 16 of the IBC.

When the flat ICF forms are installed on buildings that do not conform to the applicability limits of Sections R404.4.1 and R611.2 of the IRC, the structural analysis and design of the concrete shall be prepared in accordance with ACI 318, and Chapter 19 of the IBC or Section R612 of the IRC.

Design calculations and details for specific applications shall be furnished to the code official to verify compliance with this report and the applicable code. The individual preparing such documents shall possess the necessary credentials regarding competency and qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken.

4.2.2 Alternate Design: In lieu of calculations required by Section 4.2.1 of this report, the structural design of reinforced concrete formed by the Integraspec ICF wall system for residential construction is permitted to comply with the *Prescriptive Method for Insulating Concrete Forms in Residential Construction* (publication No. EB118), dated May 1998, published by the Portland Cement Association (PCA), subject to all applicability and use limits for a flat ICF wall system specified in Table 1.1 of that document. The PCA document shall be made available to the building official upon request. Buildings constructed with the Integraspec ICF wall system and designed in accordance with this section (Section 2.3.2) shall not exceed a height of two stories plus a basement, where the maximum unsupported wall height is 10 feet (3048 mm).

4.2.3 Design in Accordance with the IRC: Insulating concrete walls constructed with the Integraspec ICF wall system shall be designed and constructed in accordance with Sections R404.4 and R611 of the IRC.

4.2.4 Special Inspections: Special inspection shall be provided as noted in Section 1704 of the IBC, for placement of reinforcing steel and concrete and for concrete cylinder testing. Special inspectors shall comply with the applicable code. Special inspection under the IRC is not required when the walls comply with the prescriptive requirements of Chapter 4 or Chapter 6 of the IRC. Otherwise, requirements of the IBC apply.

5.0 CONDITIONS OF USE

Integraspec Insulating Concrete Forms described in this report comply with those codes specifically listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation complies with this report, the manufacturer's published instructions and the applicable code.

5.2 Integraspec Insulating Concrete Forms shall be separated from the interior of the building with an approved 15-minute thermal barrier, except for crawl space construction as described in Section 4.1.3 of this report.

5.3 Integraspec Insulating Concrete Forms shall be limited to buildings of combustible construction.

5.4 Integraspec Insulating Concrete Forms are produced by Contour Products, Inc., in Kansas City, Kansas, under a quality control program with inspections by Intertek Testing Services NA Ltd. (AA-688).

6.0 EVIDENCE SUBMITTED

6.1 Manufacturer's descriptive literature.

6.2 Manufacturer's published installation instructions.

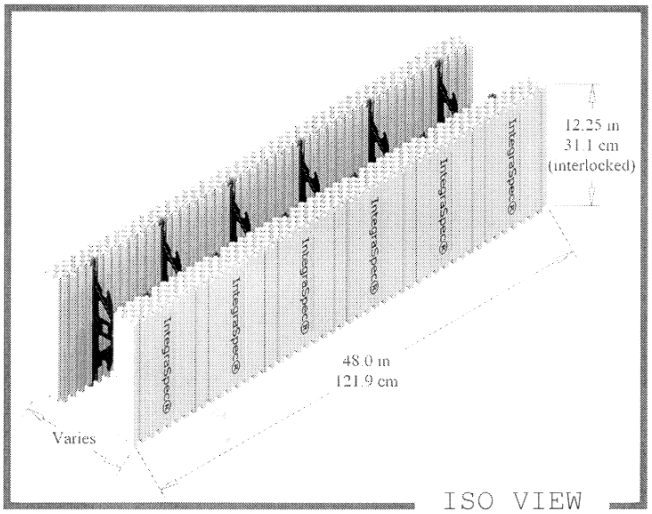
6.3 Data in accordance with the applicable sections of the ICC-ES Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems (AC15), dated June 2003 (effective July 1, 2003), and in accordance with the applicable sections of the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated July 2002 (effective January 1, 2003); including reports of testing performed in accordance with ASTM C 578 showing compliance with the requirements for flexural strength, compressive strength, and density testing.

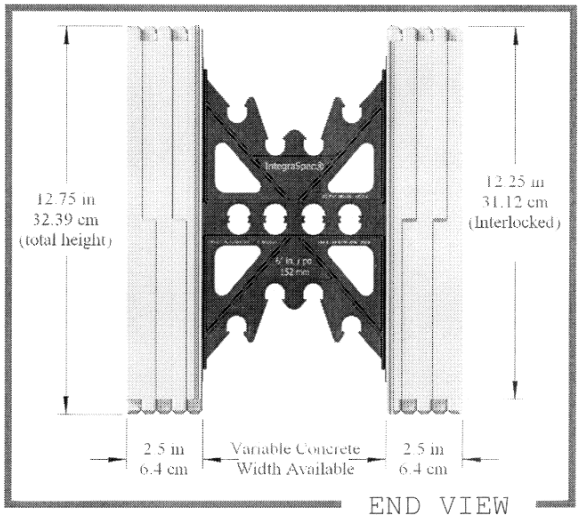
6.4 A quality control manual.

7.0 IDENTIFICATION

Each pallet of Integraspec Insulating Concrete Forms covered by this report shall be identified by a label bearing the manufacturer's name (Phil-Insul Corporation) and trademark (IntegraSpec), the bead supplier (BASF) lot and bag number, the name of the inspection agency (Intertek Testing Services NA Ltd.) and the evaluation report number (ESR-1147).

Additionally, the spacer packaging shall identify the product manufacturer (United Plastics or PPD Thermoplastiques).


12.25 in
31.1 cm
(interlocked)
48.0 in
121.9 cm
Varies
ISO VIEW


12.75 in
32.39 cm
(total height)
12.25 in
31.12 cm
(Interlocked)
2.5 in
6.4 cm
Variable Concrete
Width Available
2.5 in
6.4 cm
END VIEW

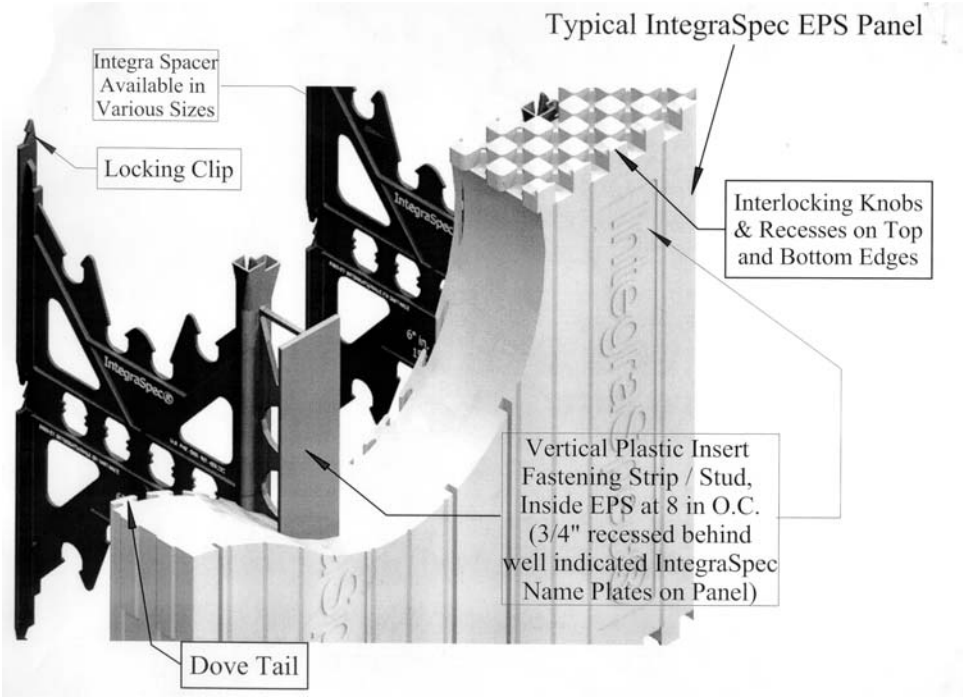

Typical IntegraSpec EPS Panel
Integra Spacer
Available in
Various Sizes
Locking Clip
Interlocking Knobs
& Recesses on Top
and Bottom Edges
Vertical Plastic Insert
Fastening Strip / Stud,
Inside EPS at 8 in O.C.
(3/4" recessed behind
well indicated IntegraSpec
Name Plates on Panel)
Dove Tail

FIGURE 1