

BuildBlock CSI Specifications for Expanded Polystyrene Stay in place Concrete Formwork (ICFs)

Part 1 General

1.01 Summary

- A. Supply and installation of BuildBlock Insulating Concrete Forms (ICFs) for stay in place structural cast in place concrete walls. These may include basement and above grade walls in load bearing and non-load bearing walls for both exterior and interior, and in both commercial and residential applications.
- B. Includes the installation of steel reinforcing, placement of concrete, ledgers, anchors and or bearing plates for attaching to the wall system.
- C. Install any required openings for other work associated with the BuildBlock ICF walls
- D. Adequate bracing and scaffolding to be provided by installer that meets and complies with all applicable codes.

1.02 Scope of Work

- A. Furnish all materials, tools, equipment and labor for the installation of BuildBlock Insulating Concrete Forms.
- B. Furnish all labor to install the steel reinforcing bars, build and place window and door openings, install all through wall penetrations, sleeves, and rim joist brackets, install all bracing and scaffolding to shore walls and openings for concrete pour, placement of concrete within the BuildBlock forms, and set all bearing plates anchor bolts or plate anchors.

1.03 Products installed that may or may not be supplied by contractor. (Specifier Note: If to be supplied by contractor, box must be checked)

- A. Steel Reinforcement..... _____
- B. Concrete..... _____
- C. Window and Door opening Bucks..... _____

- D. Anchor bolts, and Plate Anchors....._____
- E. Bearing Plates, and Rim Joist Brackets....._____
- F. Penetrations and Sleeves....._____

1.04 References and Standards

(Specifier Note: Add/Delete/Modify the References and Standards to correspond to the specific requirements and geographic location of the project.)

A. American Concrete Institute (ACI)

1. ACI 301– Standard Specification for Structural Concrete
2. ACI 318 – Building Code Requirements for Reinforced Concrete
3. ACI 332 – Guide to Residential Cast-in-Place Concrete Construction
4. ACI 347 – Guide to formwork for Concrete.

B. Canadian Standards Association (CSA)

1. CSA A23.1 – Concrete Materials and Methods of Concrete Construction
2. CSA A23.2 – Methods of Test for Concrete
3. CSA A23.3 – Design of Concrete Structures
4. CSA S269.3 – Concrete Formwork

C. American Society for Testing and Materials (ASTM)

1. ASTM C203 - Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
2. ASTM C272 - Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
3. ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block-Type Thermal Insulation
4. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
5. ASTM D635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
6. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
7. ASTM D1929 Standard Test Method for Determining Ignition Temperature of Plastics.
8. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
9. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.
10. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials

11. ASTM E119 - Standard test Methods for Fire Tests of Building Construction and Materials.
12. ASTM D 1761 – 88 Standard Test Methods for Mechanical Fasteners in Wood
13. ASTM E 90 – 04 Standard Test Methods for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
14. ASTM C 94 – 28-Day Concrete Compressive Strength
15. ASTM C 150 – Portland Cement
16. ASTM C 33 – Normal Weight Aggregates
17. ASTM C 330 – Light Weight Aggregates
18. ASTM C 618 – Fly Ash
19. ASTM A 615 – Steel Specifications for Steel Reinforcement

1.05 Quality Assurance

- A.** Contractor is required to install all materials according to manufacturer's training and printed installation procedures.
- B.** Installation is to comply with all project drawings and calculations.
- C.** Contractor is responsible to comply with all applicable governing codes and regulations.
- D.** All materials that are to be in contact with the BuildBlock Insulating Concrete Forms must be compatible with the expanded polystyrene used in their construction.
- E.** Contractor Experience: Contractor shall have a minimum of 1 year experience in the installation of ICF products and demonstrated experience with the scope and scale equivalent to the project.
- F.** Pre-installation Meetings: Prior to any work performed all contractors involved with the installation of forms, placing of the rebar and or steel, the concrete, electrical and or mechanical equipment are to meet and discuss all aspects of the installation and scope of work to be performed.

1.06 Submittals

- A.** Product data: Provide data on form materials and installation requirements and procedures.
- B.** Drawings and Calculations: Submit project drawings, details of construction, structural calculations as required by the local building department, indicate pertinent dimensions, materials and arrangement.

C. Steel Reinforcement: Provide structural calculations reinforcement sizing and placement schedule sealed by a Professional Engineer.

D. Concrete: Submit the concrete mix design as proposed for use.

1.07 System Description

A. BuildBlock Insulating Concrete Forms are made of two expanded Polystyrene panels with nominal density of 1.5 lbs/ft³. The panels are separated by injection molded polypropylene webs. All webbing is spaced at 6 inch intervals.

B. The webs are of different widths which determine the core width of the forms between the two polystyrene panels. The core widths made by BuildBlock are 4 inches (102mm), 6 inches (152mm) and 8 inches (203mm).

C. The straight form's polystyrene panels yield an installed block 16 inches (152mm) tall by 48 inches (1220mm) long. The polystyrene panels are 2.5 inches (63.5mm) each in width making a total of 5 inches (127mm) of EPS stay in place insulation with a calculated R-20 insulation value.

D. The expanded polystyrene panels are molded out of Huntsman 6340 and 5340 beads, Basf 422 beads, Nova M97-BC beads and or Styrocarn MC500 Beads. All beads are certified to Underwriters Laboratories testing or ICC-ES Legacy Reports for Flame Spread and Smoke Development under ASTM E83. The polystyrene complies as a type II rigid cellular Polystyrene (RCPS) in accordance with ASTM C 578-95

E. The polypropylene webs used in the BuildBlock ICF forms are 15 inches (381mm) in height and 1.5 inches (38mm) in width. All web flanges are recessed below the eps surface of the panels by ½ inch (12.7mm) to provide for all types of exterior and interior finishes to be attached.

1.08 Delivery, Storage and Handling

A. All BuildBlock forms are to be delivered to site in original factory packaging with manufacture's product labeling.

B. Handle and store product in a location to prevent damage and soiling.

C. Keep materials in original manufacturer's packaging. This will help protect forms from the elements. If forms are to be staged on the jobsite for extended periods of time protection from direct sunlight is recommended.

1.09 Project Conditions and scheduling

- A. During installation bracing and shoring are to be in place to protect walls from wind and weather conditions.
- B. Coordinate all material deliveries to meet construction schedules. Note all contractors that require penetrations, attachment points or who need to attach items to the BuildBlock walls will need to be coordinated with before placement of concrete.
- C. Follow manufacturer's requirements to protect concrete after placement during periods when the weather is below minimums specified by the building codes. This will ensure proper curing of the concrete.

1.10 Warranty

- A. BuildBlock Building Systems LLC warrants all BuildBlock Insulating Concrete Forms. For a written copy of warranty contact BuildBlock Building Systems or find it on the web at www.buildblock.com.

Part 2 Products

2.00 Manufacturers

- A. BuildBlock Building System's forms; Product: BuildBlock™. Available through BuildBlock Building Systems, LLC. 9701 North Broadway Ext., Oklahoma City, Oklahoma 73114. Phone (405) 840-3386.

2.01 Materials

- A. BuildBlock Insulating Concrete Forms (All forms fully reversible all directions). Each form is manufactured with two expanded polystyrene panels connected with polypropylene webs placed vertically on 6 inch center. All webs shall contain support locking fingers for horizontal reinforcing, attachment flanges on each side of the foam panels for attaching interior and exterior finishes and heavy duty hard points on each flange for attaching heavy objects that require extra holding support. All forms shall have interlocking tops and bottoms to lock forms together.

1. BB-400 Straight form (4 inch (102mm) concrete core) – 48" L x 9" W x 16" H
2. BB-600 Straight form (6 inch (152mm) concrete core) – 48" L x 11" W x 16" H
3. BB-800 Straight form (8 inch (203mm) concrete core) – 48" L x 13" W x 16" H
4. BB-490 90 Degree Corner form (4 inch (102mm) concrete core) – Left and Right
5. BB-690 90 Degree Corner form (6 inch (152mm) concrete core) – Left and Right
6. BB-890 90 Degree Corner form (8 inch (203mm) concrete core) – Left and Right
7. BB-445 45 Degree Corner form (4 inch (102mm) concrete core) – Left and Right
8. BB-645 45 Degree Corner form (6 inch (152mm) concrete core) – Left and Right

9. BB-845 45 Degree Corner form (8 inch (203mm) concrete core) – Left and Right
10. BB-6BL Straight Brick Ledge form (6 inch (152mm) concrete core)
11. BB-8BL Straight Brick Ledge form (8 inch (203mm) concrete core)

B. All webs composed of polypropylene meeting ASTM-D-635 for Rate of Burning and/or Extent and time of Burning of Plastics in a Horizontal Position, and ASTM-D-1929 Method for determining Ignition Temperature of Plastics.

C. All forms are 1.5 lb/ft³ minimum density Expanded Polystyrene.

D. Flame Spread of all beads used meet: ASTM-E-84 Equals 25 or less.

E. Smoke Development of all beads used meet: ASTM-E-84 Equals 450 or less.

F. Sound Transmission: ASTM-E90-04 Equal to or greater than 57

G. Mechanical Fastener testing meets: ASTM-D-1761-88 Type 'S' Course Thread Drywall Screw Withdrawal load = 43.1 lbs (safety factor of 3) Lateral Resistance load = 79 lbs (safety factor of 3)

2.02 Concrete

A. All concrete shall meet or exceed the compressive strength of 3000 psi. (20.5 Mpa). The concrete will be with a slump design to meet the compressive strength with a slump between 5.5 inches (114mm) and 6.5 inches (165mm) with an aggregate size no greater than ½" (13mm).

2.03 Steel Reinforcement

A. All Steel reinforcement used and placed in the BuildBlock forms shall be as specified by the design engineer with a minimum yield strength of 40,000 psi (276 Mpa) 60,000 psi (414 Mpa) is recommended where applicable.

2.04 Accessories and Auxiliary Materials

A. Bracing, wall alignment, and Scaffolding: Must meet all local building codes.

B. Window and Door Bucks: May be treated wood, V-Buck, or other approved material specified by engineer.

C. Bearing Plates and Rim Joist Brackets or anchors: Must meet engineer's specifications.

- D. Anchor Bolts and or Plate Anchors: Must have 5 inches of concrete penetration or meet engineer's specifications.
- E. Sleeves and Penetrations: Sized to meet design specifications.
- F. Water Proofing materials for below grade applications: As per design specifications.
- G. Exterior finishes: As per design specifications.
- H. Interior finish: Must meet 15 minute thermal barrier requirements.

Part 3 Execution

3.00 Examination

- A. Site conditions verified: Verify all building lines, and building dimensions. Verify footings and/or slabs level within ¼ inch. Verify elevation of site before proceeding with formwork.
- B. Verify all materials, tools, equipment and forms are available for installing formwork.
- C. Verify the proper size and placement of steel vertical dowels as specified by the plans or design.

3.01 Surface Preparation

- A. All footings and/or slabs must be clean in areas where forms are to be installed.
- B. If vertical dowels are not present they must be installed according to Engineers designs and or manufactures recommendations.

3.02 Installation of Formwork

- A. Install BuildBlock Insulating Concrete Forms according to manufacture's recommendations. All aspects of formwork must conform to these requirements with regards to the following:
 - 1. Erection of shoring and bracing to meet design requirements in accordance with ACI 301. All shoring must stabilize formwork for all types of construction loads place on the walls. All bracing and shoring must hold formwork plumb and straight.

2. Placement of BuildBlock forms at corners alternating corner directions at each row and aligning all furring strips to facilitate wall covering attachments.
3. Install all reinforcement as per engineer's specifications.
4. Verify all window and door openings are placed in correct locations and braced properly.
5. Install reinforcing, as per engineers shop drawings over openings to provide for lintels within the walls.
6. Final pre-pour checklist per manufacture's recommendations and job specific specifications. Check with other trades to insure placement and necessity of all accessories, penetrations, openings, sleeves, bolts, anchors, and other items.
7. Placement of concrete with specified design mix. Concrete placed according to manufacturer's recommendations.
8. All Anchors, Rim Joist brackets, Top Plate Anchors and/or Straps and Penetrations installed per design or manufacture's recommendations.
9. All walls rechecked and adjusted for straight and plumb right after concrete is placed.
10. Brush and clean forms, bucks, and sweep floors before leaving job site after pour.

3.03 Field Quality Control

- A.** Inspect erected formwork, shoring and bracing to ensure that work is in accordance with design, and that elements are secure.
- B.** Ensure that all formwork is level, plumb, square and straight and that all dimensions are correct as per the plans or drawings.

3.04 Cleaning

- A.** Clean forms as installation proceeds, to remove foreign matter within forms.
- B.** Clean formed 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.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.
- E. All formwork should be free and clear of concrete overspills. All bucks and openings should be clean and bracing removed after concrete cures as per engineers specifications. All floors should be scrapped and cleaned of concrete spills.
- F. Clean up and dispose of all debris on the job site related to the installation of the BuildBlock Insulating Concrete Forms.

END OF SECTION