

# **Section 4**

## **Installation**

- 4.1 Estimating for Fox Block ICF Products
- 4.2 Clever Installation Guide
- 4.3 Step-by-Step Installation Guide
- 4.4 Man Hour Rates
- 4.5 Check Lists



## Section 4 - Installation

### 4.1 Estimating for Fox Block ICF Products

Fox Blocks offers 3 methods to calculate the block for your project:

- 1) Use the basic math below to quickly calculate your estimate.
- 2) You can go to the website [www.foxblocks.com](http://www.foxblocks.com) and use the Project Estimator.
- 3) You can go to the website [www.foxblocks.com](http://www.foxblocks.com) and download the stand alone Project Estimator which includes most aspects of an ICF build.

Estimating Basic Quantities of Fox Block for your project using basic math:

#### Step One - Collect data:

Size of block needed (4", 6", 8", 10" or 12") = A

Add up the total linear footage of the job = B

The number of courses (rows) required:

(Wall height in inches / 16" or use chart) = C

Number of 90° turns for job = D

Inside 90° turns = E Outside 90° turns = F

Number of turns for job other than 90 = G

Number of T-Block locations = H

Square footage of openings = I

#### Step Two - Calculate block requirements:

90° block needed: D x C (Total number of 90° turns times the number of rows high)

45° block needed: G x C (Total number of 45° turns times the number of rows high)

T Block needed: H x C (Total number of T Block locations times the number of rows high)

Straight Block needed: (Use chart and calculations below)

Fox 90° Corner Size Chart		
Block Size	Length in feet	
	Inside	Outside
4"	① = 3.5	② = 5.0
6"	① = 3.5	② = 5.3
8"	① = 3.6	② = 5.6
10"	① = 3.6	② = 5.6
12"	① = 3.7	② = 6.3

Fox 45° Corner Size Chart		
Block Size	Length in feet	
	Inside	Outside
4"	③ = 3.5	③ = 3.5
6"	③ = 3.5	③ = 3.5
8"	③ = 3.5	③ = 3.5
10"	③ = 0.0	③ = 0.0
12"	③ = 0.0	③ = 0.0

T-Block Size Chart		
Block Size	Length in feet	
	Inside	Outside
4"	—	④ = 0.0
6"	—	④ = 3.5
8"	—	④ = 3.5
10"	—	④ = 0.0
12"	—	④ = 0.0

(E x ①) + (F x ②) + (G x ③) + (H x ④) = J (Linear feet of wall taken up by corners and T Block)

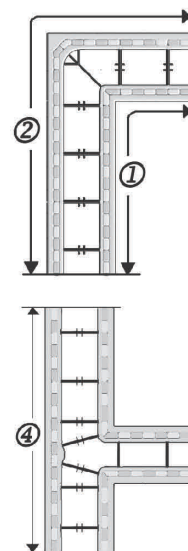
B - J = K (Total linear feet of wall taken up by straight block)

I / 5.33 = L (Number of block taken up by openings. 5.33 is sq. ft. per block)

(K x C) - L = Total Straight block needed for job not including waste factor. (Add 3% for waste)

See other side of page for more calculations.

Wall Height options:					
ACTUAL	DECIMAL	INCHES	ROWS	4" ext	Half Block
2'-8"	2.67	32	2	0	0
3'-4"	3.00	36	2	1	0
4'-0"	4.00	48	3	0	0
4'-4"	4.33	52	3	1	0
5'-4"	5.33	64	4	0	0
5'-8"	5.67	68	4	1	0
6'-8"	6.67	80	5	0	0
7'-0"	7.00	84	5	1	0
7'-4"	6.67	80	5	0	1
8'-0"	8.00	96	6	0	0
8'-4"	8.33	100	6	1	0
8'-8"	8.00	96	6	0	1
9'-4"	9.333	112	7	0	0
9'-8"	9.667	116	7	1	0
10'-0"	9.333	112	7	0	1
10'-4"	9.667	116	7	1	1
10'-8"	10.667	128	8	0	0
11'-0"	11.000	132	8	1	0
11'-4"	10.667	128	8	0	1
11'-8"	11.000	132	8	1	1
12'-0"	12.000	144	9	0	0
12'-4"	12.333	148	9	1	0
12'-8"	12.000	144	9	0	1
13'-0"	12.333	148	9	1	1
13'-4"	13.333	160	10	0	0
13'-8"	13.667	164	10	1	0
14'-0"	13.333	160	10	0	1
14'-4"	13.667	164	10	1	1
14'-8"	14.667	176	11	0	0



### Step Three - Other types of block:

Taper Block needed (only available in 6" & 8"):

Linear feet of taper block need / 4 (4 = length of one corbel block)

Remove this number from the straight block count

Corbel Block needed (only available in 6" & 8"):

Linear feet of corbel block need / 4 (4 = length of one corbel block)

Remove this number from the straight block count

Radius block needed (only available in 6"):

Linear feet of radius block need / 1.33 (1.33 = length of one corbel block)

Remove one straight block for every three radius block needed

### Step Four - Calculate concrete:

Fox blocks volume is exactly 4", 6", 8", 10" or 12" so calculate as you would other regular concrete formwork.

The following chart will give volumes per block:

Concrete Volumes											
Cubic Yards						Cubic Meters					
Block Type	Size					Block Type	Size				
	4"	6"	8"	10"	12"		4"	6"	8"	10"	12"
Straight	0.066	0.099	0.132	0.165	0.198	Straight	0.05	0.076	0.101	0.126	0.151
90 corner	0.07	0.105	0.145	0.181	0.212	90 corner	0.054	0.08	0.111	0.138	0.162
45 corner	0.066	0.082	0.117	NA	NA	45 corner	0.05	0.063	0.089	NA	NA
Corbel Block	NA	0.129	0.162	NA	NA	Corbel Block	NA	0.099	0.124	NA	NA
Taper Block	NA	0.111	0.144	NA	NA	Taper Block	NA	0.085	0.11	NA	NA
T Block short	NA	0.105	0.141	NA	NA	T Block short	NA	0.08	0.108	NA	NA
T Block long	NA	0.121	0.152	NA	NA	T Block long	NA	0.093	0.116	NA	NA
Radius Block	NA	0.033	NA	NA	NA	Radius Block	NA	0.025	NA	NA	NA

### Step Five - Misc:

Bracing: Linear feet of wall / 6'

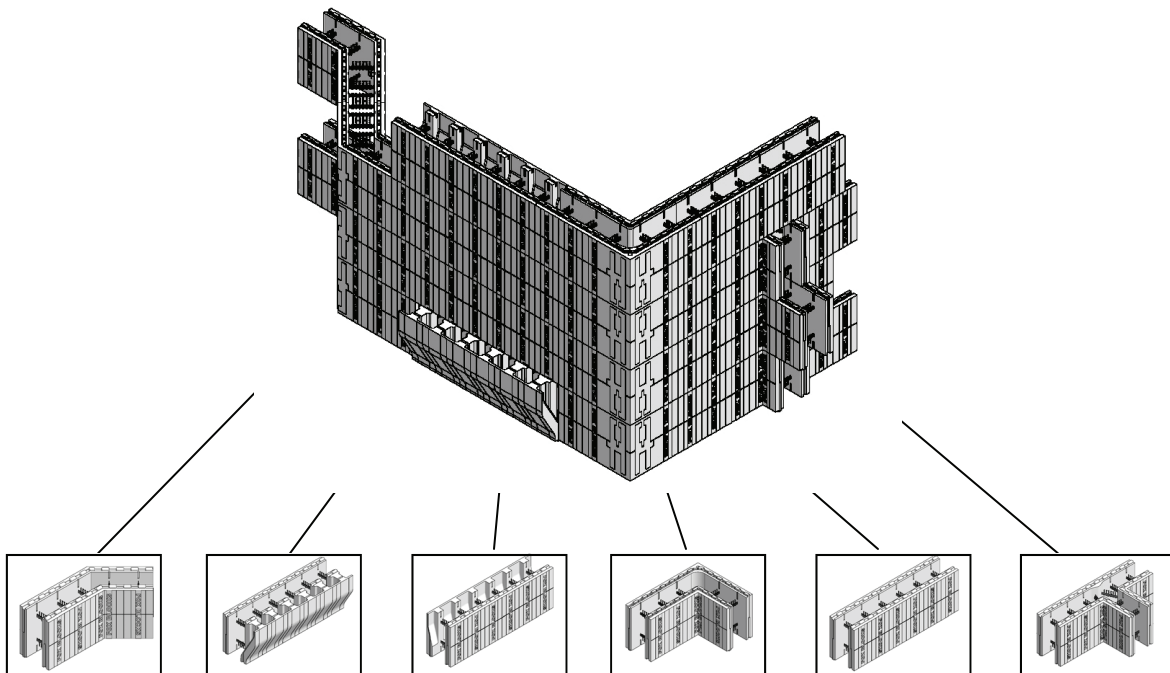
Opening Buck materials: Choose your buck material and follow manufacturers estimating technique

Rebar: (# of rows needed x Linear feet of wall) + (Linear feet of wall / spacing needed)





## Clever Installation Guide



The following guide is a condensed version of the **Fox Block** 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 Block** construction. With the correct knowledge, tools and materials, your **Fox Block** 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](http://www.foxblocks.com).





All **Fox Block** 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 during a pour.

The **Fox Block** ICF Wall System product line consists of the Straight and 90° forms in the 4", 6", 8", 10" and 12" core sizes; 45° Angle forms in the 4", 6", and 8" core sizes, the Corbel Ledge, Taper Top and T-Block forms in the 6" and 8" sizes, the Radius form (5', 6', 7', 8', 9' and 10" radii) in the 6" core size, and the 4" height adjuster.

To ensure the success of your ICF installation, **Fox Block** 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 these exciting events having true value.

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

*Fox Block has no control over conditions and use of application, installation, accessory materials or systems, and workmanship during the construction of Fox Block walls. Fox Block assumes no responsibility expressed or implied, except as stated at the Fox Block website -[www.foxblocks.com](http://www.foxblocks.com).*

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## 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 place/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 Fox Block HV Clips 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 and consolidation 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

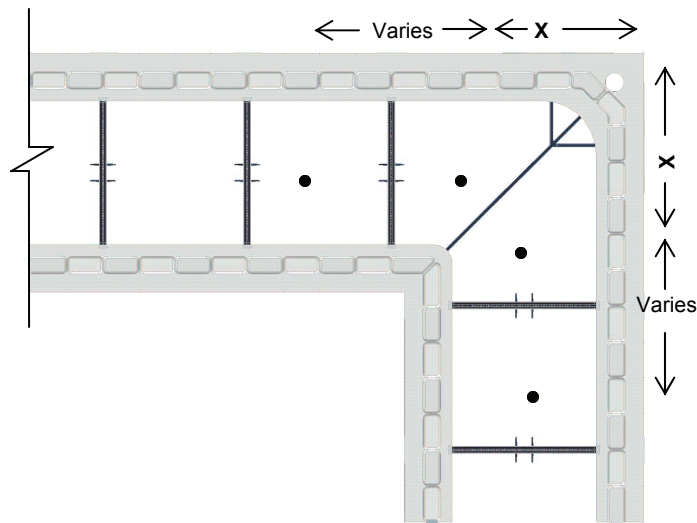


# Step 1 Footing or Slab Foundation

- 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 ties during course placement of Fox Block.  
  
**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", 8" or 12" corner forms.
- 1.3 Where a step footing is required, we recommend that the step be set at 16" increments to align with courses.
- 1.4 When placing the concrete into the footing or slab formwork, do not disrupt the existing form work or rebar. Use internal vibration equipment to consolidate the concrete during placement per the ACI 309/318 specifications.



**Diagram A**



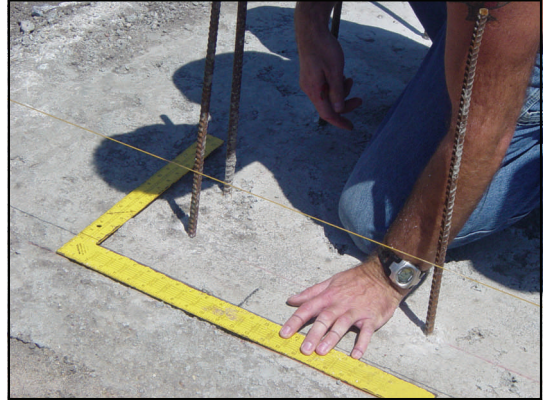
- X = 8" for 4 inch Fox Block
- X = 10" for 6 inch Fox Block
- X = 12" for 8 inch Fox Block
- X = 14" for 10 inch Fox Block
- X = 16" for 12 inch Fox Block

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 Block 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).
- 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", 6", 8", 10' and 12" Fox Block corner forms.
- 2.4 On the first course, use HV Clips on the ties 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.)**
- 2.5 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.



**Photo #1**



**Photo #2**



# 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**

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# 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. EPS, 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 tie 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. **(See Photo #5)**
- 5.4 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.
- 5.5 Rebar placement at 45° angle and 90° corner locations should be bent and continuous to help reinforce the Fox Block wall during concrete placement.

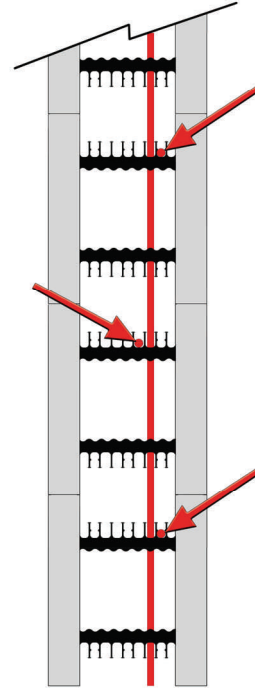


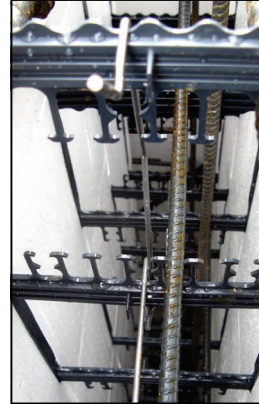
Photo #5





# 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 Secure top course of block to course below using Fox Block HV Clips. (**See Photo #6**). Clip the second tie from each side of every joint which will give you a 24" o/c pattern.
- 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 #7**) 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 #6**



**Photo #7**

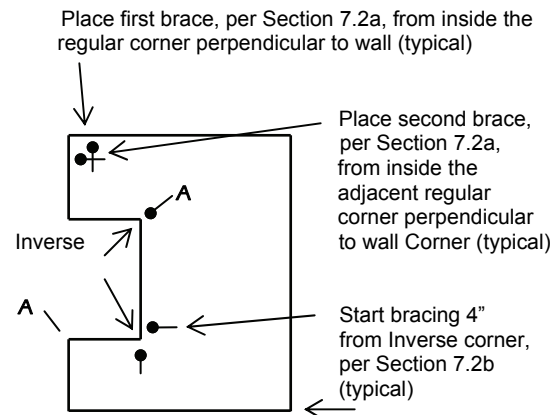




# Step 7 Wall Bracing

- 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 #8).
- 7.2 Install wall alignment bracing in the following manner after the third course is completed:
- Regular Corners:** Start 8 inches from the open end of the 4", 6", 8", 10" and 12" 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.
  - Inverse Corners:** Start 4 inches from the inverse corners (see Diagram B). Attach bracing to the specially molded internal Fox Block' 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.
- 7.4 At every course, fasten a bracing strong back vertical member to the Fox Block 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. 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 Block for support at **1-877-369-2562** if needed.

**Diagram B**



**Photo #8**



# Step 8 Concrete Placement

- 8.1 Use **Pre-Placement Inspection Checklist** on page 2.
- 8.2 Order/use proper concrete mix (see **Specified 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 #9)**. Check that the pump operator has a reducer before end of hose. If possible, final size of hose should be reduced to 3 to 3 1/2 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 #10)**.
- 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 #9**



**Photo #10**



# 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 three to four feet at a time. **(See Photo #11).**
- 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 inter locking 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 #12).**
- 8.14 All walls, bucks, and floors should be brushed and swept clean before concrete hardens. Recheck alignment for plumb before leaving the jobsite.

**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.



Photo #11



Photo #12

# Step 9 Fox Block 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 backfilling and interior/exterior wall finishes.

## Recommended Concrete Mix

- per Plan and Specifications
- Slump: 4" ICF - 6"-7", 6" ICF - 5.5"-6.5", 8" ICF - 5"-6", 12" ICF - 5"-6"
- Aggregate: 4" ICF - 3/8" max., 6" ICF - 3/8"-1/2" max., 8" ICF - 1/2"-3/4" max., 12" 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

## Recommended Materials List

- Reinforcing steel, as required, including stirrups, HV clips, or plastic zip ties
- Screws (to attach alignment bracing to Fox Block); 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 Block
- Sheet or liquid waterproofing membrane system and dimple drain board protection
- 3" wide duct tape or clear pressure sensitive tape
- Shims
- Fox Block HV Clips



## Fox Block Building Code Approvals, Evaluations and Certifications

- ICC ES **ESR-2270**, the ICC report complies with the provisions of the 2006 International Residential Code (IRC), the 2006 International Building Code (IBC), the 2009 IRC and 209 IBC
- Florida Product Approval - **FL7497**
- Intertek Testing Services, Warnock Hersey Certification in United States and Canada
- **ASTM E119, UL 723 and E84**
- Miami-Dade County, FL - **NOA - 07-0919.10**
- Wisconsin Evaluation **#2007181**
- CCMC **13472-R**
- City of Los Angeles - **RR25689**

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## **4.3 Step-by Step Installation Guide**

### Fox Block Insulating Concrete Forms

#### Step-by-step Installation Guide

- 4.3.1 Planning and Preparation to Build
- 4.3.2 Tools and Materials List
- 4.3.3 Handling and Storage of Fox Block ICF on Jobsites
- 4.3.4 Footings, slabs and Grade Beams
- 4.3.5 Fox Block First Course Wall Layout
- 4.3.6 Placement of Second Fox Block Course
- 4.3.7 Placement of Third and Higher Courses of Fox Block
- 4.3.8 ICF Wall Bracing, Alignment & Scaffolding Systems
- 4.3.9 Door and Window Openings
- 4.3.10 Steel Reinforcement and Placement
- 4.3.11 Utility Service Penetrations
- 4.3.12 Gable End Walls
- 4.3.13 End Walls
- 4.3.14 Radius Walls
- 4.3.15 Beam Pockets
- 4.3.16 Floor Connections
- 4.3.17 Roof Connections
- 4.3.18 Additional Form Support
- 4.3.19 Concrete Placement
- 4.3.20 Electrical
- 4.3.21 Plumbing
- 4.3.22 Air and Vapor Barriers
- 4.3.23 Interior Finish
- 4.3.24 Exterior Finishes
- 4.3.25 Waterproofing / Dampproofing/ Termite Protection
- 4.3.26 Exterior Transition area at Grade Level
- 4.3.27 HVAC and indoor Air Quality
- 4.3.28 Man Hour Rates
- 4.3.29 Check Lists





### **4.3.1 Planning and Preparation to Build**

Plan the job from the start for a fast profitable build. A well planned project will work much more smoothly and save you, the contractor, from unnecessary additional costs.

Have the materials and tools at the site. Have adequate bracing to do the project. Plan good access for the concrete pump and ready-mix trucks. See Appendix A for Safety Guidelines associated with concrete placement using a concrete pump and ready-mix trucks. Check and align the walls prior to placing the concrete. Align and plumb the walls again just after the pour.

Information needed before the start of construction to plan the build:

- Building plans.
- Rebar specification for the walls, the lintels and around openings.
- Specification for the concrete.
- Rough stud opening measurement requirements for the window and door openings.
- Anchor bolt specification and on-center spacing (in hurricane prone areas, high wind areas, and regions having a high seismic design category, there may be additional requirements to connect the floors and roofs to the walls).

The key planning steps are:

- Plan for job safety.
- Complete an accurate takeoff and order sufficient Fox Block.
- Draw a wall cross-section elevation view in advance and determine where the coursing will be, the window openings, lintels and the top of the wall. This exercise will assist in planning the build.
- Place footings level to + or – ¼ inch.
- Plan to have the necessary tools at the site.
- Plan to have adequate crew.
- Designate a space on site for the storage of the Fox Block forms. Frequently it is near the center of the building being constructed where access will be easy during the construction of the walls.
- Mark out the wall on the footing or slab and then mark where doors, windows, utility services, etc will go. This will enable you to easily visualize the layout, identify potential difficulties and prompt you to plan how address these items.
- Schedule the pour so you have adequate time to inspect the Fox Block walls with the forms empty and confirm they are ready and all the bracing and support is in place for the concrete.
- Prior to the placement, walk through the site and complete a checklist to confirm the walls are ready for the concrete. See the check list in Section 4.3.19
- Order the concrete pump to come ½ hour before the concrete so it has adequate time to set up.
- Request the concrete pumper bring a double 90 degree or reducer to 3" and a short length of 3" flexible hose, to be added on the end of the pipe to slow the velocity of the concrete during placement.
- Plan to have a vibrator on site (recommended 1 Horsepower with a head 1 inch or less in diameter), confirm power source and have adequate extension cords.





- Ensure there is adequate access for the concrete pump truck and ready-mix trucks and make sure there is a location for the ready-mix trucks and the concrete pump truck to clean out
- Remember to re-plumb and check the alignment of the wall immediately after the pour is complete
- Do not backfill against the ICF foundation walls until the floor system has been installed or adequate lateral support has been provided. The temporary bracing and alignment systems designed to brace and align the walls during stacking of the Fox Block ICFs and placement of concrete are not designed to provide adequate lateral support to resist the forces imposed by the backfilled soil.

#### **4.3.2 Tool and Materials List**

In addition to the usual tools a contractor would have, the following is a list of tools recommended to have on site while assembling Fox Block walls. Having these items on the project site will facilitate an easier build:

- Wall bracing and alignment system including:
  - Screws to secure the strong backs (a.k.a uprights) to the Fox Block ICFs.
  - Fasteners to anchor system to substrate.
  - Scaffold planks and other lumber if required for guard rails, mid rails, toe boards and bearing planks.
  - Fasteners to secure scaffold planks and guard rails in place, if required.
- String line or chalk line.
- Fox Block HV Clips.
- Rebar bender/cutter.
- Rebar ties.
- Foam gun and refills.
- Pruning saw & key hole saw.
- Construction laser level.
- Mason's level.
- Fiber tape.
- Waterproof makers.
- Cordless drill.
- Step stools and step ladders.

Additional items recommended to have on site at the time of the concrete pour:

- Personnel safety equipment: safety equipment: safety glasses, rubber gloves, wash water etc.
- If elevations require: fall restraint and/or fall protection equipment.
- Internal vibrator: recommended 1 horsepower and with maximum head diameter of 1 inch or less. Also confirm power source and have adequate extension cords.
- Concrete pump special equipment, 3-inch reducer and a length of 3-inch hose, or double 90-degree attachment to slow the velocity of the concrete.



### **4.3.3 Handling and Storage of the Fox Block ICF on Jobsites**

#### **General Guidelines**

There are several recommendations to effectively handle and store Fox Block forms on site. Unlike most ICF systems the consistent 2 5/8" EPS panel thickness of all the Fox Block forms means Fox Block ICFs can better resist damage from handling compared with other ICFs. Further the Fox Block straight forms arrive on disposable/recyclable corrugated sheets in small bundles of 6 to 12 forms banded together. This provides further jobsite protection. Several suggestions are:

- a) If transporting Fox Block on an open trailer position the bundles so the air can pass through the forms to reduce drag, and ensure they are well secured to avoid damage from the strapping material.
- b) Unloading can be accomplished manually or using lifting equipment.
- c) The bundles of Fox Block can be easily moved by two people.

As a general guideline, Fox Block ICFs should be stored on site in a location which has easy access for the trucks delivering the forms and easy access by the construction crews. On sites where the forms will be stored for several days or weeks, it is recommended that the location be secure. The forms should be protected from prolonged exposure to ultra violet (UV) radiation, mud, winter ice and snow, because keeping the Fox Block clean and not having material accumulate in the interlock will assist the crew to stack the Fox Block walls quickly saving time and money.

It is important to store the forms in a location on the job site where they are easily accessible by the crew and at a location where they are safe from damage from other on-site activities.

#### **Outside storage**

If Fox Block ICF are be stored outside it must be recognized that the expanded polystyrene (EPS) left exposed to sunlight will start to yellow after approximately 2 months. Fox Block ICFs are shipped in bundles with corrugated lids, held in place with strapping. The yellowing and subsequent chalking of the foam is not of major concern, but must be removed by washing or brushing prior to application of any product which is to adhere directly to the surface of the EPS (i.e., peel and stick waterproofing or textured acrylic finishes (TAF)). In situations where it is anticipated that the Fox Block ICFs will be in outside storage for more than 3 months, protection from sunlight is recommended. The forms can be stored under a roof or covered with dark tarps.

Also when Fox Block are stored outside efforts must be taken to keep debris, mud, and in winter ice and snow, from accumulating in the interlock.

#### **Residential Constructions Sites**

At residential construction sites, frequently the bundles of Fox Block can be placed in the center of the building site at least 10 feet away from the location of the walls. This provides excellent access to the Fox Block by the crew while maintaining adequate space along the walls for construction of the walls and erection of the bracing and scaffolding.



## Commercial Construction Sites

On commercial construction sites the Fox Block forms are best stored in an area where they are both easily accessible for transfer to the walls for construction and away from activities which could cause damage. Frequently the forms are stored in a secured location on site and then transported to the construction location along the walls as needed by the crews.

### Hot Weather

In hot weather, the more intense sunlight can accelerate the yellowing and chalking of the foam plastics if it is left exposed. This can take place in less than 2 months if Fox Block ICFs are left exposed to sunlight. Contractors are recommended to take the precautions as set out in the paragraph on outside storage.

### Cold Weather

In cold weather remember to place the Fox Block ICFs on plastic sheeting or other materials so they do not freeze to the ground or slab. Likewise, cover them so that ice and snow does not accumulate in the interlock.

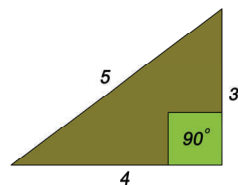
#### **4.3.4 Footings, Slabs and Grade Beams**

Footings can be formed footings, slabs on ground, or grade beams supported on piles. All of these are viable footing systems provided they have been properly designed and engineered as required by local soil conditions and building department requirements. If site specific structural engineering is required it is the responsibility of the owner. The footing or slab must be level to within + or -  $\frac{1}{4}$  inch.

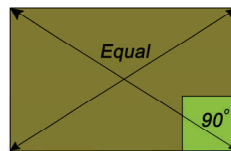
Step 1: Following excavation or other site preparation as required, layout the footing location in accordance with the plans and specifications.

Step 2: Ensure accurate 90 degree corners by using one of the following methods:

- Equal diagonal measurements ( assuming rectangular layout)
- 3-4-5 triangle
- Surveying



4\_3\_4a 345 Triangle



4\_3\_4b Diagonals equal



Step 3: Install footing forms and rebar as required by the plans, specifications or applicable building code. This includes dowel placement and spacing.

Step 4: Place caps on all dowels once they are installed for safety compliance.



4\_3\_4c Caps on rebar

Step 5: Place concrete into the formwork as per ACI 309 & 318 specification, and level to + or – ¼ inch. If required by specifications, project drawings or applicable building code install a keyway.

Note: If step footings are required due to a sloped building site the ideal increment is 16 inches. This is the recommended step height as it reduces the labor required by matching the height of the Fox Block forms. A step height of 8 inches can be used but the Fox Block forms will need to be cut in half. It is possible to achieve step heights of 4 inches by using Fox Block height adjusters.

#### **4.3.5 Fox Block First Course Wall Layout**

It is important to layout the Fox Block ICF wall on the footing or slab as specified in the building plans or engineering drawings. Accurate wall layout is key to constructing a complete and profitable project.

Step: 1: Mark out the exterior of the surface of the Fox Block walls on the footing or slab using a chalk-line.

Step 2: Check to ensure the 90 degree corners are accurate by using one of the following methods:

- Equal diagonal measurements
- 3-4-5 triangle
- Surveying

Step 3: Mark on the footing or slab the location of the doors, windows and any other penetrations in the wall. Then a guide board or metal channel can be fastened to the footing or slab along the chalk-line to guide the placement of the Fox Block forms. If only using a chalk line a suggestion is to use clear lacquer to protect the chalk-line from being washed away by rain.

Step 4: Place the first course of Fox Block forms starting at one corner and working around the wall. The Fox Block forms can be adhered to the footing with a foam gun, available as an accessory product from Fox Block.



Step 5: Verify that the outside face of the Fox Block walls line up with the overall building dimensions as specified on the plans.

Step 6: Tie the Fox Block in first course together end to end using HV Clips.

Step 7: Install the horizontal rebar as specified.

**NOTES:**

- i) To achieve accurate 45 degree corners use Fox Block 45 degree corner forms.
- ii) Wall layout of radius or other corner angles can easily be achieved with Fox Block ICF.
- iii) If dowel bars were not installed into the footing and they have been specified per local building official approval and inspection, they can readily be installed for local building official approval and inspection by drilling holes in the footing or slab and inserting dowels with epoxy or other approved adhesive.

**4.3.6 Placement of the Second Fox Block Course**

Step 1: Starting at the original corner, place a corner form in the reversed direction, with the long end extending in the other direction compared to the first course. This will create the offset or running bond.

Step 2: Fasten every corner form end-to-end to the adjoining straight forms with HV Clips. We recommend HV clips on the first and second corner blocks for secure alignment of the Fox Block ICF wall during construction.

Step 3: Continue setting the forms in place around the wall working in the same direction as was taken with the first course.

Step 4: Each Fox Block form must be fully seated into the forms below to minimize settling at the interlocks during placement of the concrete.

Step 5: It is preferable that the cross-ties (marked FOX BLOCK) line up vertically, however this may be difficult to achieve with all building dimensions.

Step 6: After the second course is in place install the horizontal rebar as specified.

Step 7: After stacking the second course confirm the wall is straight and level. If it is not level make adjustment by shimming or trimming the bottom of the wall as needed.

Step 8: After confirming the wall is straight and level use foam adhesive to secure it in position to the footing or slab.

**NOTES:**

- i) When vertical joints are less than 8 inches apart or if due to vertical joints the distance between webs is greater than 8" additional form support is required. This is most frequently achieved by screwing 1"x4"s, or 3 inch wide strips cut from plywood horizontally in the area and attaching the additional support to two webs either side of the vertical joint(s).



- ii) It is important to note at this point that the wall pattern has been established.  
Course number 1 will be the pattern for all odd numbered courses (3, 5, 7, etc.).  
Course number 2 will be the pattern for all even numbered courses (2, 4, 6, etc.).

#### **4.3.7 Placement of third and higher courses of Fox Block ICF**

Continue building the Fox Block wall one course at a time as was done for the first and second courses.

Step 1: Fasten every corner form end-to-end to adjoining straight forms using HV Clips or adhesive foam.

Step 2: Install the bracing and alignment system after the third course is in place.

Step 3: Install the required horizontal rebar as per code requirements or engineering specifications as courses are placed.

Step 4: In the top course secure forms end-to-end to maintain building dimensions.

Step 5: When the top course is in place, install the vertical rebar as by placing it down through the horizontal rebar. It must be installed as per the engineering drawings or building code requirements.

Step 6: Secure top course to the forms below on both sides of the forms and end-to-end with HV Clips. This is to prevent the forms from being displaced or knocked out of alignment during concrete placement.

Step 7: Install appropriate size pipes or tubing to provide penetrations for all utility services and exhaust and dryer vents.

Step 8: If additional stories are planned, the interlock needs to be protected prior to concrete placement. This can readily be done with tape or a metal channel cover to prevent concrete splatter from accumulating in the interlock.

Step 9: Check the building dimensions. Check the corners and along the walls to confirm they are plumb.

Step 10: Check the walls to ensure they are straight by placing a string line at the top course offset from the wall  $\frac{3}{4}$ " using 2 pieces of wood placed in the corners. Check for straightness by running another  $\frac{3}{4}$ " piece of wood between the string line and the wall.

#### **Notes:**

- i) When vertical joints are less than 8" apart or if due to vertical joints the distance between webs is greater than 8" additional form support is required. This is most frequently achieved by screwing 1"x 4"s, or 3 inch wide strips cut from plywood horizontally in the area and attaching the additional support to two webs either side of the vertical joint(s).
- ii) If you need to stack the forms so the vertical joints line up additional form support is required at these stacked joints.





- iii) At window and door openings, when placing rebar maintain minimum of 2" space between the rebar and the buck material.
- iv) The corner forms have additional plastic reinforcement embedded in the foam to provide added strength and furring opportunity for attachment of cladding and exterior finishes at the corners.

#### **4.3.8 ICF Wall Bracing, Alignment & Scaffolding Systems**

ICF wall bracing alignment & scaffolding systems are used to provide temporary bracing of the Fox Block ICF walls to keep the walls straight and plumb during concrete placement and provide a safe work platform for the placement of concrete. **Practice job safety, respect all warning and limitations of the system which is selected for use on your job.** Typically the wall alignment system is installed on the inner side of the Fox Block wall being constructed.

Generally each alignment unit consists of a vertical upright steel channel with slots for attaching screws to the cross-ties of the Fox Block forms, a diagonal with a turnbuckle and a scaffold bracket.

After installing 2 to 4 courses of Fox Block forms (depending on wind and other conditions), attach the alignment system to Fox Block walls with screws to the cross-ties.

Place bracing and alignment units within two feet of each corner and one every 4 to 6 feet thereafter in accordance with OSHA (American) requirements or OHSA (Canadian) requirements. Alignment units should also be placed on either side of every door and window opening.

Step 1: Attached the upright steel channel to cross-ties with a screw (#10 hex head is recommended) in each course of Fox Block forms. The screws should be snug but not tight. Always place screws near the top of the slots to accommodate any settling during concrete placement. When specified, attached the base of the upright to the substrate with adequate anchorage.

Step 2: Attach a turnbuckle arm to the upright with a bolt and then secure the other end to the substrate with adequate anchorage, as specified. If anchoring into soil additional care must be taken to provide sufficient anchorage.

Step 3: The scaffold bracket is then mounted on the upright at the specified location.

Step 4: Place the appropriate scaffold planks and guard rails and toe boards as recommended by the manufacturer and compliant with OSHA or OHSA requirements.

Step 5: Prior to concrete placement make certain walls are aligned and plumb, or leaning slightly inward. The wall must not lean out at all.

Step 6: A string line must be used to achieve straight walls.

Step 7: Just before and after concrete placement the diagonal turnbuckle arms are used plumb the wall and to adjust wall straightness to the string line.



## NOTES:

- i) It is the responsibility of the contractor to meet the applicable labour safety regulations. Generally these are OSHA requirements in the USA and OHSA in Canada.
- ii) For other bracing alignment and scaffolding systems see the respective manufactures instructions for use.
- iii) For item ii) to maintain a safe jobsite make note of and respect any and all limitations.
- iv) See website under accessories for manufacturers specifications.



4\_3\_8a Scaffolding



4\_3\_8b Bracing

### **4.3.9 Window and Door Openings**

It is recommended that bucks be built ahead of time and be on site and ready for placement in the walls at the appropriate time in the construction of the Fox Block ICF walls. The bucks are used to hold back the concrete and in most cases stay-in-place permanently providing a fastening surface for the installation of windows and doors.

Bucks can be either the plastic variety or fabricated out of treated wood with 2" X 12"s or plywood having 2" x 4"s running the length of the buck along both sides. EPS bucks with PVC inserts or supports are acceptable alternative materials to use with Fox Block ICF products.

Step 1: Build bucks ahead of time and have on-site for Fox Block build. Make sure the bucks are assembled with the correct rough opening dimensions for the window or door assembly specified for the openings.

Step 2: Install bucks in each location where the plans call for an opening. Check both the elevation and the location in the wall to confirm it is placed in the correct location.

Step 3: Provide a system of anchorage to the concrete in the Fox Block wall. Vinyl Bucks have fins which become embedded in the concrete when it is placed and provide the anchorage. Wood bucks can be anchored with bolts or by driving long nails, spikes or carriage bolts through the wood into the concrete cavity to become embedded in the concrete.



**Step 4:** The bucks, after being placed in the Fox Block walls, should have internal bracing to support the jambs and header, to keep them plumb and level by providing adequate support to stop them from deflecting into the opening from the load imposed by the wet concrete during placement. This bracing can be achieved using 2"x lumber or using one of the several systems available for this purpose. This bracing is removed after the concrete has cured.

**NOTES:**

- i) When building wood bucks it is recommended that the bottom of the buck (the sill) be constructed with 2"x4"s so that a space is left between the 2"x4"s. Concrete can then be placed into the forms below the buck through this space. If solid materials are used, bottom sill would need to be removed during concrete placement.
- ii) Also, when constructing wood bucks remember that untreated wood cannot be placed in direct contact with the concrete. Therefore the bucks must be constructed with pressure treated lumber or a moisture barrier must be installed between the concrete and the wood.
- iii) When using pressure treated lumber ensure the anchor bolts and/or nails are compatible with the pressure treated lumber.
- iv) When using proprietary buck systems and/or bracing systems refer the respective manufactures information for proper instructions for use of their product.
- v) When placing concrete it is recommended that concrete be first placed under the openings through the holes left in the sill of the bucks. When using wood bucks, once the wall cavity in the Fox Block below the bucks have been filled and the concrete consolidated the middle 2"x4" may be inserted into place in the middle of the sill of the buck.
- vi) Bucks must be constructed to provide the necessary Rough Opening dimensions. This information should be available on the building drawings or from the window or door manufacturer.
- vii) The internal bracing in the opening may be removed when the concrete has cured adequately. At this time if using wood bucks the 1"x4" strapping may be removed.
- viii) Please note that when windows and doors are installed into Fox Block walls attention to proper flashing detail is important. Correct installation of flashing, top caps, sills, proper caulking, etc. Is needed to ensure that the weather barrier and air barrier are continuous and that water is directed to the outside of the walls. Fox Block recommend using a peel and stick flexible 30mil thick flashing. See [www.foxblocks.com](http://www.foxblocks.com) for more information.



4\_3\_9a Wood buck



4\_3\_9b Vinyl buck



4\_3\_9c PWF buck



4\_3-9d  
2x4 + 1/2 PWF ply buck



#### **4.3.10 Steel Reinforcement and Placement**

Step 1: The steel reinforcement (rebar) must be placed as specified on the engineering drawings or as specified in the prescriptive ICF wall design in the applicable building code. Follow local building code for proper lap splice length. (Rule of thumb = 40 x bar diameter)

Step 2: Snap the horizontal rebar into the locking supports on the cross-ties of the first course. As additional courses are added to the wall place the rebar in each course as required. The rebar should be placed so that it alternates left and right of center on alternate courses of Fox Block.

Step 3: By staggering the horizontal rebar left and right a space is left for the vertical rebar to be lower from the top of the wall into position, and be held in place by the horizontal rebar.

Step 4: The vertical steel is held in position by the horizontal rebar, and the sleeves where required. Some jurisdictions require the top of the vertical steel to be secured. If this is the case tie the top of the vertical rebar to the top horizontal rebar.

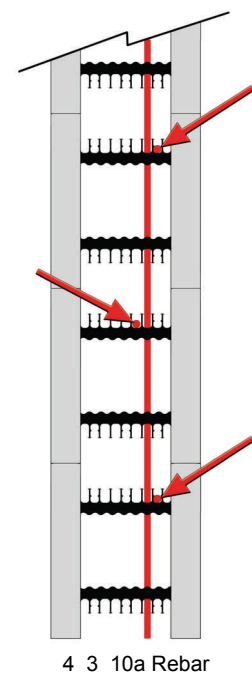
Step 5: For reinforcement around openings, and lintels, refer to applicable prescriptive design in the applicable building code, or engineering design specifications. These specifications will include details for placement of steel around openings and in the lintel across the top including stirrups if required.

Step 7: Rebar placement at 45 degree and 90 degree corner locations should be bent and continuous for a minimum of 24" in each direction. This will require the use of pre-bent corner bends or the ability to bend rebar on site.

Step 8: Lintel reinforcement is required above doors and window openings, where the opening is greater than 2 feet. Construct as specified in applicable building code or engineering drawings.

#### **Notes:**

- i) For applications outside of the prescriptive design provided by several building codes, engineering structural design of the reinforced concrete wall cast in the Fox Block ICF must be in accordance with ACI 318 in the US and CAN/CSA A23.3 in Canada.
- ii) It is recommended that the vertical rebar be 1 " to 1.5" shorter than the height of the wall. The rebar can be pre-ordered cut to length or field cut.
- iii) If rebar splices are required the codes allow the use of both contact and non-contact lap splices.



#### **4.3.11 Utility Service Penetrations**

Utility services such as electrical service and vents can be accommodated by inserting and appropriate sized tube through the forms prior to concrete placement. Remember it is much easier to do this before the concrete is poured than to have to cut a hole through the concrete later.

Step 1: Determine the service penetrations needed and the size and location.

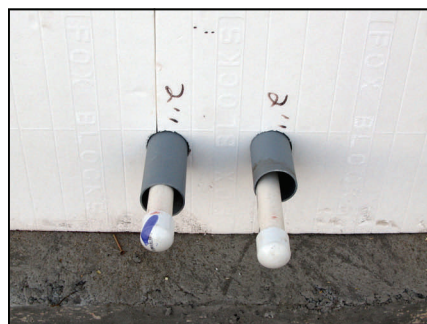
Step 2: Install the appropriately sized sleeves in the correct locations.

#### **NOTES:**

- i) List of possible utility & service penetrations
  - Electrical main service
  - Gas line
  - Water
  - Sewer
  - Cable & telephone line
  - Alarm system lines
  - Dryer vent
  - Water heater vent
  - Furnace vent
  - Bathroom and kitchen vents
  - Central vacuum
  - A/C line
  - Kitchen appliance venting
  - Pet door
  - Hose bibs
- ii) Remember sleeves that are too lightweight may be crushed during concrete placement.



4\_3\_11a  
Service Penetrations



4\_3\_11b  
Service Penetrations



#### **4.3.12 Gables End Walls**

To form a gable end walls cut the forms at the required angle and stack them in place. Install bracing as necessary. If it is anticipated that the wet concrete will flow out of the top of the forms due to the angle of the cuts and the slump of the concrete, fasten strapping along each upper outside edge of the forms and then fasten a strip of plywood on top of the sloped forms. This will contain the wet concrete. Remove the plywood and strapping when the concrete has hardened.

#### **4.3.13 End Walls**

In cases where a wall is to be terminated with no corner at the end of the wall, there are typically three different methods to achieve this: continuous EPS at the wall end, exposed concrete at the wall end and the wall ending with a wood buck. Each is described below in some detail.

In cases where the wall end is to be encased in EPS foam, EPS should be cut from EPS sheet stock of the thickness desired and inserted into the ends of the forms. Alternatively for 4" and 6" walls portions can be cut from a Fox Block form and inserted at the end of the wall. The end of the wall then needs to be supported with a temporary buck, typically treated 2"x framing lumber. This buck needs to be tied back to the wall with strapping which is screwed into the 3 webs closest to the end of the wall. The strapping can be 1"x4" cut approximately 18" in length or it can be cut from 1/2 " plywood 3" wide. The buck should be braced at its base, the three foot level and at the top, to resist movement and transmit the formwork forces to the ground or supporting substrate.

Alternatively, vinyl buck can be used to terminate a wall. See [www.foxblocks.com](http://www.foxblocks.com) for more information.

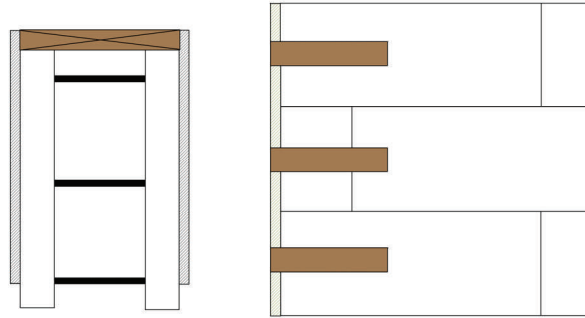


4\_3\_13a EPS buck



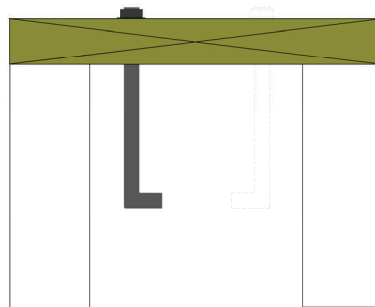


In cases where the concrete is to be exposed a 2"x buck should be used and held firmly against the ends of the panels of the Fox Block forms. Again, this buck needs to be tied back to the wall with strapping which is screwed into the 3 webs closest to the end of the wall. The strapping can be 1"x4" cut approximately 18" in length or it can be cut from 1/2" plywood 3" wide. The buck should be braced at its base, the three foot level and at the top, to resist movement and transmit the formwork forces to the ground or supporting substrate.



4\_3\_13b wood buck

And in cases where the 2"x buck is to be left in place, it should be pressure treated lumber, or separated from the concrete with a 30 to 60 mil sheet membrane applied to the side of the untreated lumber to be exposed to the concrete. To anchor the buck in place 1/2 inch holes are to be drilled 2' or 3' on centers along the length of the of the buck. Once it is in position and prior to the placement of concrete 10" carriage bolts or lag bolts are driven through these holes so their ends extend into concrete cavity to become embedded in the concrete. The bucks need to be tied back to the wall with strapping which is screwed into the 3 webs closest to the end of the wall. The strapping can 1"x4" cut approximately 18" in length or it can be cut from 1/2" plywood 3" wide. The buck should be braced at its base, the three foot level and at the top, to resist movement and transmit the formwork forces to the ground or supporting substrate.



4\_3\_13c

Alternatively one of the proprietary systems supplied by V-Buck or Jamb-it-All could be used to form the end of the wall. Please find their contact information in Section 6.



#### **4.3.14 Radius Walls**

Fox Block has radius block in a 6" wall thickness to build curved walls with a radius of 5', 6', 7', 8', 9' and 10'. For curved walls with a radius of greater than 10 feet straight Fox Block can be easily modified with cuts on the inside panels

When building with the radius blocks stack in a running bond manner so that the only vertical stacking joints are at the ends of the radius portion of the wall. Use Fox Block HV clips to secure the blocks together. Remember to apply additional support at these vertical joints (install 1"x 3" strapping, cut from 1/2" plywood, across the vertical joints at every other course) and use adequate bracing.

Please note horizontal rebar as specified in the engineering drawings must be bent to the appropriate radius to be inserted in courses of Fox Block.

#### **4.3.15 Beam Pockets**

Creating beam pockets in a Fox Block walls is easily done by using EPS to block out the portion of the wall where the beam pocket is needed.

Create a sacrificial form by cutting one or several pieces of EPS from scrap Fox Block forms or from EPS sheets or Styrofoam and position in the wall cavity to create a void in the concrete at the required locations. Remember to anchor it in place as it will tend to float when the concrete is placed around it.



4\_3\_15A EPS Beam Pocket



4\_3\_15B EPS Beam Pocket

Place the concrete in the wall. Give attention to not dislodge the sacrificial form, particularly during consolidation of the wet concrete. After the concrete has set this EPS can be easily removed from the wall leaving the beam pocket in the Fox Block wall.





4\_3\_15C Wood Pocket

Note: It is not uncommon for the structural beams (steel, wood, and composite) to need a pad under the beam for levelling support.



4\_3\_15D Beam Pocket

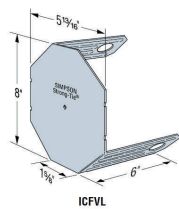
#### **4.3.16 Floor Connections**

Floor systems to be placed on the top of Fox Block walls are built as typical floor platforms and built as per local building code requirements.

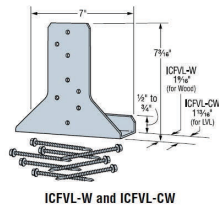
Floor systems to be connected to the side of Fox Block walls are typically installed using a rim joist and joist hangers for the floor joists. The rim joist is connected to the wall using 1 of 2 methods:

- i) At the elevation of the floor, cast bosses of concrete out to the face of the EPS with anchor bolts embedded into the concrete, and then attached the rim joist to the wall with anchor bolts as specified by code or by engineer's specifications. See Appendix D for this construction detail.
- ii) Attach the rim joist using the Simpson Strong Tie hanger. On-center spacing is as per the manufacturer's instructions or engineers' specification. See Section 6 for product contact information.

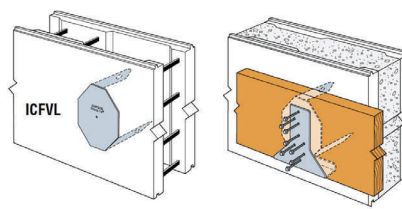




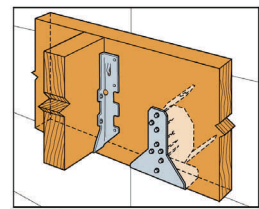
4-3\_16c



4-3\_16d



4-3\_16e



4-3\_16f

There are four further alternatives:

- Use the Fox Block Taper Top Form, placed on the wall so the EPS panel is thinner on the inward side of the wall, and then set the floor joists on the ledge. For more detailed information see Appendix D for form drawing illustrations.
- Use the Fox Block Corbel form placed on the wall so the ledge faces inward. Then set the floor joists on the ledge. For the requirements of the rebar in the corbel form to support the floor loads see Section 5.
- Attach the floor joists to the Fox Block walls using the proprietary system sold by ICF Connect Ltd.
- Use the Dietrich Metal Framing system, floor, roof and interior walls systems. Wall and floor connection details are available from Dietrich.

**NOTE:** For further information on the systems sold by Simpson Strong Tie, ICF Connect Ltd. And Dietrich Industries, please see Section 6.

Please see [www.foxblocks.com](http://www.foxblocks.com) for technical details.

#### **4.3.17 Roof Connections**

Roof trusses are attached to the top plate as would typically be done in framed construction, and as per code requirements. In high wind areas the building code may require installation of hurricane tie-down straps, to further secure the roof.

#### **4.3.18 Additional Form Support**

The time spent preparing the Fox Block walls for concrete placement pays huge dividends in job ease and efficiency, accuracy and results in avoiding unnecessary costs. It is recommended that the following construction details be complete prior to placement of concrete:

- Horizontal wood strapping is required on both sides of Fox Block walls when:
  - The offset between courses is less than 8", strap the vertical joints.
  - There are more than 4 inches of EPS beyond a cross-tie.



- Window or door openings occur less than four feet from a corner. Run strapping across opening to corner.
- Temporary wood straps are required around window and door openings to maintain straightness.
- Bracing is required inside window and door bucks to hold bucks in place and prevent sagging and bowing of jambs and header.
- Foam adhesive can be used to provide additional support on wood and plastic bucks.
- Secure all height adjusters with foam adhesive.
- It is recommended that outside corners should be reinforced with tape or wood strapping.
- The top course should be secured to the course below with adhesive foam or HV Clips.
- Sloped walls (i.e. gable end walls) should be properly foamed and braced.
- Radius walls should be secured with foam adhesive and flexible strapping material and HV clips.
- Fox Block forms in all lintels should be secured end-to-end with HV Clips.
- The middle of large openings (i.e. garage door openings) should be braced horizontally and vertically to prevent movement of the forms during concrete placement.

#### **4.3.19 Concrete Placement**

It is Fox Block's recommendation that the concrete used in the footings have a minimum design strength of 2500 psi and that the concrete used in the Fox Block walls have a minimum design strength of 3000 psi. Use 3/8" pea gravel for large aggregate and have a slump of 5 to 6 inches. If required by code or approved by site specific structural engineering, the concrete used in the Fox Block walls may have minimum design strength less than 3000 psi depending on the construction project conditions.

Step 1: Reference the pre-pour checklist in the proceeding section.

Step 2: Order/use proper concrete design mix.  
Ask local Redi-Mix supplier for recommended mix design.

Step 3: When ordering the pump truck, state the time when the truck is to be at the jobsite. The pump truck should arrive a minimum of 30 minutes prior to the arrival of the concrete trucks to allow adequate time for a safe set-up procedure. When ordering the concrete pump request that the pump come with an "S" bend or double 90, ram's horn, or reducer for the end of the hose. If possible final size of hose should be reduced to 3 or 4 inches in diameter.



Step 4: Slump testing may be necessary to perform per plans, specifications, or engineering design.

Step 5: Fill the area of the walls below window and door opening first.

Step 6: Then begin pouring 4' to 5' from a corner. Direct the concrete flow away from the corner, then move along the wall.

Step 7: Concrete should be placed with a constant moderate and steady flow using two or three lifts (layers) of 3 to 4 feet in height for a total pour height of eight to ten feet. Pour heights of greater than ten feet can be easily accommodated by placing more lifts of concrete. The time between placements of lifts should be a minimum of 30 to 60 minutes.

Step 8: Proper jobsite consolidation of concrete is necessary and can be accomplished by a combination of both internal vibration and external vibration of the walls. A 3/4" to 1" pencil vibrator with a maximum 1 horsepower motor is recommended. Refer to ACI 309 Methods of Consolidation for more information. Each lift should be consolidated with vibration after it is placed. For second and subsequent lifts the vibrator should be lowered to the point that it causes mixing of the top of the previous lift with the lift just placed to avoid a cold joint being formed.

Consolidate concrete at all windows and door bucks completely with both internal vibration and external tapping, especially at the top corners of bucks.

Step 9: Before finishing placing 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 the concrete top it is common practice to, "wet set" anchor bolts or plate straps into the fresh concrete (It is recognized that not all jurisdictions allow this practice). These anchor bolts or straps will be used later to anchor the top plate and/or roof trusses or rafters.

Step 10: All bracing, scaffolding planks, walls, bucks and floors should be cleaned of all concrete before it hardens.

Step 11: Re-check alignment for plumb before leaving the jobsite.

#### Notes:

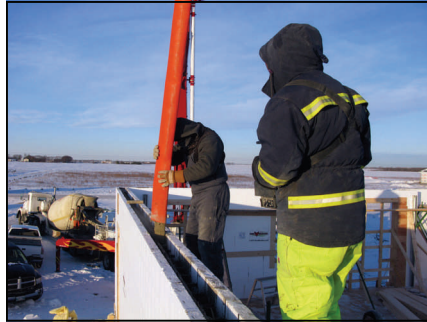
- i) Pay particular attention to lintels and other areas of the walls where rebar congestion may inhibit the easy flow of concrete. These locations should receive special focus in both the placement and consolidation of the concrete to ensure there are no voids, and adequate concrete has been placed and it is in good contact with the rebar.
- ii) Do not remove vertical bracing until adequate alternate lateral support is confirmed to be in place, and concrete has achieved adequate strength. Vertical window and door opening bracing should remain in place for a minimum of 7 days.
- iii) When placing concrete at temperatures below 40 degrees Fahrenheit thermal protection is required. Follow ACI 306, Cold Weather concreting. Fox Block will





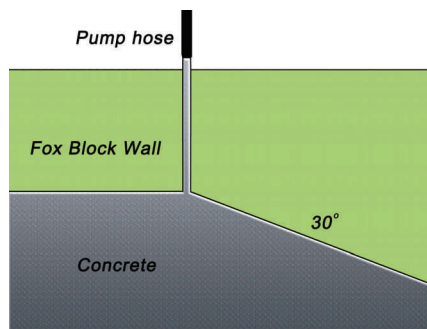
provide much of this needed thermal protection. Please contact Fox Block for further information. The Portland Cement Association has published research of the benefits of ICF construction in cold weather.

- iv) When placing concrete above 90 degrees F. follow ACI 305, Hot Weather Concreting.



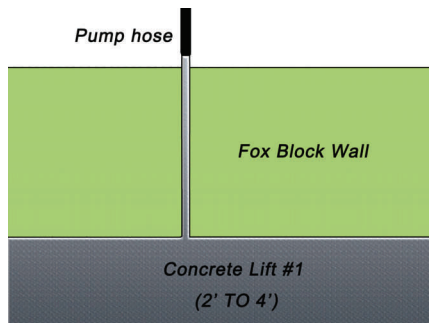
4\_3\_20a Concrete placement

- i) *Concrete being placed in a Fox Block wall*

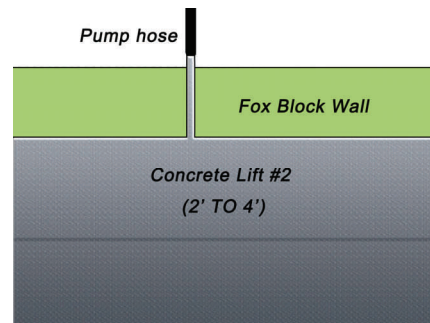


4\_3\_20b

- ii) *Proper slump of concrete*



4\_3\_20c 1st concrete lift



4\_3\_20d 2nd concrete lift

- iii) *Concrete lift heights*





4\_3\_20e Finishing concrete

iv) *Finishing the top of a flat topped Fox Block wall.*

#### **4.3.20 Electrical Service**

If it is necessary to bring the electrical service through the Fox Block wall it is recommended that a sleeve be placed through the Fox Block wall prior to placement of concrete, to block out a hole through the wall. If this is not done a hole can be cut through the Fox Block wall.

In residences and small buildings it is recommended that a piece of  $\frac{3}{4}$ " plywood be fastened to the Fox Block wall in the location where the main panel is to be located. The panel can be mounted to the plywood. Then run the wiring through the channels cut in the EPS.

After the concrete has been placed in the Fox Block walls, and hardened, cut channels through the EPS. The channels should be almost the full depth of the EPS. Then place the electrical wire(s) (typically romex) in the channels. These channels can be cut with a hot knife, router, grinder or electric chain saw. Make sure the depth is sufficient to allow the wire(s) can be pushed deep into the EPS so that shielding is not required at the cross-ties.



4\_3\_22a Electrical 1



4\_3\_22b Electrical 2



In commercial construction conduit may be installed in the concrete wall as is typically done in conventional construction. A company by the name of Plastilock sells a conduit package specifically for ICF construction. See Section 6 for the contact information.

For electrical boxes, cut out the EPS with a hot knife or other means. Then fasten electrical boxes to the flanges (also known as furring strips) on the ends of the cross-ties. In some jurisdictions the AHJ require that the electrical boxes must be fastened to the concrete. If this is the case in your region fasten the electrical boxes through the back to the concrete wall with appropriate concrete fasteners.

#### **4.3.21 Plumbing**

Typically plumbing is run in interior walls. A common exception is the kitchen sink which frequently is located on an outside wall under a window.

Pipes may be run through the EPS by removing the EPS after the concrete has hardened to create the space for the pipe(s). Please note that the outside diameter of the pipes and connections must not exceed the thickness of the EPS foam which is 2 5/8".

If it is necessary to run a pipe through a Fox Block ICF wall it is recommended that a sleeve be placed through the Fox Block wall prior to placement of concrete, to block out a hole through the wall. If this was not done prior to concrete placement a hole can be cut through the Fox Block wall however more effort is required.

#### **4.3.22 Air and Vapor Barrier**

Typically the continuous concrete wall is recognized as providing the air barrier and so no additional air barrier is required.

In most jurisdictions the EPS is recognized as performing as a vapor retarder, and so no additional vapor barrier is required.

Also please note that in typical frame construction the vapor barrier serves to prevent water vapor from migrating into the insulation and condensing, as this compromises the performance of the insulation and creates conditions which may be conducive to degradation of the insulation and framing over time. In ICF construction, for the first few years, the moisture flow is from the concrete out of the wall. As such there is no benefit from an additional vapor barrier. And the materials, EPS and reinforced concrete, do not degrade in high moisture environments. Further in those regions which have high humidity for extended periods of time placing additional vapor barriers on Fox Block wall can trap moisture in the walls which may lead to problems.

#### **4.3.23 Interior Finish**

Fox Block forms are designed with furring strips oriented vertically, at the ends of each cross-tie. These furring strips are embedded in the EPS every 8" on center horizontally. These serve to receive fasteners. As well, in the corner forms, additional furring opportunity is provided to enable easy attachment of the finishes at corners.



The interior of ICF walls must be finished with a thermal barrier. The most convenient material to do this with is ½" sheet rock (gypsum board), as it is recognized by the building codes as providing a 15 minute thermal barrier. The sheet rock must be mechanically fastened, and screws should be used to fasten the sheet rock to the furring strips. Adhesives can be used in conjunction with the screws.



4\_3\_25a Fox Block Tie Markings

#### **4.3.24 Exterior Finishes**

Fox Block forms are designed with furring strips oriented vertically, at the ends of each cross-tie. These furring strips are embedded in the EPS every 8" on center horizontally. These serve to receive fasteners. As well, in the corner forms, additional furring opportunity is provided to enable easy attachment of the finishes at corners.

Exterior finishes can be attached to the furring strips in the EPS in a similar fashion as would be typically done with frame walls. An advantage with Fox Block walls is that if additional anchorage is required concrete fasteners can be used to fasten directly into the concrete wall.

In the case of brick veneer, a brick ledge can be cast with the Fox Block Corbel block and then the bricks are laid on the ledge. Please see Section 5 for additional information on the use of the Fox Block corbel form and reinforcing requirements. Brick ties are installed with fasteners to the furring strips. If additional anchorage is required the brick ties can be anchored back to the concrete wall.

EIFS lamina can be installed directly to the expanded polystyrene (EPS). Some EIFS complies refer to this as a Textured Acrylic Finish (TAFS). The EPS surface must be prepared in accordance with the EIFS or TAF manufacturers' specification. EIFS and TAF cladding is a barrier system, and to achieve satisfactory performance, the correct detailing around windows and doors is of utmost importance.

In all cases the window/door and other penetrations must be properly flashed and caulked where necessary to direct water to the exterior wall surface.

See website, [www.foxblocks.com](http://www.foxblocks.com) for most current flashing recommendations.



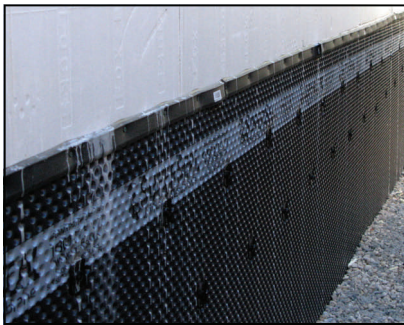
#### **4.3.25 Waterproofing/Dampproofing/Termite Protection**

The exterior of below grade walls must have a dampproofing or waterproofing material applied. The wall must also be backfilled with free draining backfill or other drainage material provided to allow water to move to the foundation drain and drain away from the foundation. Check with material supplier to see if a protection layer is required for the type of dampproofing or waterproofing used.

**CAUTION!** Check with the supplier of any system being considered to confirm that it is compatible with EPS. Products manufactured with petroleum based materials may not be compatible with a Fox Block substrate. EPS is vulnerable to degradation when placed in contact with petroleum based products. It is the responsibility of the contractor to install compatible waterproofing/dampproofing materials. Such products are found in Section 6.1.

#### **NOTE:**

Installation of the dampproofing and waterproofing must be in accordance with the building code and the manufacturers' installation instructions. See website, [www.foxblocks.com](http://www.foxblocks.com) for product recommendations and manufacturers' contact information.



4\_3\_27a Dimple Membrane

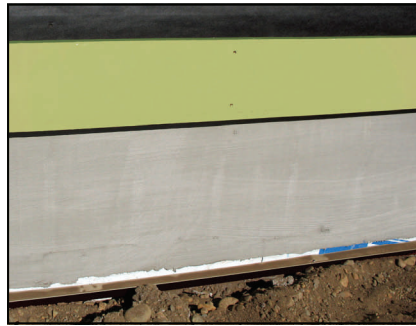


4\_3\_27a Peel & Stick Membrane



#### **4.3.26 Exterior Transition at Grade Level**

The dampproofing or waterproofing on a foundation wall stops at the elevation of the finished grade. The building code requires that the exterior cladding start 6 inches or more above the finished grade elevation. This leaves a transition zone and as EPS degrades in sunlight it must be protected. Several paring products and peel and stick products are sold specifically for this application zone. Please find more information about them in Section 6.



4\_3\_28a Transition Zone

#### **4.3.27 HVAC and Indoor Air Quality**

One of the major advantages of ICFs in general and Fox Block in particular is the enhanced thermal performance of the wall system. There have been several studies conducted by the Portland Cement Association, ORNL laboratories and in Canada by NRC.

In summary technical bulletins published by the ICFA and the PCA, found in Section 8 of this manual describe the ICF effect. As well the PCA report prepared by Dr. Pieter VanderWerf identified that ICF houses experienced a reduction in energy use of 32% for space cooling and 44% for space heating when compared to typical wood frame construction.

These clearly indicate the energy savings that can be realized by constructing buildings with Fox Block ICF walls.

To assist customers in the correct sizing of HVAC equipment Fox Block offers two references:

- i) The Portland Cement Association has prepared HVAC Sizing software for Concrete Homes

Contact information: [www.cement.org](http://www.cement.org)

- ii) Energy wise, an energy consulting firm in Texas provided project specific information.

Contact Information: Tel: 972-540-5365 & website:

[www.energywisestructures.com](http://www.energywisestructures.com)





The Fox Block walls with their reinforced concrete core also function as a very effective air barrier. This when combined with the excellent thermal performance of Fox Block walls results in buildings which can be readily designed and constructed to have consistent interior air quality, less impacted by variable infiltration of outside air.

#### 4.4 Man Hour Rates

Man Hour Rates (MHR) have been around for decades. Most contractors document their production rates without realizing that time / square footage built will give them a man hour rate as you would find in most cost estimating programs such as RS Means. For most Insulated Concrete Form's (ICF's) this has become a common practice. Over 20 years of history have established accurate numbers to budget future jobs with.

	MHR	Job Type	
<b>1</b>	.055 or less	Very efficient crew building a simple job with less than six corners, less than four openings and few or no embeds.	<p><b>Clever thoughts:</b></p> <p>Size of job is not as big a factor as you would think. The only time the size of job is really a factor is when the job is so large that the crew can gain speed while building which lowers the MHR. This will usually be on jobs over 20,000 square feet using the same crew throughout.</p> <p><b>Ways to lower your MHR:</b></p> <ol style="list-style-type: none"> <li>1. Pre-Plan job</li> <li>2. Proper size crew for job</li> <li>3. Stage materials close to job</li> <li>4. Use proper scaffold/bracing</li> <li>5. Pre-Build opening bucks</li> <li>6. Proper rebar placement</li> <li>7. Fox training for crew</li> </ol>
<b>2</b>	.06 .065 .07	Average job with less than eight corners, less than eight openings and less than eight embeds.	
<b>3</b>	.075 .08 .085 .09	Most common MHR for new crews on moderate or large jobs. This will cover complex residential jobs with 12 or less corners. This MHR area will also work with large commercial jobs with basic 16" o/c rebar and few openings.	
<b>4</b>	.095 .10 .105 .11	Very complex residential with 15 or more corners and many openings and embeds. Also includes commercial jobs with many openings and embeds.	
<b>5</b>	.12 and over	ICF jobs with at least three of the following: more than 8 short corners (30" or less), high seismic rebar design, more than 20 openings, many embeds, extreme weather, using the wrong scaffold for wall height.	

Square foot of Job (SFJ) = Length \* Height (of Fox walls being built)

**SFJ \* MHR = Man Hours to build job**

Example: Job has 180 Lineal feet (LF) of wall that is 12' tall.  $180 * 12 = \mathbf{2160}$  square feet (SF)

Job has 6 corners with 6 openings and basic 16" o/c rebar design. Crew has a bit of experience and ICF scaffold is used. I would recommend aiming for a .075 MHR but use **.085** MHR as a budget number.

With experience you will become more efficient, landing more work with more profit.

**$2160 * .085 = 183.6$  Total Man Hours (TMH) for job**

**$183.6 \text{ TMH} / 6 \text{ man crew} = 30.6 \text{ Total Crew Hours (TCH)}$**

These numbers are estimates only. Many factors will effect the outcome of a job which needs to be taken into account. Please document all work and reflect back to your own crews history when completing budgets for upcoming work. We would like to thank contractors for sharing past history allowing us to build accuracy into this document.



## **4.5 Check Lists**

### ***Check Lists***

- The Check Lists on the following pages are to help remind you of proper sequencing as well as highlight items that could be missed.
- The lists will help crews continue to build efficiently at times when the lead hand is unavailable.

<u>Phase</u>		<u>Page</u>
<b>1</b>	----- Prior to Job -----	<b>3</b>
<b>2</b>	-- Product Delivery --	<b>3</b>
<b>3</b>	Start of job checklist	<b>4</b>
<b>4</b>	----- Row 1 -----	<b>4</b>
<b>5</b>	---- Reinforcement ----	<b>5</b>
<b>6</b>	----- Row 2 -----	<b>5</b>
<b>7</b>	----- Row 3 -----	<b>6</b>
<b>8</b>	----- Row 4 -----	<b>6</b>
<b>9</b>	----- Bracing -----	<b>7</b>
<b>10</b>	----- Openings -----	<b>8</b>
<b>11</b>	----- Top row -----	<b>8</b>
<b>12</b>	-- Prior to Concrete --	<b>9</b>
<b>13</b>	--- Multiple Levels ---	<b>9</b>
<b>14</b>	----- Concrete -----	<b>10</b>
<b>15</b>	--- Post Concrete ---	<b>11</b>
<b>16</b>	Extreme weather concreting	<b>11</b>

#### **NOTES:**

- This checklist is to serve as a guide. The site foreman should review the project and add critical items he identifies as important for a successful pour.
- Refer to ACI 305 Placing Concrete in Hot Weather and ACI 306 Placing Concrete in Cold Weather and ACI 309 Guide to Consolidation of Concrete



## ***Phase 1: Prior to Job***

- ☐ 1. Blueprint shows rebar schedule or proper rebar design has been established.
- ☐ 2. Rough Opening sizes are available for all window and door openings.
- ☐ 3. Wall heights have been pre-planned to determine the number of courses needed.
- ☐ 4. Height of top and/or bottom of openings are clear.
- ☐ 5. Depth of backfill is clear if needed.
- ☐ 6. Thickness of concrete is established.

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## ***Phase 2: Product Delivery***

- ☐ 1. There is clear access for delivery truck.
- ☐ 2. Staging area is established for block.
- ☐ 3. Bracing and rebar will be arriving at or close to the same time as ICF block.
- ☐ 4. Job is squared prior to material being moved in. (Hard to do after)

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## Phase 3: Start of job

### Items needed to build job:

- ☐ 1. Rebar and design.
- ☐ 2. Blueprint.
- ☐ 3. Buck material and opening sizes.
- ☐ 4. ICF forms.
- ☐ 5. Alignment/scaffold system including screws.
- ☐ 6. 2 x 10 planks.
- ☐ 7. Anchor bolts or Simpson Hangers
- ☐ 8. Strapping
- ☐ 9. Fox Block HV Clips



### Tools including:

- ☐ 1. Saws (pruning and handsaw)
- ☐ 2. Tie wire & Pliers
- ☐ 3. Spray foam adhesive
- ☐ 4. Rebar bender / cutter
- ☐ 5. 1" fiber tape
- ☐ 6. Chalk and string lines
- ☐ 7. Proper signage

### Optional:

- ☐ 8. Table saw to rip cut block

## Phase 4: Row 1

- ☐ 1. Footing / Slab is clean level & squared.
- ☐ 2. Chalk lines are complete.  
(Outside of form is outside of building dimension)
- ☐ 3. Mark out all window and door openings on working surface. Have someone start to build bucks.
- ☐ 4. Place the ICF corner form - line up to chalk line. Can go either way with long leg of corner.
- ☐ 5. Starting at corner form, place straight ICF forms attaching tightly together end to end with HV Clips.
- ☐ 6. Decide if you are going to use a butt or lapped joint. (But joints do not need to be cut on a line, lapped joints must be cut straight and on a line.)
- ☐ 8. Once 1st row is complete, install rebar as per plans, code or engineering. (see sheet 2 on reinforcement)



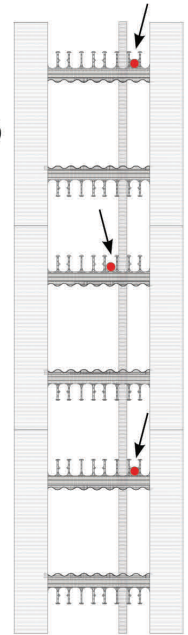
## Phase 5: Reinforcement

- ☐ 1. As rebar is placed, remember that concrete needs access to fill wall.
- ☐ 2. Horizontal rebar should alternate to allow vertical rebar to be held in place. (see diagram)
- ☐ 3. All lap splices should overlap 40 bar diameters. (Unless Engineering shows different.)
- ☐ 4. Contact lap splices must be tied. Non contact lap splices do not need to be tied.
- ☐ 5. Lintel rebar should have 2" concrete cover at bottom.

C - Stirrups as per reinforcing charts or Engineering.

### Clever Tip: Reinforcing steel

Below grade walls = usually Tension side  
Above grade walls = usually Center of wall.




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## Phase 6: Row 2

- ☐ 1. Start row 2 at same corner you started row 1 and using the opposite corner you started with on row 1.
- ☐ 2. Place straight forms from the corner form. Webs should line up automatically.
- ☐ 3. Use HV Clips to connect rows 1 and 2 together at 24" o/c and 1st and 3rd tie from every corner.
- ☐ 4. Once 2nd row is complete, install rebar as per plan, code or engineering.
- ☐ 5. Check top of 2nd course to confirm level footings. Shim and/or trim as needed to be +/- 1/4"
- ☐ 6. If satisfied, kick wall to the chalk lines and spray foam to footings at 16" o/c and both sides of wall.  
(Insert tip of spray foam under form so spray foam fills about 2" of space.)
- ☐ 7. Remember that courses 1,3,5,7 and courses 2,4,6,8 are all the same pattern for stacking. Once you have the first 2 courses stacked this is your blueprint for all other courses.

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## Phase 7: Row 3

- ☐ 1. Start at same corner as row one and lay forms out along wall.
- ☐ 2. All joints should line up with joints on row one.
- ☐ 3. Use HV Clips on 1st and 3rd tie from each corner and in both directions from corner.
- ☐ 4. If a form is to be cut, it's size should be the same as row one.
- ☐ 5. Install rebar as per plan, code or engineering.

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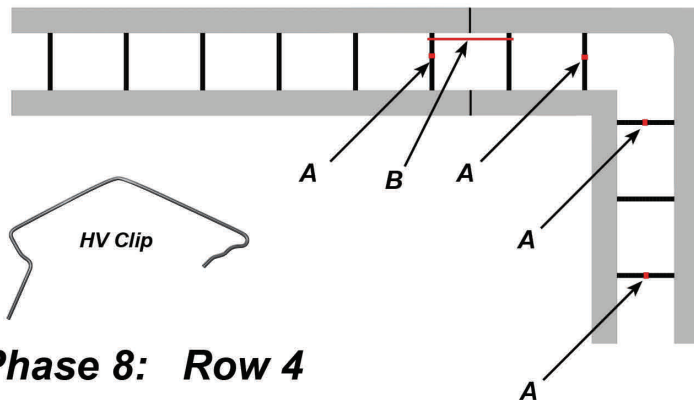
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A = HV Clip to course below

B = HV Clip holding corner block to straight block



## Phase 8: Row 4

- ☐ 1. Start at same corner as row one and lay forms out along wall.
- ☐ 2. All joints should line up with joints on row two.
- ☐ 3. Use HV Clips on 1st and 3rd tie from each corner and in both directions from corner.
- ☐ 4. If a form is to be cut, it's size should be the same as row two.
- ☐ 5. Install rebar as per plan, code or engineering.

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## Phase 9: Bracing

- ☐ 1. When laying out bracing keep in mind how it will safely support scaffold planks.
- ☐ 2. At each corner you should have at least one scaffold, place it on the 4th tie from the corner. (24")
- ☐ 3. Space bracing so planks will fit. (9 or 10 webs apart work good for 14' planks)
- ☐ 4. Attach strong backs using one #10 sheet metal screw, at the top of the slots, into the tie of each ICF form. Keep screws loose enough to slide in the slot. Do not use tapping screws. Strong back should line up with cut lines on form units to ensure they will line up with top row ties.
- ☐ 5. Attach one turnbuckle and scaffold bracket to one strong back and measure to make sure height will be good for concrete placement. If not, try another set of holes in the strong back.
- ☐ 6. Install all turnbuckles at same height.
- ☐ 7. Attach turnbuckles to ground slab or floor. (Not less than 45 degrees. Extend if needed)
- ☐ 8. Install all scaffold brackets at same height to allow planks to line up.
- ☐ 9. Place planking and secure in place.
- ☐ 10. Install guard rails if needed.
- ☐ 11. Plumb all corners and install a string line at top of wall along the out side edge. Slide a 3/4" spacer block between the string and the form at each corner, and slide a 3/4" spacer block along wall and adjust the plumb of the wall with the alignment turnbuckles as you move along the wall from corner to corner.
- ☐ 12. Just before concrete placement it is a good practice to adjust the top of the wall IN about a 1/4". Leave the corners plumb.
- ☐ 13. During the concrete placement monitor the string line and if the wall moves toward the string have someone adjust it back.
- ☐ 14. After the concrete placement, realign the walls using the string, blocks and turnbuckles.

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## ***Phase 10: Openings***

- ☐ 1. Establish the bottom of buck and mark on forms.
  - ☐ 2. If the outside edge of buck lines up on a tie you should alter web pattern or simply slide the buck over.
  - ☐ 3. Cut the forms to accept the bucks.
  - ☐ 4. If needed install vertical rebar into spaces under the buck locations.
  - ☐ 5. Bucks should be built with access points in bottom to allow for concrete placement.
  - ☐ 6. Place the bucks onto position on wall. Buck does not need to line up with cut lines on forms.
  - ☐ 7. Build ICF forms around buck.
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## ***Phase 11: Top row***

- ☐ 1. Establish where lintel rebar will need to be prior to laying forms in place.
  - ☐ 2. If needed place lintel rebar on top of window and door bucks. Remember to keep the rebar up off the buck to allow the proper amount of concrete to flow around rebar as required by code.
  - ☐ 3. Start at same corner as row one and lay forms out along wall.
  - ☐ 4. Use HV Clips to hold the forms together horizontally.
  - ☐ 5. Use HV Clips at 1st and 3rd tie from each corner and in both directions from corner.
  - ☐ 6. Use HV Clips on entire row at 2' o/c  
(Second tie back from all joint lines).
  - ☐ 7. Install service penetrations if needed.
  - ☐ 8. Insert beam pockets if needed.  
  
Hint: 2 layers of ICF foam cut from scrap on site will give you a 5 1/4" pocket.  
Then just cut it out after the concrete cures.
  - ☐ 9. Install vertical rebar as per plan, code or Engineering.
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## ***Phase 12: Prior to Concrete***

- ☐ 1. Attach a string line to monitor wall during concrete placement. (A good spot for the string line is opposite the bracing about 2" down from the top of the wall. See notes in bracing section)
- ☐ 2. Rebar and lintel steel is complete as per plan.
- ☐ 3. Openings have been braced and framed.
- ☐ 4. Corners have been secured with tape or strapping.
- ☐ 5. Forms with more than 3 foam bars past the last web have been strapped.
- ☐ 6. Stacked joints (any joints 8" or less apart) have been strapped.
- ☐ 7. Short wall sections (4' or less) have been strapped.
- ☐ 8. Beam pockets are in place.
- ☐ 9. Sill plate attachment is ready for installation after concrete placement.
- ☐ 10. Space is ready for concrete pump to set up.

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## ***Phase 13: Multiple Levels***

- ☐ 11. Top of foam has been covered to protect from concrete.
- ☐ 12. Service penetrations have been installed.  
(Vents, central vac exhaust etc.)
- ☐ 13. Rebar dowels are ready to be installed.
- ☐ 14. When placing concrete remember to leave a portion of the tie exposed.  
This will allow you to tie the next row down when you continue building.
- ☐ 15. Embeds Installed and secured

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## Phase 14: Concrete

- ☐ 1. Establish concrete crew and who will be responsible for what.
  - a. One person to place concrete
  - b. Two people to consolidate concrete
  - c. One or two people leveling walls
  - d. Extra manpower on pour day is not a bad thing!
- ☐ 2. You have to tell the pump operator how many lifts you will be doing and what slump concrete you want.  
2' to 4' lifts with a 5" to 6" slump is normal.
- ☐ 3. Start placing concrete at least 2' from a corner. (Never into a corner as it could move the wall)  
Always flow the concrete through the corner.
- ☐ 4. If the concrete gets through the top rebar and Durowal with just a bit of restriction the slump is good.  
If the concrete flows freely past the top rebar and Durowal the slump is too high.
- ☐ 5. Create a lift of concrete on either side of corner before actually filling the corner.  
These lifts on either side act as an anchor holding the corner in place.
- ☐ 6. At a window fill from one side and let the concrete flow under the window buck, then stop the pump, move to the opposite side of the buck, and continue. Some windows will require extra concrete to be placed into the opening at bottom of buck.
- ☐ 7. Consolidate concrete during each lift following the person who is placing concrete.
- ☐ 8. Leave at least 18" to 24" at top of wall for final lift. This will allow concrete pump to keep up.
- ☐ 9. Monitor walls during and after concrete placement and then adjust turnbuckles to level walls.
- ☐ 10. If required install anchor bolts.
- ☐ 11. Ensure all window and door bucks have been consolidated properly by hitting their face all around with a hammer.
- ☐ 12. Clean concrete off footings, slabs, scaffold, walls, tools etc.
- ☐ 13. Before you leave take one last look to ensure your walls are straight and plumb.

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## ***Phase 15: Post Concrete***

- ☐ 1. Bracing should be left in place for 72 hours after concrete placement. If you must remove bracing, from 24 to 72 hours after concrete placement, it is recommended that you place temporary bracing against walls prior to removing ICF bracing.
- ☐ 2. Prior to backfill you may need to have floor diaphragm in place according to building code.

Note: Concrete must cure the same amount of time as a conventional job prior to continuing the project.

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## ***Phase 16: Extreme weather concreting***

When building with ICF's in extreme weather, there are just a few additional precautions that need to be taken.

- ☐ 1. Keep walls covered to keep snow out of wall cavity. Concrete does not melt snow.
- ☐ 2. If you get snow into the wall cavity you must remove it prior to concrete placement.  
This can be done by cutting temporary holes into the bottom of forms or drizzling hot water into the forms. Hot water comes on the mixer trucks in winter.
- ☐ 3. Use 18" wide insulated tarps or equivalent along top of wall.
- ☐ 4. In very cold weather (-0° F / -20° C) only lift off 8' of insulation at a time while placing concrete.  
This will allow the warmth of the concrete to preheat the wall and rebar during the pour.
- ☐ 5. When complete cover the wall to protect concrete from cooling. The hydration process will keep the wall at a good temperature without the need for any extra hoarding or heating.
- ☐ 6. Remember to cover exposed concrete at bucks.
- ☐ 7. In very hot weather keep exposed concrete covered and apply moisture applied.

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