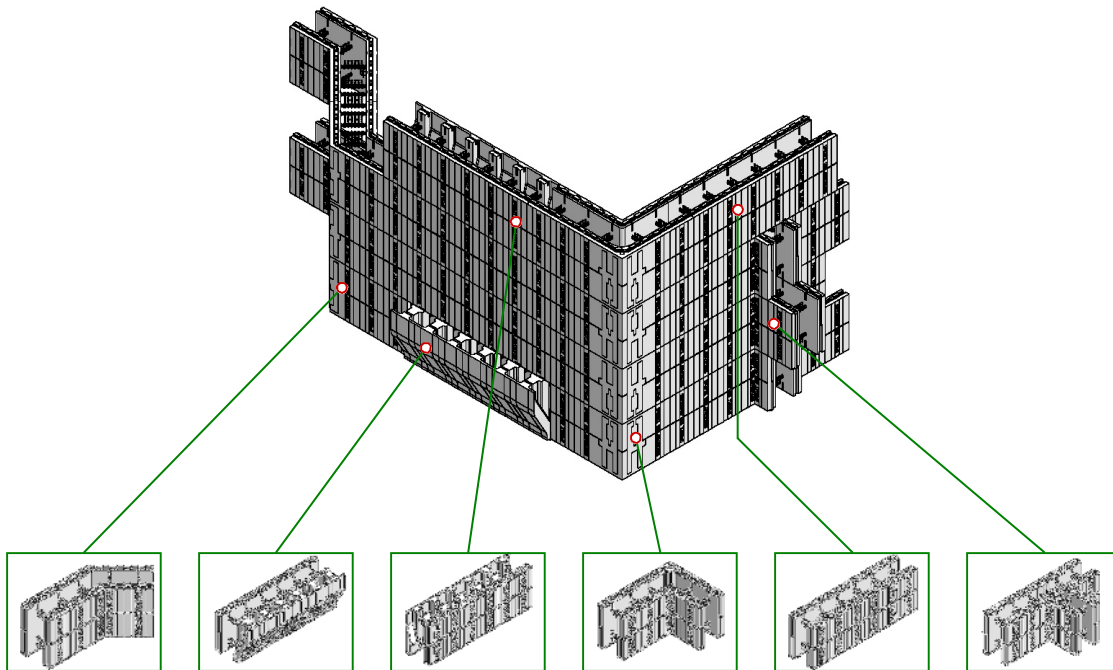




Insulating Concrete Form Wall System

Clever Installation Guide



The following guide is a condensed version of the **Fox Blocks** Product Installation Manual. It is a useful tool to take with you to the jobsite as a reminder of the various steps that are involved in **Fox Blocks** construction. With the correct knowledge, tools and materials, your **Fox Blocks** project will become a more comfortable, energy efficient and stronger sustainable structure.

For tips, techniques, frequently asked questions and a more detailed installation manual, please visit our website for a complete download at www.foxblocks.com.

All **Fox Blocks** forms are designed with a pre-formed interlocking system that holds the courses of block securely together and are reversible. This prevents movement of the forms during concrete placement and concrete leakage during a pour.

The **Fox Blocks** ICF Wall System product line consists of the Straight, 90°, 45° forms in the 4", 6" and 8" core sizes; the Corbel Ledge, Taper Top and T-Block forms in the 6" and 8" sizes and the 4" height adjuster.

To ensure the success of your ICF installation, **Fox Blocks** offers a local and corporate Training Program which covers the basics of ICF construction from footing to roof connections, consolidation, proper rebar placement and much more. Classroom presentations, site visits, and discussions, as well as hands on wall building make this an exciting event and a true value.

Fox Blocks reserves the right to make improvements and changes to the information in this and any other published materials. The current version of Fox Blocks' Product Installation Manual and technical materials are available on the Fox Blocks website www.foxblocks.com or by calling Fox Blocks at 1-877-369-2562.

Fox Blocks has no control over conditions and use of application, installation, accessory materials or systems, and workmanship during the construction of Fox Blocks walls. Fox Blocks assumes no responsibility expressed or implied, except as stated at the Fox Blocks website - www.foxblocks.com.

© Copywrite by Fox™ Blocks 2010

Pre-pour Inspection Checklist



1. Are the walls straight, plumb, level and square?
2. Are alignment and scaffold systems installed properly?
3. Is reinforcing steel placed in accordance with the plans and specifications, including window and door opening lintel rebar/stirrups?
4. Are window and door openings located correctly, cross-braced sufficiently, plumb and square, treated lumber or PVC buck opening material installed securely and the sill buck opening material removable to pour/consolidate the concrete?
5. Have all penetrations (electric, plumbing, HVAC, dryer vents, etc.) been accommodated?
6. Is the concrete ordered acceptable for the method of placement per the plans, specifications, engineering or code requirements? See **Recommended Concrete Mix and Concrete Volume** on Page 3.
7. Check all block cuts to make sure there are no connections where concrete might push out. Use steel tie wire or plastic zip ties to fasten cut blocks together. Apply spray foam adhesive to block joints greater than 1/8" to secure the wall construction and reduce concrete leakage during the pour. Have cordless drill & bits, scrap lumber, fastener screws and bracing ready for use, if needed.
8. Have adequate labor available for the concrete placement to pour/consolidate the concrete by internal vibration, anchor bolt and tie-down strap installation and clean up. Before concrete is placed using a pump truck, check for any overhead obstructions.

How to Estimate Quantities of Fox Blocks Needed

1. Determine number of courses required for wall height:
2. _____ # **90° Corner Forms Needed** = _____ # Courses X _____ # 90° Corner Forms
3. _____ # **45° Angle Forms Needed** = _____ # Courses X _____ # 45° Angle Forms
4. _____ # **T-Block Forms Needed** = _____ # Courses X _____ # T-Block form locations
5. _____ sf 90° Corner Forms (from table below) x Step 2
 + _____ sf 45° Angle Forms (from table below) x Step 3
 + _____ sf T-Block Forms (from table below) x Step 4
 = _____ sf Subtotal
6. _____ sf Total of Wall Area (W x H) less 80% of window and door opening square footage total
 - _____ sf Subtotal from Step 5
 - _____ sf Subtotal needed for straight forms / 5.33 sf
 = _____ # **Straight Forms Needed** Note: Add 1% - 5% to Steps 2, 3, 4, & 6 above for possible waste, depending on the construction design and installation difficulty
7. _____ **Total cu. yd. concrete needed** (cu. yd. of each block shape from table below, then add 1.5 cu. yd. for waste and pump)



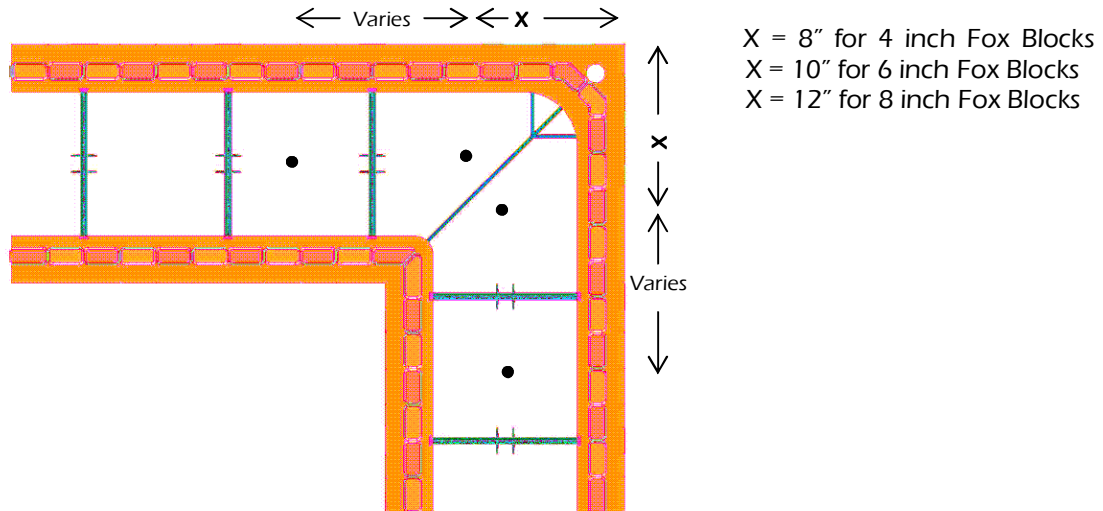
Recommended Concrete Volume

Block Type	Square Feet per Block			Concrete Volume per Block (cu. yd.)			Estimated Blocks per Cu. Yd. of Concrete		
	4"	6"	8"	4"	6"	8"	4"	6"	8"
Straight	5.33	5.33	5.33	.066	.099	.132	15	10	8
90° Corner	6.67	7.11	7.56	.070	.105	.145	14	9	7
45° Angle	5.78	4.89	5.33	.066	.082	.117	15	12	9
Taper Top	N/A	5.33	5.33	N/A	.111	.144	N/A	9	7
Corbel Ledge	N/A	5.33	5.33	N/A	.129	.162	N/A	8	6
T-Block (Avg.)*	N/A	4.89	4.89	N/A	.113*	.146*	N/A	9.5	7.5

Step 1 Footing or Slab Foundation

- 1.1 Layout and excavate the building perimeter. Establish wall locations and then install the footing foundation formwork using surveying equipment. Footing or slab foundation must be level for best results (within 1/4" in all directions).
- 1.2 Size, install and secure the horizontal and vertical rebar/dowel bars per the plans, specifications and/or local building code requirements. The vertical dowel bar spacing is critical to prevent dowels from interfering with the plastic webs during course placement of Fox Blocks. See **Diagram A** for the dowel bar placement and spacing beginning at the corner locations of the footing or slab, which varies for the 4", 6" or 8" corner forms. A keyway may be formed in the top center of the footing as well as the reinforcing dowels bars to enhance the structural design.
- 1.3 Where a step footing is required, we recommend that the step be set at 16" increments to align with courses. If an 8" step footing is required, blocks may be cut in half horizontally and must be braced securely with formwork to prevent failure during the concrete pour.
- 1.4 When placing the concrete into the footing or slab formwork, do not disrupt the existing formwork or rebar. Use internal vibration equipment to consolidate the concrete during placement per the ACI 309/318 specifications.

Diagram A



Note: Optimum location of steel dowels is centered between webs. The successive dowel bar spacing will vary depending on the plan, specifications and engineered design for each project.

Step 2 First Course Placement

2.1 Prior to setting forms, determine the exact wall height required for the project. If the required wall height is not divisible by 16", then one or two courses may need to be cut horizontally. When determining the cut, care should be taken to preserve all cross members.

2.2 Establish and layout Fox Blocks wall locations on footing or slab with a permanent marking/line. (See Photo #1). This will include labeling or marking the location of door and window openings (including dimensions).



Photo #1

2.3 Set corner forms level and plumb on the layout chalk line. Set straight forms beginning from corners and moving toward center of wall. Run the first course of corners with long side in same direction. Reverse every other course in the opposite direction. This offsets courses and makes a 16" overlap for the 4" Fox Blocks corner forms and an 8" overlap for the 6" and 8" Fox Blocks corner forms.

2.4 This first course of forms can be attached to the footing by either gluing the forms to the concrete with a spray expansion foam adhesive to ensure the forms will not move while placing the concrete, or by mechanically fastening the form to 2x4 formwork, or by mechanically fastening a light gauge metal guide to the concrete to hold the Fox Blocks forms in place.



Photo #2

2.5 On the first course, use plastic zip ties on the webs to connect the form ends and pull them tightly together. (See Photo #2) Then, place the horizontal rebar in the supports at the top of the internal webs within the block cavity. The supports hold the rebar securely and eliminate the need for excessive wire tying. Repeat this step for each course of block per engineering requirements or design. (See Step 5, Reinforcing Steel, for more information.)

2.6 Cut blocks on vertical lines (center between two interlocks) in a manner that will not jeopardize the functioning interlock of each form. If it is not possible to adjust wall dimensions, a "stacked joint" or "common seam" will be created which should be placed under a window or at center of door to minimize its effect. If possible, keep this cut four to six feet from a corner. Install the first course completely and compare the layout to the plans for accuracy.

Step 3 Second & Third Course Placement

- 3.1 Install the second course of forms by reversing the corner block forms so that they are offset from the first, in a running bond pattern. At this point check for level across all of the forms. If the courses are not level, use shims or trim the block as required on both sides of the form. It is recommended to use plastic zip ties around the webs to secure the first and second courses together. Install the third course of forms by reversing the corner block forms so that they are offset from the second course.
- 3.2 Once the third course is in place, start the wall bracing installation. (See Photo #3), Careful consideration should be taken for window layouts which start at the second or third course. (See Step 7, Wall Bracing for more information).



Photo #3

Step 4 Door & Window Openings

- 4.1 Install pre-assembled window and door frames (bucks) at each location where an opening is required as previously labeled or marked on the slab of footing; cut and fit Fox Blocks around them and temporarily brace, plumb, and level. (See Photo #4) Bucks are used to hold back the concrete and stay in place permanently providing a fastening surface for the installation of windows and doors. Treated lumber or vinyl bucks may be used.
- 4.2 The door and window rough openings are typically located on the plan drawings. If available, use the actual rough opening dimensions from the door and window manufacturer instead.



Photo #4

Step 5 Reinforcing Steel

5.1 Please refer to ACI 318, Building Code Requirements for Structural Concrete and Commentary, which covers the design and construction of buildings and non-building structures.

5.2 Snap horizontal rebar into the locking web supports of the first course, alternating at each course, left and right of center.

5.3 Continue to stagger in this manner on all successive courses. By staggering horizontal rebar, it will hold the vertical bar, once placed, between the horizontal bars. Overlap all horizontal and vertical rebar ends at 40 times the bar diameter or per plans, specifications or the engineering design.

5.4 Create 2" tall rebar sleeves out of 1 1/2" PVC pipe with a skill saw. Before stacking the second course, place sleeves over vertical dowels protruding from footing or slab. *Note: Some code inspectors do not allow these sleeves, so check local building codes before using.* (See Photo #5)



Photo #5

5.5 "Dur-o-Wal" truss reinforcing wire may be used in the Fox Blocks wall installation at the mid-span height and at the top of the wall to enhance the straightness of the wall assembly. (See Photo #6)

5.6 Once the entire wall is stacked, thread vertical rebar between horizontal rebar and place end into PVC sleeves located 12" above the footing. Tie vertical rebar to horizontal rebar with steel wire or plastic zip ties. Vertical rebar must be 1" - 1 1/2" shorter than the top of the wall. This rebar can be preordered to length or field cut.



Photo #6

5.7 Refer to engineering specifications for all window and door header/lintel rebar placement, placement of vertical rebar on both sides of the jamb opening, and stirrup requirements.

5.8 Rebar placement at 45° angle and 90° corner locations should be bent and continuous to help reinforce the Fox Blocks wall during concrete placement.

Step 6 Successive Courses

- 6.1 Install following courses of forms by continuing to overlap the courses so that all joints are locked both above and below by overlapping forms. Gluing courses together at the horizontal joints is not necessary unless the cutting of blocks or construction of the wall makes it necessary.
- 6.2 The odd numbered courses and even numbered courses should follow the same installation pattern.
- 6.3 Adhere the top course of forms to the course below it and tie the webs to connect the form ends together. **(See Photo #7)**. Remove the unused end of the zip tie before concrete placement.
- 6.4 Identify all building service penetrations and install appropriate size pipes, vents, outlets, fixtures or utility lines.
- 6.5 Once wall is completely stacked, **(See Photo #8)** install a string line at the outside top edge of the desired wall height and trim top of wall until level. This string line is a guide for the contractor to perform the final alignment to ensure the wall is straight from corner to corner before and after the concrete pour is complete. **(See Step 8, Concrete Placement, for more information)**.



Photo #7



Photo #8

Step 7 Wall Bracing

7.1 Install alignment bracing around the entire wall of the structure to ensure that the walls are straight and plumb, and to enable alignment adjustment before and during the pour to maintain the walls plumb. (See Photo #9).

7.2 Install wall alignment bracing in the following manner after the third course is completed:

- a. **Regular Corners:** Start 4 inches from the open end of the 6" & 8" Fox Blocks corner form and starting 8 inches from the open end of the 4" Fox Block corner form. This prevents bracing from interfering with each other (see Diagram B) and the corner form ends from spreading apart from the attached straight forms.
- b. **Inverse Corners:** Start 4 inches from the inverse corners (see Diagram B). Attach bracing to the specially molded internal Fox Blocks' corner bracket tie. A special corner brace assembly (A) can also be used by the installer if available and as determined necessary.

7.3 Thereafter, it is recommended to place a bracing unit every 6 feet. This distance may be increased if "Dur-o-Wal" truss reinforcing wire is used in the wall at mid-span and at the top of the wall to enhance the straightness of the Fox Blocks wall assembly.

7.4 At every course, fasten a bracing strong back vertical member to the Fox Blocks wall with a minimum of one #10 x 2" fastening screw. The strong back brace should have a one inch long vertical slot for screw attachments. Place screws at top of the vertical slots. To prevent bowing from wall compression, do not over tighten screws when attaching bracing.

7.5 Proper installation of bracing system is critical to wall alignment as well as crew safety. Please contact Fox Blocks for support at **1-877-369-2562** if needed.

Diagram B

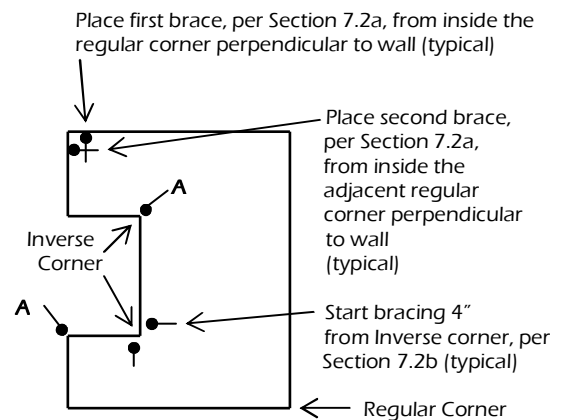


Photo #9

Step 8 Concrete Placement

- 8.1 Use **Pre-Pour Inspection Checklist** on page 2.
- 8.2 Order/use proper concrete mix (see **Recommended Concrete Mix** on page 11).
- 8.3 When ordering pump truck, state the time when the truck is to be at the jobsite. The pump truck should arrive 30-60 minutes prior to arrival of the concrete truck to allow adequate time for a safe set-up procedure. **(See Photo #10)**. Check that the pump operator has an "S" bend, ram's horn, or reducer before end of hose. If possible, final size of hose should be reduced to 3 inches.
- 8.4 Slump testing may be necessary to perform per plans, specifications or engineering design.
- 8.5 Layout and install all anchor bolt or ledger connector systems (i.e. Simpson Strong-Tie) prior to concrete placement to allow framers to use joist hangers to support intermediate floors and external decks.
- 8.6 Tape or protect the interlocking connectors at the top of the wall prior to the concrete placement to keep clean in preparation of stacking the Fox Blocks forms on additional floor levels.
- 8.7 Fill the sill bases first at the window and door buck locations. **(See Photo #11)**.
- 8.8 Begin pouring 4' to 5' from a corner; direct concrete flow away from the corner, then move along the wall.
- 8.9 As the pour continues, fill any opening or pipe sleeve entirely and consolidate the concrete mix design by vibrating.
- 8.10 Proper jobsite consolidation of concrete can be accomplished by a combination of both internal vibration or external vibration (1" pencil vibrator recommended) of all walls, See ACI 309, Methods of Consolidation. Consolidate concrete at all window and door bucks completely with external tapping, especially at the top corners of bucks plus internal vibrating of all walls.



Photo #10



Photo #11

Step 8 Concrete Placement (cont.)

- 8.11 Concrete should be placed with a constant, moderate and steady flow, using two or three lifts (layers) for pour heights of eight to ten feet. Do this in lifts (layers) approximately 3-4 feet at a time. (See Photo #12).
- 8.12 Final alignment of each wall must be performed before the concrete has set. Re-check each bracing unit for plumb and string line wall for straightness.
- 8.13 Before finishing concrete at the top of the wall, manually remove the raised foam interlocking connectors and use them to plug the recessed cavities to provide a flat surface to finish the top of the wall. After finishing concrete top, "wet set" anchor bolts or plate straps into the new concrete. These bolts or straps will be used later to install the top plate for the installation of the roof rafters. (See Photo #13).
- 8.14 All walls, bucks, and floors should be brushed and swept clean before concrete hardens. Re-check alignment for plumb before leaving the jobsite.



Photo #12



Photo #13

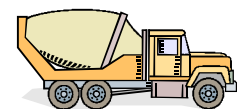
Note: Do not remove vertical bracing on walls for at least 72-96 hours depending on the temperature. All concrete exposed to weather 40° or less needs to be covered with thermal protection. See ACI 306. Vertical window and door header bracing should remain for a minimum of 7 days. Refer to ACI 318 for additional information.

Step 9 Fox Blocks Wall Completion

Remove the bracing after the concrete has cured, then proceed with further stages of construction, which will include waterproofing for below grade structures, floor and roof system installation, soil back-filling and interior/exterior wall finishes.

Recommended Concrete Mix

- Minimum concrete compressive strength: Footings - 2,500 psi & Walls - 3,000 psi
- Slump: 4" ICF - 6"-7", 6" ICF - 5.5"-6.5", 8" ICF - 5"-6"
- Aggregate: 4" ICF - 3/8" max., 6" ICF - 3/8"-1/2" max., 8" ICF - 1/2"-3/4" max.



Recommended Tools List



* For Wall Installation:

- * Scaffold planks
- * Framing Square
- * Plumb bob
- * Hammer drill
- * Level (2' & 6')
- * Chalk line & chalk (refill)
- * Rebar bender & cutter
- * Laser level, water level, or transit
- * Cordless drill with appropriate driver bits
- * Mason's line (enough to circle the structure)
- * 1/2" x 2' - 3' long steel stakes to anchor alignment braces
- * Sun protective gear for each crew member
- * Skill saw
- * Table saw
- * Cross-cut saw
- * Keyhole saw
- * Pruning saw
- * Foam gun
- * Heavy duty 25' tape measure
- * Wall alignment & bracing system
- * Permanent Marker

* For Concrete Pour Day:

- * Safety glasses
- * Concrete finishing tools
- * Rubber gloves for all work crew
- * Concrete vibrator, 1" maximum head—10-14' shaft & extension cords (if needed)
- * Hard hats
- * Flat shovels
- * Concrete hand trowels

* For Utilities Installation After Concrete Pour:

- * Hot knife (for cutouts)
- * Cordless chain saw or electric skill saw (for cutting channels)
- * Foam gun

Recommended Materials List



- * Reinforcing steel, as required, including stirrups, steel wire ties, or plastic zip ties
- * Screws (to attach alignment bracing to Fox Blocks); 1 5/8" and 2 1/2" #10 coarse thread
- * Anchor bolts, plate straps, nuts, and washers or Simpson ICFVL ledger connectors
- * Concrete screws; 1 1/2" to 1 3/4" to attach the alignment brace anchors into the concrete slab
- * Material for rough openings (i.e. 2x12, 2x4, & 2x2 treated lumber or plywood) for fabricating wood bucks, anchors (e.g. spikes, anchor bolts or nails) or V-Buck (PVC)
- * PVC sleeves for mechanical, electrical, or for reinforcing dowels
- * 1/2" - 5/8" OSB or plywood to bridge and secure cut joints or block-outs for anchor bolts
- * EPS controlled expansion foam adhesive as recommended by Fox Blocks
- * Sheet or liquid waterproofing membrane system and dimple drain board protection
- * 3" wide duct tape or clear pressure sensitive tape
- * Shims

Fox Blocks Building Code Approvals, Evaluations and Certifications

- * ICC ES **ESR-2270**, the ICC report complies with the provisions of the UBC, BNBC and SBC Model Building Code, in addition to the 2006 International Residential Code (IRC) and the 2006 International Building Code (IBC).
- * Florida Product Approval - **FL7497**
- * Intertek Testing Services, Warnock Hersey Certification in United States and Canada
- * **ASTM E119, UL 723 and E84** * City of Los Angeles - **RR25689**
- * Miami-Dade County, FL - **NOA - 07-0919.10**
- * Wisconsin Evaluation #**2007181**

Edition 3 March 2010