

Polycrete® Big Block™ Standard Specification

SECTION 03 11 19
INSULATED CONCRETE FORMING
10/13

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACI INTERNATIONAL (ACI)

- ACI 117 (2010) Specifications for Tolerances for Concrete Construction and Materials and Commentary
- ACI 301 (2005; Errata 2008) Specifications for Structural Concrete
- ACI 318 (2008; Errata 2010) Building Code Requirements for Structural Concrete and Commentary
- ACI 347 (2004; Errata 2008) Guide to Formwork for Concrete

ASTM INTERNATIONAL (ASTM)

- ASTM C 1363 (2005) Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- ASTM C1622/C1622M (2010) Standard Specification for Cold-Weather Admixture Systems
- ASTM C 177 (2010) Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- ASTM C 203 (2005a) Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- ASTM C 578 (2010) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- ASTM D 1621 (2010) Standard Test Method for Compressive Properties of Rigid Cellular Plastics

ASTM D1761	(2006) Standard Test Methods for Mechanical Fasteners in Wood
ASTM E 119	(2010b) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E2634	(2010) Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems
ASTM E 84	(2010b) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E 90	(2009) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

1.2 SUBMITTALS

1. Product Data
Manufacturer's product data on ICF Wall System
2. Samples
Sample of product to be used
3. Test Reports
Third party Test reports evidencing building code compliance
4. Certificates
Manufacturer's certification of compliance with ASTM E2634
Manufacturer's certification of lateral strength
Installer's successful training certification
Manufacturer's product warranty
5. Manufacturer's Instructions
Installation manual

1.3 QUALITY ASSURANCE

1.3.1 ICF Manufacturer

Polycrete International, Inc 580 boul. Lionel-Boulet, Varennes, Québec Canada J3X 1P7 (450)985-2777 Polycrete@Polycrete.com

PolycreteUSA, LLC (US Agent) 6802 Paragon Place, Suite 410, Richmond, Virginia 23230 Phone (800)570-4313 Info@PolycreteUSA.com

1.3.2 Installer Qualification

Installer shall be trained by PolycreteUSA or a qualified ICF Technical Advisor to ensure product is installed in accordance with the Polycrete's published installation instructions. Installer must have experience in ICF systems and successfully completed at least three (3) projects that are similar to this project in size, scope and complexity.

1.3.3 Pre-Installation Meetings

Prior to commencement of ICF installation and associated work, conduct a meeting at project site with the ICF manufacturer's representative, and trades responsible for installing forms, concrete, and reinforcement.

1.4 DELIVERY, STORAGE, AND HANDLING

Polycrete® Big Block ICF is packed in bundles of 16 blocks each. Each bundle measures approximately 105" x 49" x 47" (L x W x H) and weighs 520 lbs (236 kg). Polycrete® Big Block bundles must be shipped on 'flatbed' trailer.

Handle and store products in location to prevent damage, soiling, and retain original factory packaging to protect from UV light.

A fork truck is required to offload product from delivery vehicle.

1.5 FIELD/SITE CONDITIONS

Conform to [ACI 318](#) for cold and hot weather concreting requirements.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Insulated concrete wall form system consists of two panels of molded expanded polystyrene (EPS) insulation connected by metal cross ties to act as permanent formwork for cast-in-place reinforced concrete beams, lintels, non-load-bearing walls, load-bearing walls, foundation walls, and retaining walls while provide insulating characteristics and attachment point for interior and exterior finishes.

2.1.1 Design Requirements

Design, engineer, and construct formwork in accordance with methodology of [ACI 347](#) for anticipated loads, lateral pressures, and stresses, and capable of withstanding a minimum of 1,600 lbs per square foot of lateral pressure resulting from placement and vibration of concrete.

2.1.2 Performance Requirements

The Insulated Concrete Form (ICF) wall system shall provide minimum 5-5/8" and maximum 24" forming cavity width. The cavity width shall be a consistent flat rectangular cross section. Provide cross ties in the ICF wall system 8.375" o/c maximum. Steel wire cross ties shall have .16 in (4 mm) minimum thickness. Fastening strip is 22 gauge steel 1-1/8" width for the full length of the wall to fasten exterior and interior wall finishes. Wall system shall provide accurate positioning of concrete reinforcing bars within the form cavity conforming to [ACI 318](#).

2.2 MANUFACTURED UNITS

2.2.1 Description

The ICF system includes an expanded polystyrene forming unit used to construct a monolithic reinforced concrete wall. The forms remain in place, providing a concrete wall to be finished with conventional interior and exterior wall coverings. Unit types are as follows.

1. Insulated concrete wall form system consists of
 - a. Two (2) flame resistant panels of Expanded Polystyrene (EPS type II)
 - b. One (1) steel wire mesh molded inside each EPS panel.
 - c. Two (2) continuous horizontal metal fastening strips welded to the wire mesh and molded inside EPS panels at minimum 12" o/c.
 - d. Forty-Eight (48) foldable steel ties for the 2' height EPS panels assembly spaced at maximum 8.375" o/c
2. EPS panel standard thickness is 2 ½" and 1 ¾" is available as required by design
3. Panels are provided with heights of 12"; 18" and 24"
4. Pre-assembled forms have four (4) standard dimensions to provide concrete walls with 5⅝"; 7 ⅝"; 9 ⅝" or 11 ⅝" thickness.
 - a. Custom sizes up to 24" to be provided upon request
5. 90° and 135° metal corner supports (8" X 8" X 10')
6. Metal starting bases in 8' sections

2.2.2 Performance/Design Criteria

Insulated Concrete Forms provide a minimum 5-5/8" and maximum 24" concrete "flat" cross section. Preformed forms have interlocking edges to facilitate course-to-course bonding to prevent uplift and lateral failure.

- a. ICF unit shall provide a minimum R-value of R-20 (2-1/2" panel) or R-14 (1-3/4" panel)
- b. EPS shall provide a maximum vapor permeation of 0.09 perm-meter (3.5 perm-inch).
- c. Finish wall assembly shall have a minimum rating of Sound Transmission Class (STC) 50 sound attenuation performance as tested in accordance with Test Method [ASTM E 90](#).
- d. The fire resistive-rated construction of the complete ICF wall assembly including EPS, cross tie material, and concrete shall be in accordance with Test Methods [ASTM E 119](#) and be rated at a minimum of four (4) hours.

Insulating Concrete Forming System conforms to the following requirements:

TABLE 1 PROPERTIES		
Properties	ASTM Test	Value
Density	ASTM C1622/C1622M	21.6 kg/m3 1.40 lbs/ft3
Thermal Resistance	ASTM C 177	0.275 m2.C/W per cm (min) 4.0 F.ft2.h/Btu per in (min)
Fastener Withdrawal	ASTM D 1761	Ultimate withdrawal load 310 lbs Allowable withdrawal load 62 lbs (#8 x 3" construction screw)
Fastener Lateral Shear	ASTM D 1761	Ultimate lateral shear load 375 lbs Allowable lateral shear load 90 lbs (#8 x 3" construction screw)
Compressive Strength	ASTM D 1621	103 kPa 17.50 psi
Flexural Strength	ASTM C 203	276 kPa (min.) 41.0 psi (min)
Flame Spread	ASTM E 84	25 maximum
Smoke Developed	ASTM E 84	450 maximum

2.3 MATERIALS

Submit certifications signed by ICF Manufacturer stating that product supplied meets the requirements of [ASTM E2634](#) and that its minimum lateral strength resistance is 1,600 lbs/sqft (75 kPa).

2.3.1 Expanded Polystyrene (EPS)

Expanded Polystyrene shall conform to [ASTM C 578](#). Provide Type II EPS panels, Flame Resistant with 1-3/4" or 2-1/2" thick EPS panels as required by design.

2.3.2 Cross Ties and Fastening Strips

Metal cross ties spaced at 8.375" o/c maximum. Cross ties allow for multiple reinforcement placement positions to meet the structural design. Provide metal fastening strips with 1-1/8" minimum width for the full length of the wall to fasten exterior and interior wall finishes. Fastening strips are recessed 1/4" to 1-1/2" below the outside surface of the panels. Position of fastening strips are clearly marked on the surface of the EPS panels.

2.4 ACCESSORIES

2.4.1 Bracing, Scaffolding, and Wall Alignment

Support ICF system in accordance with manufacturer's instructions prior to the attachment of permanent structural elements and before placement of concrete.

2.4.2 Door and Window Bucks

Use extruded vinyl, ground rated pressure treated lumber, or metal buck material to frame door and window openings.

2.4.3 Waterproofing

Waterproofing material shall be compatible with EPS system and as specified in Section [07 13 53 ELASTOMERIC SHEET WATERPROOFING] [07 14 00 FLUID-APPLIED WATERPROOFING]

2.4.4 Fasteners

Fasteners of interior and exterior wall finishes to ICF wall system shall conform to ASTM D1761. Fasteners shall be corrosion-resistant and have sufficient length to penetrate the fastening strips.

PART 3 EXECUTION

3.1 EXAMINATION

Verify that footings and slabs are installed level and true to the structural design. Ensure dimensions and steel reinforcement are as indicated.

3.2 PREPARATION

Clean top of footings and slabs of all foreign substances, frost, ice, and standing or running water prior to starting installation of ICF system. Use methods and materials approved by ICF manufacturer.

3.3 INSTALLATION

Install ICF system in accordance with the manufacturer's installation and technical manual; submit a copy of the manual. Provide bracing and shoring to ensure stability of formwork to prevent overstressing of ICF units due to construction loads in accordance with ACI 301. Install ICF system in running bond pattern. Affix Starter Base to the footing before setting first course of formwork.

Anchor formwork to supporting surfaces to prevent upward or lateral movement of the ICF units during concrete placement. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for support of adjoining work before concrete placement. Align fastening strips to facilitate interior and exterior wall finishes. Install concrete reinforcement according to the structural drawings at all walls, lintels, beams, and around openings.

Install window and door bucks at each location where an opening is required.

Install alignment bracing around the entire wall of the structure to ensure the ICF system is straight and plumb before and during concrete placement.

3.4 CONCRETE PLACEMENT

Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures. If concrete cannot be placed in continuous pour, provide construction joints as indicated. Consolidate placed concrete with mechanical vibrating equipment conforming to ACI 301. Variations from plumb and designated building lines shall not exceed the tolerances specified in ACI 117.

3.5 FIELD QUALITY CONTROL

The ICF manufacturer's representative or technical advisor shall inspect ICF installation to ensure compliance with ICF manufacturer's installation and technical manual. Inspect erected formwork, reinforcement placement, door and window opening construction, concrete placement, and alignment and bracing system to ensure that work is in accordance with drawings. Ensure that the cast-in-place concrete walls are level, plumb, square, and straight and that all dimensions conform to the drawings and are within required tolerances.

3.6 CLEANING

Clean formed cavities, within ICF units, of debris and foreign matter prior to concrete placement. Clean up and properly dispose of all debris remaining on job site related to the installation of the ICF system, recycling materials as required.

3.7 PROTECTION

Provide temporary coverage of installation of ICF system to reduce exposure to ultraviolet light should final finish application be delayed longer than 60 days.