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Daniel M. Chouinard
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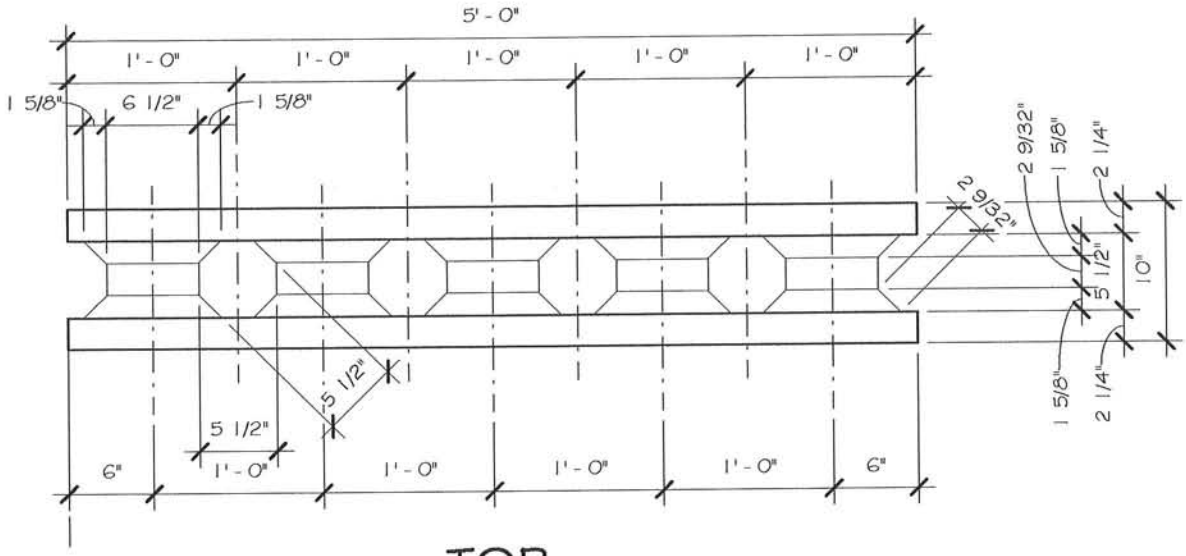

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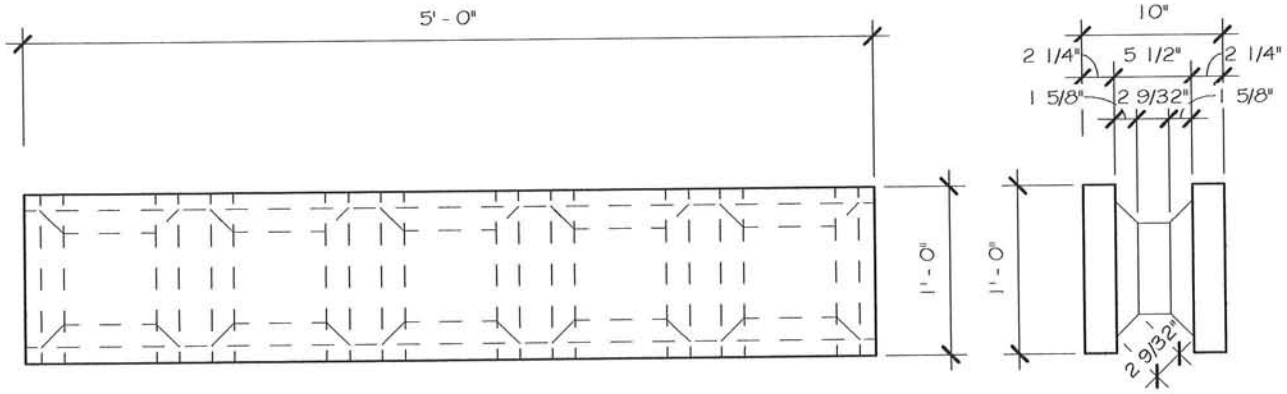

FRONT

RIGHT

RT DESIGN 623-271-1173	DAN CHOUINARD EF BLOCK	EF BLOCK VIEWS W/ DIMS	
		Project number 2010-002 Date 8/18/2010 Drawn by Author Checked by Checker	2 Scale 1" = 1'-0"

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SECTION R611
INSULATING CONCRETE FORM WALL CONSTRUCTION

R611.1 General. Insulating Concrete Form (IFC) walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of ACI 318. When ACI 318 or the provisions of this section are used to design insulating concrete form walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the jurisdiction having authority.

R611.2 Applicability limits. The provisions of this section shall apply to the construction of insulating concrete form walls for buildings not greater than 60 feet (18 288 mm) in plan dimensions, and floors not greater than 32 feet (9754 mm) or roofs not greater than 40 feet (12 192 mm) in clear span. Buildings shall not exceed two stories in height above-grade. ICF walls shall comply with the requirements in Table R611.2. Walls constructed in accordance with the provisions of this section shall be limited to buildings subjected to a maximum design wind speed of 150 miles per hour (67 m/s), and Seismic Design Categories A, B, C, D_0, D_1, and D_2. The provisions of this section shall not apply to the construction of ICF walls for buildings or portions of buildings considered irregular as defined in Section R301.2.2.2.2.

For townhouses in Seismic Design Category C and all buildings in Seismic Design Category D_0, D_1, and D_2, the provisions of this section shall apply only to buildings meeting the following requirements.

1. Rectangular buildings with a maximum building aspect ration of 2:1. The building aspect ratio shall be determined by dividing the longest dimension of the building by the shortest dimension of the building.
2. Walls are aligned vertically with the walls below.

R611.5 Screen-grid insulating concrete form wall systems. Screen-grid ICF wall systems shall comply with Figure R611.5 and shall have reinforcement in accordance with Tables R611.3(1) and R611.5 and Section R611.7. The minimum core dimensions shall comply with Table R611.2.

R611.6 Material. Insulating concrete form wall materials shall comply with this section.

R611.6.1 Concrete material. Ready-mixed concrete for insulating concrete form walls shall be in accordance with Section R402.2. Maximum slump shall not be greater than 6 inches (152 mm) as determined in accordance with ASTM C 143. Maximum aggregate size shall not be larger than ¾ inch (19mm).

Exception: Concrete mixes conforming to the ICF manufacturer's recommendations.

In Seismic Design Categories D_0, D_1, and D_2, the minimum concrete compressive strength shall be 3,000 psi (20.5MPa).

R611.6.2 Reinforcing steel. Reinforcing steel shall meet the requirements of ASTM A 615, A 706, or A996. Except in Seismic Design Categories D_0, D_1, and D_2, the minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa). In Seismic Design Categories D_0, D_1, and D_2, reinforcing steel shall meet the requirements of ASTM A 706 or low-alloy steel with a minimum yield strength of 60,000 psi (Grade 60) (414 MPa).

TABLE R611.2
REQUIREMENTS FOR ICF WALLS[b]

WALL TYPE AND NOMINAL SIZE	MAXIMUM WALL WEIGHT (psf)[c]	MINIMUM WIDTH OF VERTICAL CORE (inches)[a]	MINIMUM THICKNESS OF VERTICAL CORE (inches)[a]	MAXIMUM SPACING OF VERTICAL CORES (inches)	MAXIMUM SPACING OF HORIZONTAL CORES (inches)	MINIMUM WEB THICKNESS (inches)
6" Screen-Grid	53	5.5	5.5	12	12	N/A

For SI: 1 inch = 25.4mm; 1 pound per cubic foot = 16.018 kg/m^3; 1 pound per square foot = 0.0479 kPa.

a. For width "W", thickness "T", spacing, and web thickness, refer to Figures R611.4 and R611.5.
b. N/A indicated not applicable.
c. Wall weight is based on a unit weight of concrete of 150 pcf. The tabulated values do not include any allowances for interior and exterior finishes.
d. For all buildings in Seismic Design Category A or B, and detaches one- and two-family dwellings in Seismic Design Category C the actual wall thickness in permitted to be up to 1 inch thicker than shown and the maximum wall weight to be 56 psf. Construction requirements and other limitations within Section R611 for 3.5-inch flat ICF walls shall apply. Interpolation between provisions for 3.5-inch and 5.5-inch flat ICF walls in not permitted.

TABLE R611.5
MINIMUM VERTICAL WALL REINFORCEMENT FOR SCREEN-GRID ICF ABOVE-GRADE WALLS[a, b, c]

DESIGN WIND PRESSURE [TABLE R611.3(1)] (psf)	MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MINIMUM VERTICAL REINFORCEMENT[d,e]		
		Nonload-Bearing Wall or Supporting Roof	Supporting Light-Framed Second Story and Roof	Supporting ICF Second Story and Roof
20	8	#4@48	#4@48	#4@48
	9	#4@48	#4@48	#4@48
	10	#4@48	#4@48	#4@48
30	8	#4@48	#4@48	#4@48
	9	#4@48	#4@48	#4@48
	10	#4@36; #5@48	#4@48	#4@48
40	8	#4@48	#4@48	#4@48
	9	#4@36; #5@48	#4@36; #5@48	#4@48
	10	#4@24; #5@48	#4@24; #5@48	#4@24; #5@48
50	8	#4@36; #5@48	#4@36; #5@48	#4@48
	9	#4@24; #5@48	#4@24; #5@48	#4@24; #5@48
	10	Design Required	Design Required	Design Required
60	8	#4@24; #5@48	#4@24; #5@48	#4@36; #5@48
	9	#4@24; #5@36	#4@24; #5@36	#4@24; #5@36
	10	Design Required	Design Required	Design Required
70	8	#4@24; #5@36	#4@24; #5@36	#4@24; #5@36
	9	Design Required	Design Required	Design Required
	10	Design Required	Design Required	Design Required
080	8	#4@12; #5@36	#4@24; #5@36	#4@24; #5@36
	9	Design Required	Design Required	Design Required
	10	Design Required	Design Required	Design Required

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 pound per square inch = 6.895 kPa.

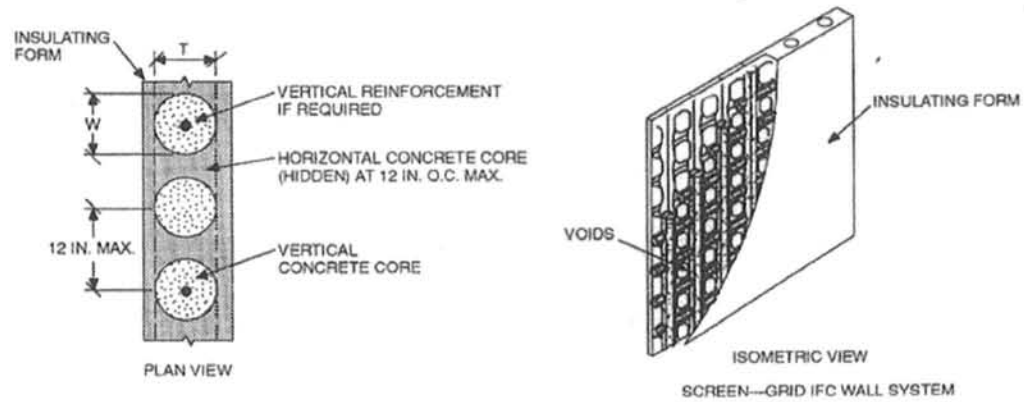
a. This table is based on reinforcing bars with a minimum yield strength of 40,000 psi and concrete with a minimum specified compressive strength of 2,500 psi. For Seismic Design Categories D_0, D_1 and D_2, reinforcing bars shall have a minimum yield strength of 60,000 psi. See Section R611.6.2.

b. Deflection criterion is $L/240$, where L is the height of the wall story in inches.

c. Interpolation shall not be permitted.

d. Increasing reinforcement spacing by 12 inches shall be permitted when reinforcing steel with a minimum yield strength of 60,000 psi is used. Reinforcement shall not be less than one #4 bar at 48 inches on center.

e. See Section R611.7.1.2 for limitations on maximum spacing of vertical reinforcement in Seismic Design Categories C, D_0, D_1 and D_2.



For SI: 1 inch = 25.4 mm.

FIGURE R611.5
SCREEN-GRID ICF WALL SYSTEM

TABLE R611.5
MINIMUM VERTICAL WALL REINFORCEMENT FOR SCREEN-GRID ICF ABOVE-GRADE WALLS[a, b, c]

DESIGN WIND PRESSURE [TABLE R611.3(1)] (psf)	MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MINIMUM VERTICAL REINFORCEMENT[d,e]		
		Nonload-Bearing Wall or Supporting Roof	Supporting Light-Framed Second Story and Roof	Supporting ICF Second Story and Roof
20	8	#4@48	#4@48	#4@48
	9	#4@48	#4@48	#4@48
	10	#4@48	#4@48	#4@48
30	8	#4@48	#4@48	#4@48
	9	#4@48	#4@48	#4@48
	10	#4@36; #5@48	#4@48	#4@48
40	8	#4@48	#4@48	#4@48
	9	#4@36; #5@48	#4@36; #5@48	#4@48
	10	#4@24; #5@48	#4@24; #5@48	#4@24; #5@48
50	8	#4@36; #5@48	#4@36; #5@48	#4@48
	9	#4@24; #5@48	#4@24; #5@48	#4@24; #5@48
	10	Design Required	Design Required	Design Required
60	8	#4@24; #5@48	#4@24; #5@48	#4@36; #5@48
	9	#4@24; #5@36	#4@24; #5@36	#4@24; #5@36
	10	Design Required	Design Required	Design Required
70	8	#4@24; #5@36	#4@24; #5@36	#4@24; #5@36
	9	Design Required	Design Required	Design Required
	10	Design Required	Design Required	Design Required
080	8	#4@12; #5@36	#4@24; #5@36	#4@24; #5@36
	9	Design Required	Design Required	Design Required
	10	Design Required	Design Required	Design Required

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 pound per square inch = 6.895 kPa.

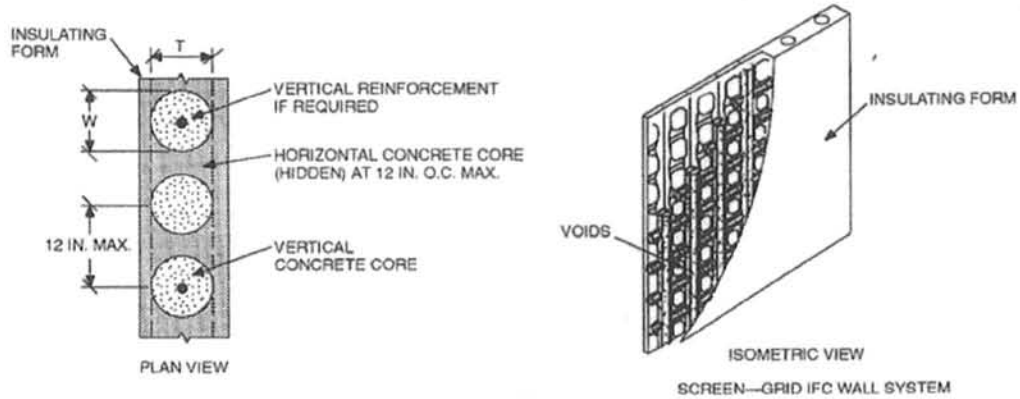
a. This table is based on reinforcing bars with a minimum yield strength of 40,000 psi and concrete with a minimum specified compressive strength of 2,500 psi. For Seismic Design Categories D_0, D_1 and D_2, reinforcing bars shall have a minimum yield strength of 60,000 psi. See Section R611.6.2.

b. Deflection criterion is $L/240$, where L is the height of the wall story in inches.

c. Interpolation shall not be permitted.

d. Increasing reinforcement spacing by 12 inches shall be permitted when reinforcing steel with a minimum yield strength of 60,000 psi is used. Reinforcement shall not be less than one #4 bar at 48 inches on center.

e. See Section R611.7.1.2 for limitations on maximum spacing of vertical reinforcement in Seismic Design Categories C, D_0, D_1 and D_2.



For SI: 1 inch = 25.4 mm.

FIGURE R611.5
SCREEN-GRID IFC WALL SYSTEM

TABLE R611.7(6)
MAXIMUM ALLOWABLE CLEAR SPANS FOR SCREEN-GRID ICF LINTELS IN LOAD-BEARING WALLS[a, b, c, d, e, f, g]
NO. 4 BOTTOM BAR SIZE

MINIMUM LINTEL THICKNESS, T (inches)[h,i]	MINIMUM LINTEL DEPTH, D (inches)	MAXIMUM CLEAR SPAN (feet-inches)					
		Supporting Roof		Supporting Light-Framed Second Story and Roof		Supporting ICF Second Story and Roof	
		Maximum Ground Snow Load (psf)					
		30	70	30	70	30	70
6	12	3-7	2-10	2-5	2-0	2-0	NA
	24	9-10	8-1	7-6	6-7	6-11	6-2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psi = 6.895 kPa, 1 psf = 0.0479 kPa.

a. This table is based on concrete with a minimum specified compressive strength of 2,500 psi, reinforcing steel with a minimum yield strength of 40,000 psi and an assumed equivalent rectangular cross section. When reinforcement with a minimum yield strength of 60,000 psi is used the span lengths in the shaded cells shall be increased by 1.2 times the table values.

b. This table is not intended to prohibit the use of ICF manufacturer's tables based on engineering analysis in accordance with ACI 318.

c. Deflection criterion: *L*/240.

d Design load assumptions:

Floor dead load is 10 psf
Floor live load is 30 psf
Maximum floor clear span is 32 ft
Light-frame wall dead load is 10 psf
Attic live load is 20 psf
Roof dead load is 15 psf
ICF wall dead load is 53 psf

e. Stirrup requirements:
Stirrups are not required for lintels 12 inches deep.
One No. 3 stirrup is required in each vertical core for lintels 24 inches deep.

f. Interpolation is permitted between ground snow loads.

g. Flat ICF lintels may be used in lieu of screen-grid lintels.

h. For actual wall lintel width, refer to Table R611.2.

i. Lintel width corresponds to the nominal screen-grid ICF wall thickness.

TABLE R611.7(7)
MAXIMUM ALLOWABLE CLEAR SPANS FOR SCREEN-GRID ICF LINTELS IN LOAD-BEARING WALLS[a, b, c, d, e, f, g]
NO. 5 BOTTOM BAR SIZE

MINIMUM LINTEL THICKNESS, T (inches)[h,i]	MINIMUM LINTEL DEPTH, D (inches)	MAXIMUM CLEAR SPAN (feet-inches)					
		Supporting Roof		Supporting Light-Framed Second Story and Roof		Supporting ICF Second Story and Roof	
		Maximum Ground Snow Load (psf)					
		30	70	30	70	30	70
6	12	3-7	2-10	2-5	2-0	2-0	NA
	24	12-3	10-0	9-3	8-3	8-7	7-8

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kPa.

a. This table is based on concrete with a minimum specified compressive strength of 2,500 psi, reinforcing steel with a minimum yield strength of 40,000 psi and an assumed equivalent rectangular cross section. When reinforcement with a minimum yield strength of 60,000 psi is used the span lengths in the shaded cells shall be increased by 1.2 times the table values.

b. This table is not intended to prohibit the use of ICF manufacturer's tables based on engineering analysis in accordance with ACI 318.

c. Deflection criterion: *L*/240.

d. Design load assumptions:

Floor dead load is 10 psf
Floor live load is 30 psf
Maximum floor clear span is 32 ft
Light-frame wall dead load is 10 psf
Attic live load is 20 psf
Roof dead load is 15 psf
ICF wall dead load is 53 psf

e. Stirrup requirements:
Stirrups are not required for lintels 12 inches deep.
One No. 3 stirrup is required in each vertical core for lintels 24 inches deep.

f. Interpolation is permitted between ground snow loads.

g. Flat ICF lintels may be used in lieu of screen-grid lintels.

h. For actual wall lintel width, refer to Table R611.2.

i. Lintel width corresponds to the nominal screen-grid ICF wall thickness.

Note;
The Flat Lintels can be used with the Screen Grid ICF system.

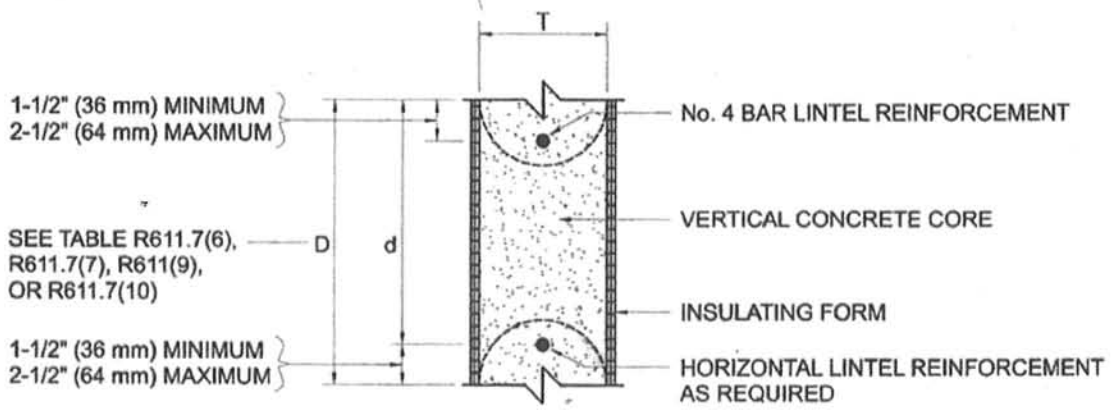


FIGURE R611.7(6)
SINGLE FORM HEIGHT SCREEN-GRID LINTEL

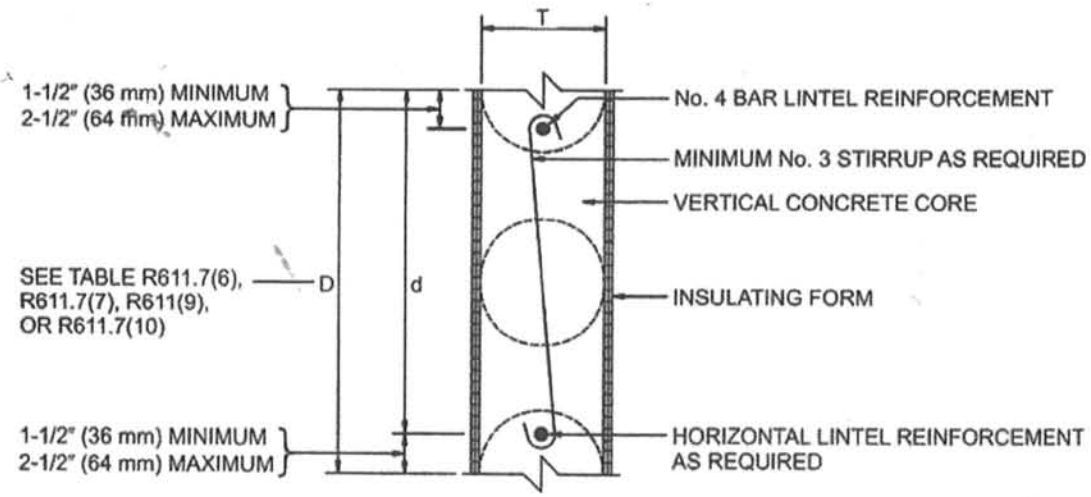


FIGURE R611.7(7)
DOUBLE FORM HEIGHT SCREEN-GRID LINTEL

R611.8.2 Ledger bearing. Wood ledger boards supporting bearing ends of joists or trusses shall be anchored to flat ICF walls with minimum thickness of 5.5 inches (140 mm) and to waffle- or screen-grid ICF walls with minimum nominal thickness of 6 inches (152 mm) in accordance with Figure R611.8(2), R611.8(3), R611.8(4) or R611.8(5) and Table R611.8(1). Wood ledger boards supporting bearing ends of joists or trusses shall be anchored to flat ICF walls with minimum thickness of 3.5 inches (140 mm) in accordance with Figure R611.8(5) and Table R611.8(1). The ledger shall be a minimum 2 by 8, No. 2 Southern Yellow Pine or No. 2 Douglas Fir. Ledgers anchored to nonload-bearing walls to support floor or roof sheathing shall be attached with $^1/_2$ inch (12.7 mm) diameter or headed anchor bolts spaced a maximum of 6 feet (1829 mm) on center. Anchor bolts shall be embedded a minimum of 4 inches (102 mm) into the concrete measured from the inside face of the insulating form. For insulating forms with a face shell thickness of 1.5 inches (38 mm) or less, the hole in the form shall be a minimum of 4 inches (102 mm) in diameter. For insulating forms with a face shell thicker than 1.5 inches (38 mm), the diameter of the hole in the form shall be increased by 1 inch (25 mm) for each $^1/_2$ inch (13 mm) of additional insulating form face shell thickness. The ledger board shall be in direct contact with the concrete at each bolt location.

R611.8.2.1 Ledger bearing requirements for Seismic Design Categories C, D_0, D_1 and D_2. Additional anchorage mechanisms connecting the wall to the floor system

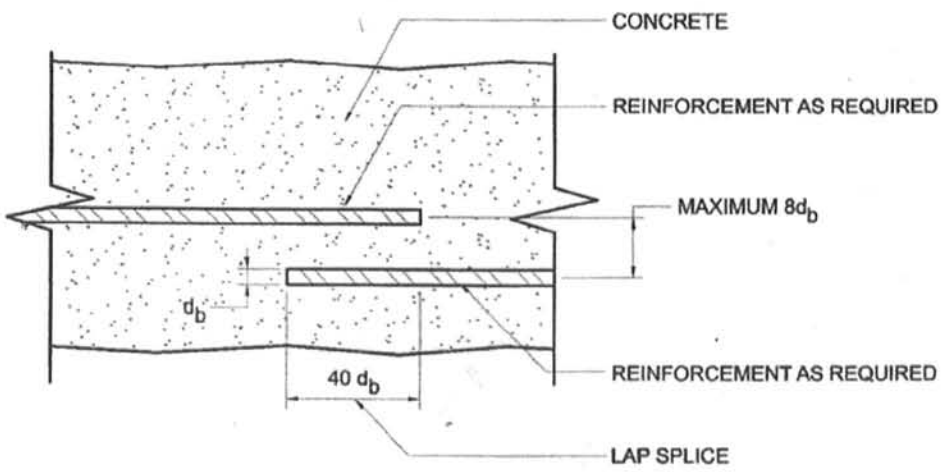


FIGURE R611.7.1.4
LAP SPLICES

shall be installed at a maximum spacing of 6 feet (1829 mm) on center for townhouses in Seismic Design Category C and 4 feet (1220 mm) on center for all buildings in Seismic Design Categories D_0, D_1 and D_2. The additional anchorage mechanisms shall be attached to the ICF wall reinforcement and joist rafters or blocking in accordance with Figures R611.8(1) through R611.8(7). The additional anchorage shall be installed through an oversized hole in the ledger board that is $^1/_2$ inch (13 mm) larger than the anchorage mechanism diameter to prevent combined tension and shear in the mechanism. The blocking shall be attached to floor or roof sheathing in accordance with edge fastener spacing. Such additional anchorage shall not be accomplished by the use of toe nails or nails subject to withdrawal nor shall such anchorage mechanisms induce tension stresses perpendicular to grain in ledgers or nailers. The capacity of such anchors shall result in connections capable of resisting the design values listed in Table R611.8(2).The diaphragm sheathing fasteners applied directly to a ledger shall not be considered effective in providing the additional anchorage required by this section.

Where the additional anchorage mechanisms consist of threaded rods with hex nuts or headed bolts complying with ASTM A 307, Grade A or ASTM F 1554, Grade 36, the design tensile strengths shown in Table R611.9 shall be equal to or greater than the product of the design values listed in Table R611.8(2) and the spacing of the bolts in feet (mm). Anchor bolts shall be embedded as indicated in Table R611.9. Bolts with hooks shall not be used.

R611.8.3 Floor and roof diaphragm construction. Floor and roof diaphragms shall be constructed of wood structural panel sheathing attached to wood framing in accordance with Table R602.3(1) or Table R602.3(2) or to cold-formed steel floor framing in accordance with Table R505.3.1(2) or to cold-formed steel roof framing in accordance with Table R804.3.

R611.8.3.1 Floor and roof diaphragm construction requirements in Seismic Design Categories D_0, D_1 and D_2. The requirements of this section shall apply in addition to those required by Section R611.8.3. Edge spacing of fasteners in floor and roof sheathing shall be 4 inches (102 mm) on center for Seismic Design Category D_0 or D_1 and 3 inches (76 mm) on center for Seismic Design Category D_2. In Seismic Design Categories D_0, D_1 and D_2, all sheathing edges shall be attached to framing or blocking. Minimum sheathing fastener size shall be 0.113 inch (3 mm) diameter with a minimum penetration of $1^3/_8$-inches (35 mm) into framing members supporting the sheathing. Minimum wood structural panel thickness shall be $^7/_{16}$ inch (11 mm) for roof sheathing and $^{23}/_{32}$ inch (18 mm) for floor sheathing. Vertical offsets in floor framing shall not be permitted.

R611.9 ICF wall to top sill plate (roof) connections. Wood sill plates attaching roof framing to ICF walls shall be anchored with minimum $^1/_2$ inch (13 mm) diameter anchor bolt embedded a minimum of 7 inches (178 mm) and placed at 6 feet (1829 mm) on center in accordance with Figure R611.9. Anchor bolts shall be located in the cores of waffle-grid and screen-grid ICF walls. Roof assemblies subject to wind uplift pressure of 20 pounds per square foot (1.44 kPa) or greater as established in Table R301.2(2) shall have rafter or truss ties provided in accordance with Table R802.11.

R611.9.1 ICF wall to top sill plate (roof) connections for Seismic Design Categories C, D_0, D_1 and D_2. The requirements of this section shall apply in addition to those required by Section R611.9. The top of an ICF wall at a gable shall be attached to an attic floor in accordance with Section R611.8.1.1. For townhouses in Seismic Design Category C, attic floor diaphragms shall be constructed of structural wood sheathing panels attached to wood framing in accordance with Table R602.3(1) or Table R602.3(2). Edge spacing of fasteners in attic floor sheathing shall be 4 inches (102 mm) on center for Seismic Design Category D_0 or D_1 and 3 inches (76 mm) on center for Seismic Design Category D_2. In Seismic Design Categories D_0, D_1 and D_2, all sheathing edges shall be attached to framing or blocking. Minimum sheathing fastener size shall be 0.113 inch (2.8 mm) diameter with a

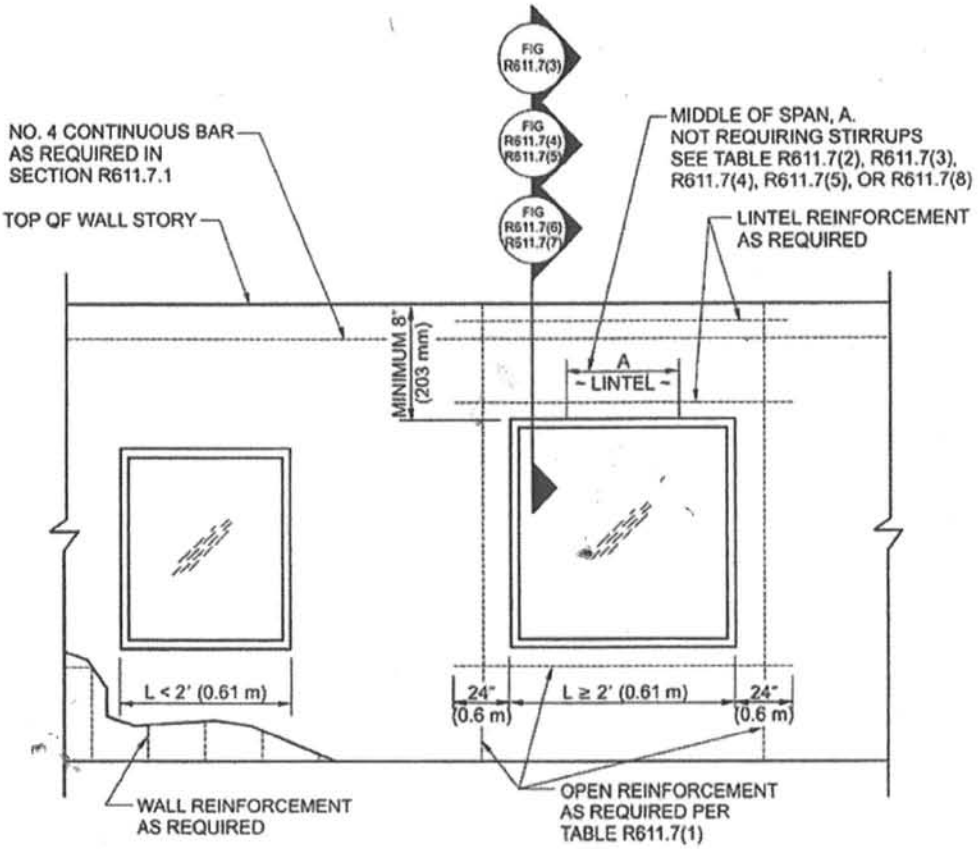
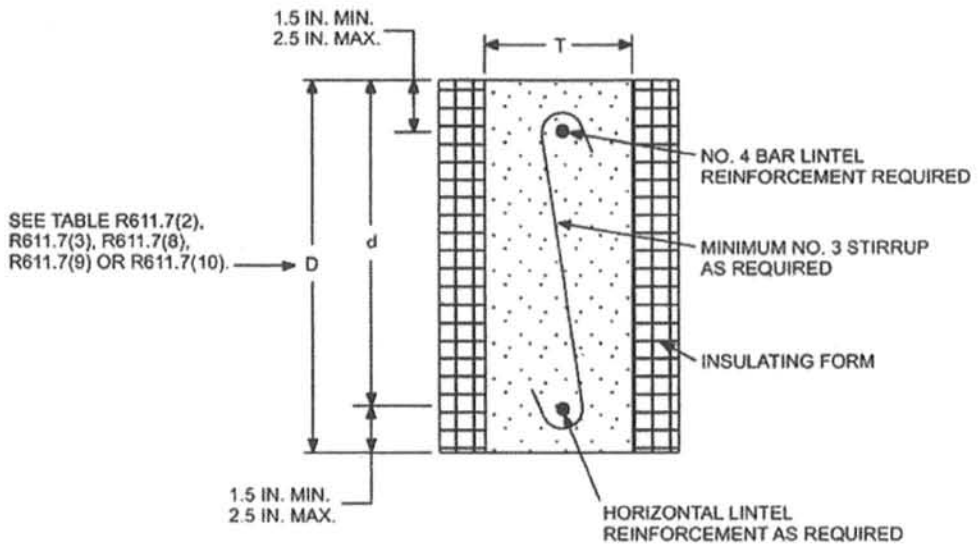


FIGURE R611.7(2)
REINFORCEMENT OF OPERNINGS



For SI: 1 inch = 25.4 mm.
NOTE: Section cut through flat wall.

FIGURE R611.7(3)
ICF LINTELS FOR FLAT AND SCREEN-GRID WALLS

TABLE R611.7(3)
MAXIMUM ALLOWABLE CLEAR SPANS FOR ICF LINTELS FOR FLAT LOAD-BEARING WALLS[a, b, c, d, f]
NO. 5 BOTTOM BAR SIZE

MINIMUM LINTEL THICKNESS, T (inches)	LINTEL DEPTH, D (inches)	MAXIMUM CLEAR SPAN, (feet-inches) (Number is Middle of Span, A)[e]					
		Supporting Roof		Supporting Light-Framed 2nd Story and Roof		Supporting ICF Second Story and Roof	
		Ground Snow Load					
		30 psf	70 psf	30 psf	70 psf	30 psf	70 psf
3.5	8	4-9 (1-2)	4-2 (0-9)	3-11 (0-8)	3-7 (0-6)	3-7 (0-6)	3-5 (0-5)
	12	7-2 (1-11)	6-3 (1-3)	5-11 (1-1)	5-5 (0-10)	5-5 (0-10)	5-0 (0-8)
	16	9-6 (2-9)	8-0 (1-9)	7-4 (1-6)	6-6 (1-2)	6-7 (1-2)	5-11 (1-0)
	20	11-1 (3-5)	9-1 (2-3)	8-4 (1-11)	7-5 (1-6)	7-6 (1-7)	6-9 (1-3)
	24	12-2 (4-1)	10-0 (2-9)	9-3 (2-4)	8-2 (1-10)	8-4 (1-11)	7-6 (1-6)
5.5	8	5-6 (1-10)	4-10 (1-2)	4-7 (1-0)	4-2 (0-9)	4-2 (0-10)	3-10 (0-8)
	12	8-3 (3-0)	6-9 (2-0)	6-3 (1-9)	5-6 (1-4)	5-7 (1-4)	5-0 (1-1)
	16	9-9 (4-1)	8-0 (2-9)	7-5 (2-5)	6-6 (1-10)	6-7 (1-11)	6-0 (1-7)
	20	10-11 (5-3)	9-0 (3-6)	8-4 (3-1)	7-5 (2-4)	7-6 (2-5)	6-9 (2-0)
	24	12-0 (6-3)	9-11 (4-3)	9-3 (3-8)	8-2 (2-11)	8-3 (3-0)	7-6 (2-5)
7.5	8	6-1 (2-6)	5-2 (1-8)	4-9 (1-5)	4-3 (1-1)	4-3 (1-1)	3-10 (0-11)
	12	8-2 (4-0)	6-9 (2-8)	6-3 (2-4)	5-6 (1-10)	5-7 (1-10)	5-0 (1-6)
	16	9-7 (5-5)	7-11 (3-8)	7-4 (3-3)	6-6 (2-6)	6-7 (2-7)	6-0 (2-2)
	20	10-10 (6-10)	8-11 (4-8)	8-4 (4-2)	7-4 (3-3)	7-6 (3-4)	6-9 (2-9)
	24	11-10 (8-2)	9-10 (5-8)	9-2 (5-1)	8-1 (3-11)	8-3 (4-1)	7-5 (3-4)
9.5	8	6-4 (3-1)	5-2 (2-1)	4-10 (1-9)	4-3 (1-5)	4-4 (1-5)	3-11 (1-2)
	12	8-2 (5-0)	6-8 (3-4)	6-2 (3-0)	5-6 (2-4)	5-7 (2-5)	5-0 (1-11)
	16	9-6 (6-9)	7-11 (4-7)	7-4 (4-2)	6-6 (3-3)	6-7 (3-4)	5-11 (2-8)
	20	10-8 (8-4)	8-10 (5-10)	8-3 (5-4)	7-4 (4-2)	7-5 (4-3)	6-9 (3-6)
	24	11-7 (10-0)	9-9 (6-11)	9-0 (6-5)	8-1 (5-0)	8-2 (5-2)	7-5 (4-3)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kPa.

a. This table is based on concrete with a minimum specified compressive strength of 2,500 psi, reinforcing steel with a minimum yield strength of 40,000 psi and an assumed equivalent rectangular cross section. When reinforcement with a minimum yield strength of 60,000 psi is used the span lengths in the shaded cells shall be increased by 1.2 times the table values.

b. This table is not intended to prohibit the use of ICF manufacturer's tables based on engineering analysis in accordance with ACI 318.

c. Deflection criterion: *L*/240.

d. Design load assumptions:

Floor dead load is 10 psf	Attic live load is 20 psf
Floor live load is 30 psf	Roof dead load is 15 psf
Building width is 32 feet	ICF wall dead load is 69 psf
Light-framed wall dead load is 10 psf	

e. No. 3 stirrups are required at *d*/2 spacing except no stirrups are required for the distance, (A), shown in the middle portion of the span in accordance with Figure R611.7(2) and Section R611.7.3.2.

f. Interpolation is permitted between ground snow loads and between lintel depths.

TABLE R611.7(2)
MAXIMUM ALLOWABLE CLEAR SPANS FOR ICF LINTELS FOR FLAT LOAD-BEARING WALLS[a, b, c, d, f]
NO. 4 BOTTOM BAR SIZE

MINIMUM LINTEL THICKNESS, T (inches)	LINTEL DEPTH, D (inches)	MAXIMUM CLEAR SPAN, (feet-inches) (Number is Middle of Span, A)[e]					
		Supporting Roof Only		Supporting Light-Framed 2nd Story and Roof		Supporting ICF Second Story and Roof	
		Ground Snow Load					
		30 psf	70 psf	30 psf	70 psf	30 psf	70 psf
3.5	8	4-9 (1-2)	4-2 (0-9)	3-10 (0-8)	3-4 (0-6)	3-5 (0-6)	3-1 (0-5)
	12	6-8 (1-11)	5-5 (1-3)	5-0 (1-1)	4-5 (0-10)	4-6 (0-10)	4-0 (0-8)
	16	7-11 (2-9)	6-5 (1-9)	6-0 (1-6)	5-3 (1-2)	5-4 (1-2)	4-10 (1-0)
	20	8-11 (3-5)	7-4 (2-3)	6-9 (1-11)	6-0 (1-6)	6-1 (1-7)	5-6 (1-3)
	24	9-10 (4-1)	8-1 (2-9)	7-6 (2-4)	6-7 (1-10)	6-9 (1-11)	6-1 (1-6)
5.5	8	5-2 (1-10)	4-2 (1-2)	3-10 (1-0)	3-5 (0-9)	3-5 (0-10)	3-1 (0-8)
	12	6-8 (3-0)	5-5 (2-0)	5-0 (1-9)	4-5 (1-4)	4-6 (1-4)	4-1 (1-1)
	16	7-10 (4-1)	6-5 (2-9)	6-0 (2-5)	5-3 (1-10)	5-4 (1-11)	4-10 (1-7)
	20	8-10 (5-3)	7-3 (3-6)	6-9 (3-1)	6-0 (2-4)	6-1 (2-5)	5-6 (2-0)
	24	9-8 (6-3)	8-0 (4-3)	7-5 (3-8)	6-7 (2-11)	6-8 (3-0)	6-0 (2-5)
7.5	8	5-2 (2-6)	4-2 (1-8)	3-11 (1-5)	3-5 (1-1)	3-6 (1-1)	3-2 (0-11)
	12	6-7 (4-0)	5-5 (2-8)	5-0 (2-4)	4-5 (1-10)	4-6 (1-10)	4-1 (1-6)
	16	7-9 (5-5)	6-5 (3-8)	5-11 (3-3)	5-3 (2-6)	5-4 (2-7)	4-10 (2-2)
	20	8-8 (6-10)	7-2 (4-8)	6-8 (4-2)	5-11 (3-3)	6-0 (3-4)	5-5 (2-9)
	24	9-6 (8-2)	7-11 (5-8)	7-4 (5-1)	6-6 (3-11)	6-7 (4-1)	6-0 (3-4)
9.5	8	5-2 (3-1)	4-2 (2-1)	3-11 (1-9)	3-5 (1-5)	3-6 (1-5)	3-2 (1-2)
	12	6-7 (5-0)	5-5 (3-4)	5-0 (3-0)	4-5 (2-4)	4-6 (2-5)	4-1 (1-11)
	16	7-8 (6-9)	6-4 (4-7)	5-11 (4-2)	5-3 (3-3)	5-4 (3-4)	4-10 (2-8)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kPa.

a. This table is based on concrete with a minimum specified compressive strength of 2,500 psi, reinforcing steel with a minimum yield strength of 40,000 psi and an assumed equivalent rectangular cross section. When reinforcement with a minimum yield strength of 60,000 psi is used, the span lengths in the shaded cells shall be increased by 1.2 times the table values.

b. This table is not intended to prohibit the use of ICF manufacturer's tables based on engineering analysis in accordance with ACI 318.

c. Deflection criterion: $L/240$.

d. Design load assumptions:

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Floor live load is 30 psf	Roof dead load is 15 psf
Building width is 32 feet	ICF wall dead load is 69 psf
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e. No. 3 stirrups are required at $d/2$ spacing except no stirrups are required for the distance, (A), shown in the middle portion of the span in accordance with Figure R611.7(2) and Section R611.7.3.2.

f. Interpolation is permitted between ground snow loads and between lintel depths.

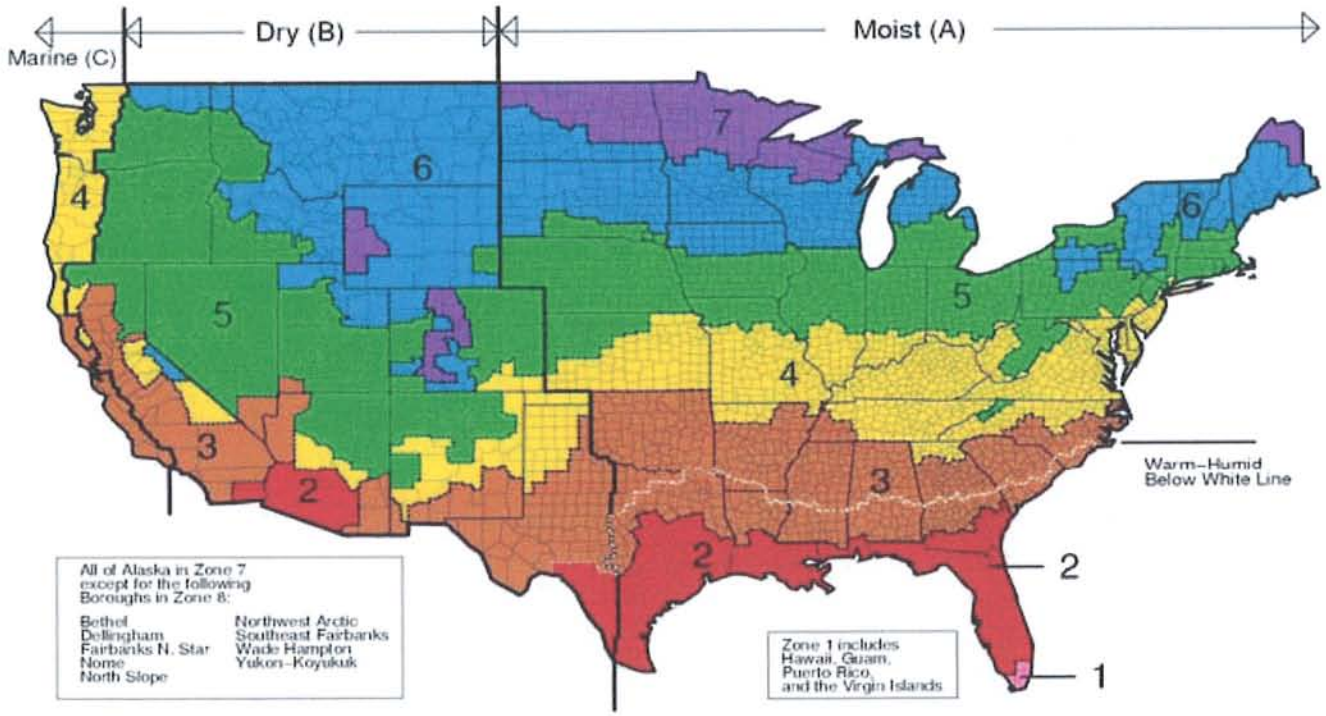
Earth Friendly Building Materials, LLC.

EARTH FRIENDLY BUILDING MATERIALS **CLIMATE RELATED MASS WALL R VALUES**

EF Block Wall Product	Thickness of ICF	Steady State R / Inch	Dynamic R-Value (Considering the Thermal Mass)					
			ZONE 1 s/s * 1.79	ZONE 2 s/s * 2.17	ZONE 3 s/s * 1.98	Zone 4 s/s * 2.02	Zone 5 s/s * 2.10	Zone 6 s/s * 2.05
Standard Earth Friendly Block								
10" Block	5.5"	23.16	41.45	50.25	45.85	46.78	48.63	47.47
12" Block	5.5"	32.19	50.45	59.25	54.85	55.78	57.63	56.47
14" Block	5.5"	41.16	59.45	68.25	63.85	64.78	66.63	65.47

Note;

The 12" & 14" Earth Friendly Block Have a 2" & 4" EPS Laminated to the Exterior
EPS calculated at R4.5 per inch
Mass conversion ratio provided by Oakridge National Laboratory
Climate Map, Courtesy of D.O.E.



Earth Friendly Building Materials LLC.
205 South Industrial Drive Tempe, Arizona 85281
Office (602) 541-0791 ~ Fax (480) 924-8691
dan1@efbm.com (877) 272-7872 Toll Free
www.efbm.com www.efblock.com

SECTION 03450a

Architectural precast Concrete

Composite 12" Screen Grid per IRC 2006

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Insulated concrete forms for:
      a. Exterior structural wall construction.
      b. Interior walls (structural and non-structural).
   2. Installation of reinforcing steel.
   3. Placement of concrete within formwork.

B. Products Installed but not Furnished Under this Section:
   1. Reinforcing Steel: Furnish in accordance with Section 03200.
   2. Cast -In-Place Concrete: Furnish in accordance Section 03300
   3. Sleeves, inserts, anchors and bolts: Furnish in accordance with Section 05500 and other applicable sections.
   4. Bucks for Windows and Doors: Furnish in accordance with Division 8.

C. Related Sections:
   1. Windows and Doors: Furnish and install in accordance with Division 8.
   2. Stucco, plaster, tile and other wall finishes: Furnish and install in accordance with Division 9.

1.02 REFERENCES

A. ASTM
   1. ASTM C1389 (formerly ASTM E514) - Test Method for Water Penetrations and Leakage Through Masonry
   2. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E119 - Test methods for Fire Tests of Building Construction and Materials.
   4. ASTM E331 - Test method for Water Penetrations of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

B. UBC:
   1. UBC 8-1- Test Method for Surface Burning Characteristics of Building Materials.
   2. UBC 14-1 - Kraft Waterproof Building Paper.
   3. UBC 26-3 - Room Fire Test Standard for Interior of Foam Plastic Systems.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Insulated concrete form system shall provide a permanent framework for a grid of reinforced concrete to form load-bearing walls, shear walls, stem walls, lintels, retaining walls and other components of the building. Channels

inside the elements shall be designed to provide optumum strength while using the lowest possible amount of concrete.

B. Performance Requirements: In accordance with manufacturer's General Structural Notes on Drawings.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, design data and installation instructions.

B. Shop Drawings: Submit drawings showing layout, dimensions and construction details.

C. Test Reports: Submit reports validating product compliance with specified requirements.

1.05 QUALITY ASSURANCE

A. Pre-Installation Conference:

1. Convene a pre-installation conference to review specifications and procedures with the Architect, Contractor, installer, manufacturer's representative, Owner and other trades relevant to the work, prior to ordering materials.

2. Notify Architect at least 48 hours prior to starting Work.

3. Contractor shall review materials, details, etc. and submit a report including revised details to Architect. Incorporate revised details approved by Architect in the Project at no additional cost to Owner.

1.06 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to and unload.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with manufacturer's instructions.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Resource Management:
1. Recycled Content: Provide insulating concrete form containing 87% recycled content.

2. Manufacturing:

a. Production of 10 square feet of material shall consume approximately 1kWh of electricity with no heating process required.

b. Residues of production shall be recycled into subsequent product production.

PART 2 PRODUCTS

2.01 MANUFACTURER/LICENSEE

A. Manufacturer: Earth Friendly Block LLC 205 S. Industrial Drive Tempe, Arizona 85281

B. Licensee: Earth Friendly Building Materials LLC Arizona 205 S. Industrial Drive Tempe, Arizona 85281

2.02 MATERIALS

A. Insulated concrete forms

1. Material:

a. Recycled content, postconsumer expanded polystyrene: ±87 % by volume.

b. Bulk density: 22 lb/ft^3 ±10%.

c. Compressive strength: 56 psi.

d. Tensile strength: 43 psi

e. Water vapor transmission: 7.3

f. Fire Endurance (10 inch wall thickness per ASTM E119): 4 hours rating per UL R14366, 9/91, 2/99

g. Thermal barrier (Room fire test):

1) No flame spread.
2) No smoke development.
3) Wall meets UBC 26-3.

h. Surface burning characteristics (ASTM E84, NFPA 255)

1) Flame spread index: 0
2) Smoke development index: 5.
3) NFPA Class A
4) UBC Class 1

i. Frost resistance: Highly frost resistant.

i. Toxicity: Low

k. Formation of mildew: Mildew and fungus growth is not anticipated.

l. Water transmission: Meets the following requirements.

1) ASTM E331
2) ASTM C1389 (formerly ASTM E514)
3) UBC 14-1 (grade "C" kraft paper).

m. Average wall humidity: Average 2.5% by volume.

n. Expansion: 0.0018 inch/foot.

o. Thermal performance (effective R-value): ±30 h.°Fsq.ft./Btu.

p. Sound Insulation: >50dB(a)

2. Standard Element Dimensions:

a. Overall thickness:

1) 10 inches (250mm)

b. Void Diameter:

1) 10 inch (250mm) overall thickness: 6 inches (155mm).

c. Outside wall thickness (void to outside face):

1) 10 inch (250mm) overall thickness: 2 inches (50mm).

d. Length:

1) 10 inch (250mm) overall thickness:60 inches (1500mm).

B. Concrete: In accordance with Section 03300 and as follows:

1. Compressive strength at 28 days: In accordance with General Structural Notes.

2. Aggregate size: In accordance with insulated concrete form manufacturer's recommendation for size of void to be provided.

3. Slump: In accordance with General Structural Notes and insulated concrete form manufacturer's recommendation for size of void to be provided.

C. Adhesive for joining insulated concrete forms: As provided by insulated concrete form manufacturer.

2.03 EQUIPMENT

A. Tools and Supplies shall be as recommended by manufacturer's Installation Guide.

2.04 FABRICATION

A Tolerances:

1. 10 inch (250mm) overall thickness

a. Overall thickness: ±1/8 inch.

b. Voids: -1/2 inch (openings may be oblong instead of round)

c. Outside wall thickness (void to outside face): +1/2 inch, -3/8 inch

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect.

2. Examine footings to verify that they are within acceptable tolerances for installation of wall panels.

3. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

A. In accordance with manufacturer's Installation Guide.

3.03 CLEANING

A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

Material Safety Data Sheet
ay e used to co py with O 's a ard
Communication Standard, 29 CFR 1910 1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(as Used on Label and List)*

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's na e: Earth Friendly Building Materials	Emergency Telephone Number: 1-877-272-7872
Address *(Number, Street, City, State and ZIP Code)*	Telephone Number for Information: 1-602-541-0791
205 S Industrial Dr.	Date Prepared: Aug 3, 2004
Tempe, AZ 85281	Signature of Preparer *(optional)*

Section II—Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Hydrated Portland Cement, Recycled Polystyrene				
No hazardous materials				
No volatiles				
Inert material				

Section III—Physical/Chemical Characteristics

Boiling Point	N/A	Specific Gravity (H_20 = 1) 0.35	
Vapor Pressure (mm Hg)	N/A	Melting Point N/A	
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1) N/A	

Solubility in Water: Not Soluble

Appearance and Odor: Grey - cementitious, odorless

Section IV—Fire and Explosion Hazard Data

Flash Point (Method Used)	N/A	Flammable Limits	LEL N/A	UEL N/A	

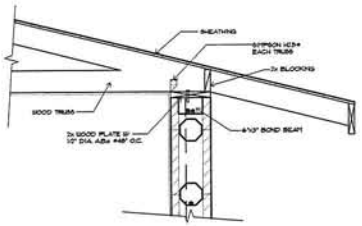
Extinguishing Media: N/A

Special Fire Fighting Procedures: N/A

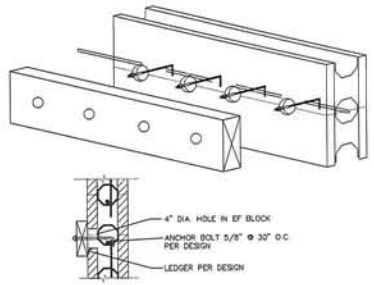
Unusual Fire and Explosion Hazards: N/A

(Reproduce locally)

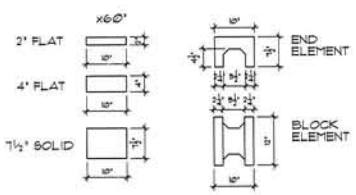
OSHA 174 Sept. 1985



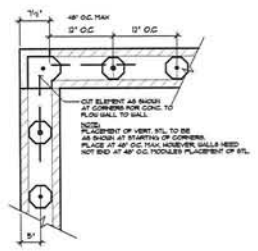
4 ROOF BEARING DETAIL
SCALE: 1" = 1'-0"



3 LEDGER DETAIL
SCALE: 1" = 1'-0"



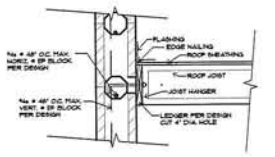
2 WALL ELEMENTS
SCALE: 1" = 1'-0"



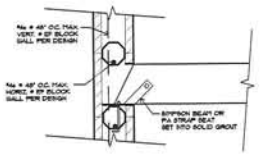
1 CORNER DETAILS
SCALE: 1" = 1'-0"

EF BLOCK NOTES

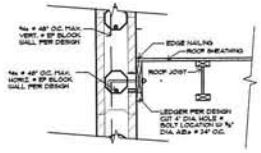
1. EF BLOCK MUST BE GROUTED SOLID W/ MIN. 2500 PSI CONCRETE
2. PLACING OF CONCRETE INTO THE CORES MUST BE ACCOMPLISHED IN ACCORDANCE WITH SECTION 1905 OF THE U.B.C.
3. REINFORCING f_y = 40,000 P.S.I. A=615 GRADE 40.
4. THE CONCRETE GROUT MUST HAVE A COMPRESSIVE STRENGTH OF 2500 P.S.I. AT 28 DAYS WITH A SLUMP OF 7". CLEAN-OUTS ARE NOT REQUIRED. VIBRATION IS NOT REQUIRED. GROUT 10' LIFT (2- 5' LIFTS SAME DAY.)
5. INSTALLATION: EF BLOCK MAY BE ERECTED IN A VERTICAL OR HORIZONTAL POSITION WITH VERTICAL AND HORIZONTAL CAVITIES ALIGNED, AND REINFORCEMENT INSTALLED AS REQUIRED BY STRUCTURAL DESIGN
6. THE WALLS MUST BE ADEQUATELY BRACED TO RESIST LATERAL FORCES DURING THE POURING OF THE CONCRETE.
7. ALL CELLS ARE TO BE GROUTED SOLID.
8. VERTICAL AND HORIZONTAL SPACING OF REINFORCEMENT SHALL BE 48" O.C. MAX. SEE ENGINEERING OR 2006 INTERNATIONAL RESIDENTIAL CODE FOR SIZE OF REINFORCEMENT.



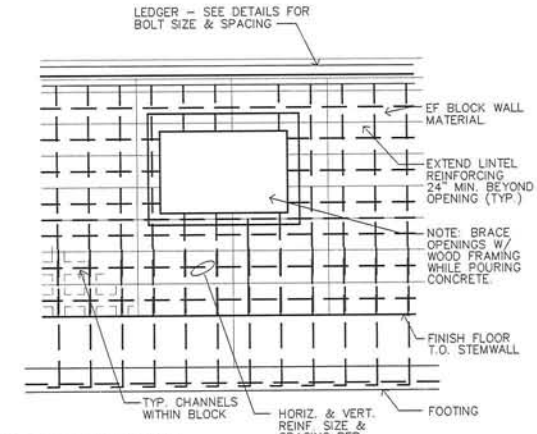
8 LEDGER AT WALL
SCALE: 1" = 1'-0"



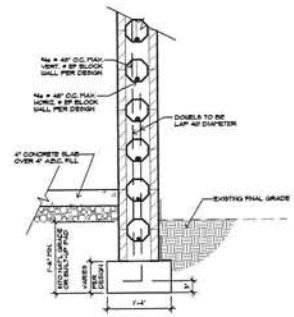
7 BEAM BEARING DETAIL
SCALE: 1" = 1'-0"



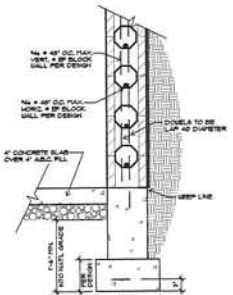
5 NON-BEARING WALL DETAIL
SCALE: 1" = 1'-0"



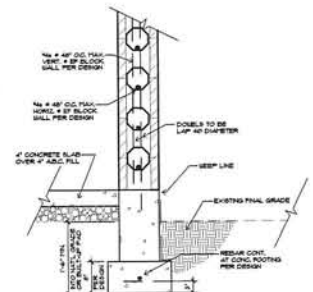
6 WALL ELEVATION DETAIL
N.T.S.



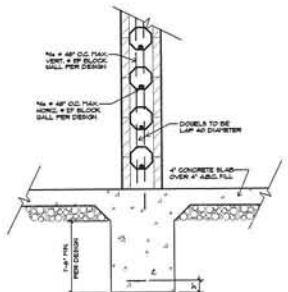
13 FOOTING — CONCRETE STEM
SCALE: 1" = 1'-0"



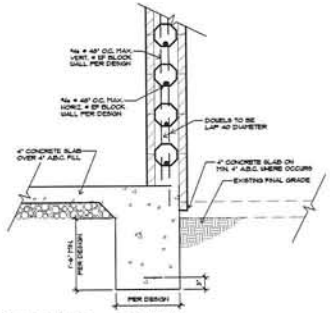
12 FOOTING — BASEMENT WALL
SCALE: 1" = 1'-0"



11 FOOTING — CONCRETE STEM
SCALE: 1" = 1'-0"



10 INTERIOR BEARING WALL
SCALE: 1" = 1'-0"

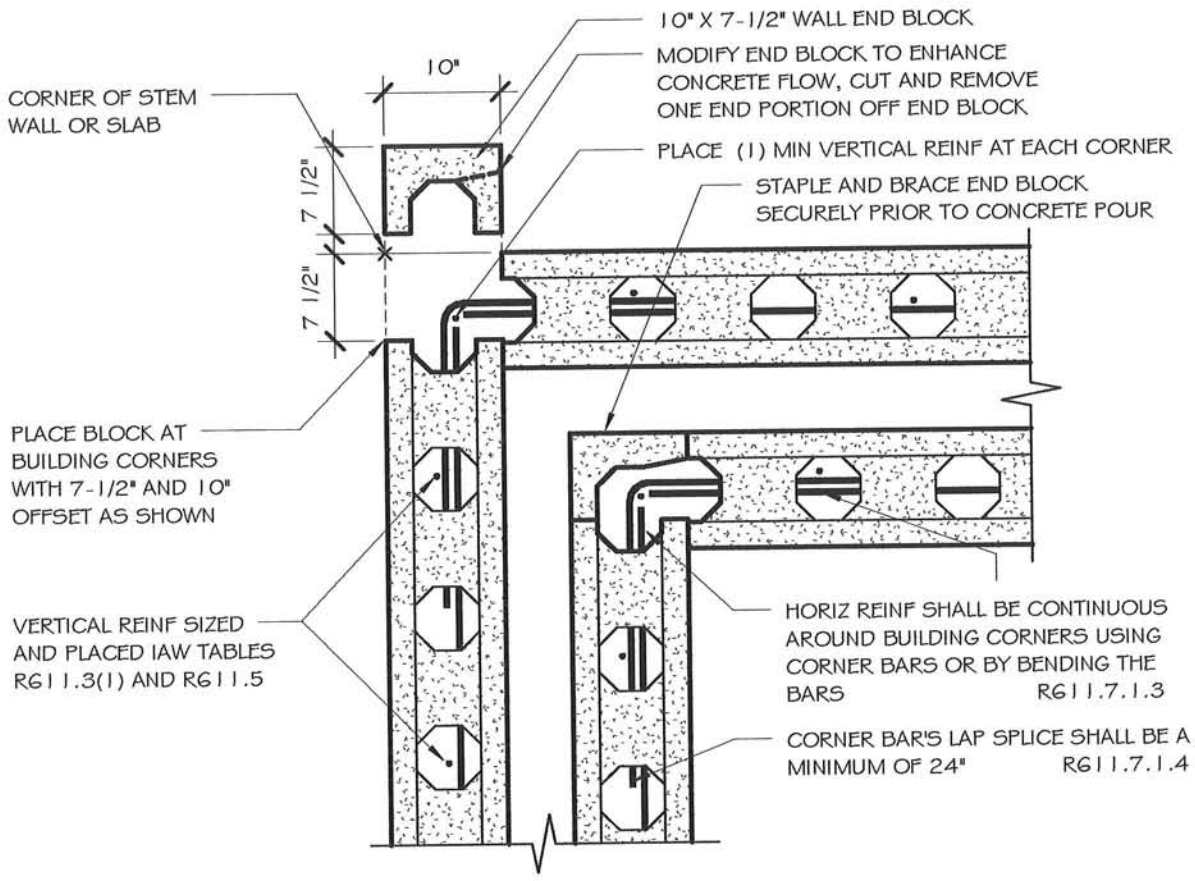


9 FOOTING — TURNDOWN
SCALE: 1" = 1'-0"

EARTH FRIENDLY BUILDING MATERIALS, LLC
DAN CHOUINARD
480-830-5333

EARTH FRIENDLY BLOCKS
209 S. INDUSTRIAL DRIVE, TEMPE, ARIZONA 85281-2506

1 SEPT 2005



EF BLOCK CORNER CONSTRUCTION

SCALE: 3/4" = 1'-0"

RT DESIGN 623-271-1173	DAN CHOUINARD EF BLOCK	EF BLOCK CORNER

Project number	2010-001
Date	8/14/2010
Drawn by	RET
Checked by	-

3A

Scale 3/4" = 1'-0"

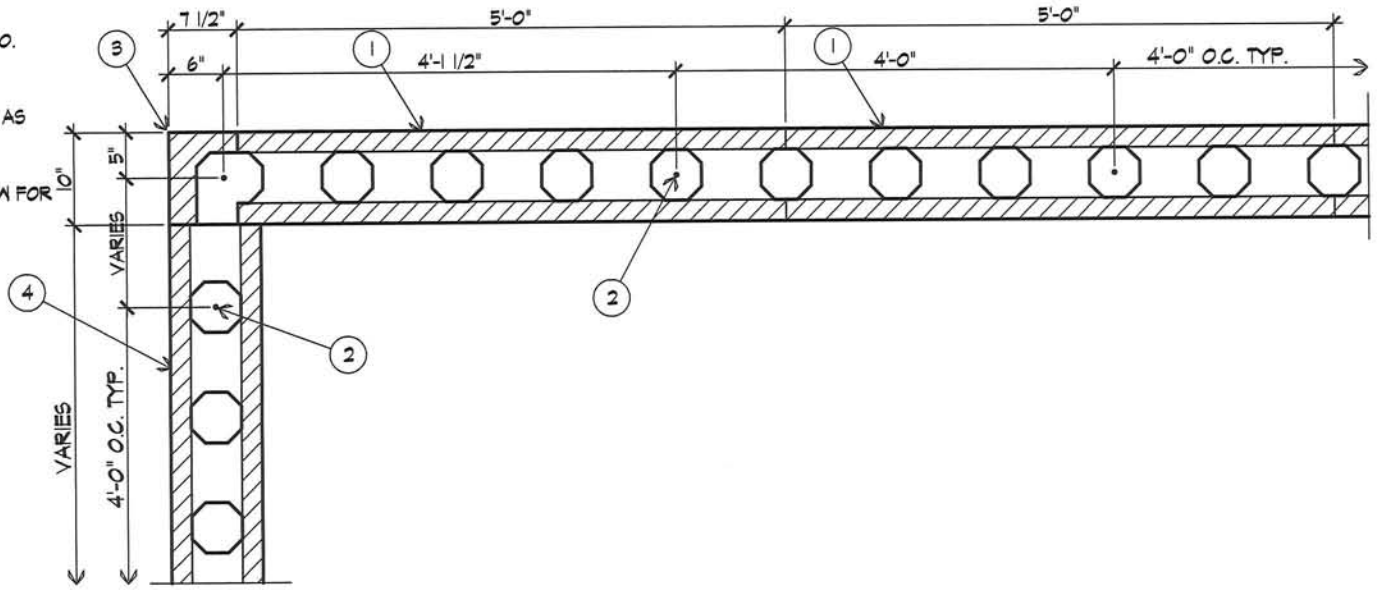
8/22/2010 10:54:44 PM

(1) EF BLOCK - TYPICAL 5' LENGTH WITH GROUTED CELLS AT 12" O.C. AND #4 REBAR AT 48" O.C. VERT.

(2) #4 REBAR AT 48" O.C. U.N.O.

(3) EF CORNER - DIMENSIONS AS NOTED.

(4) EF BLOCK - CUT TO ALLOW FOR CLEAN JOINT TO CORNER.



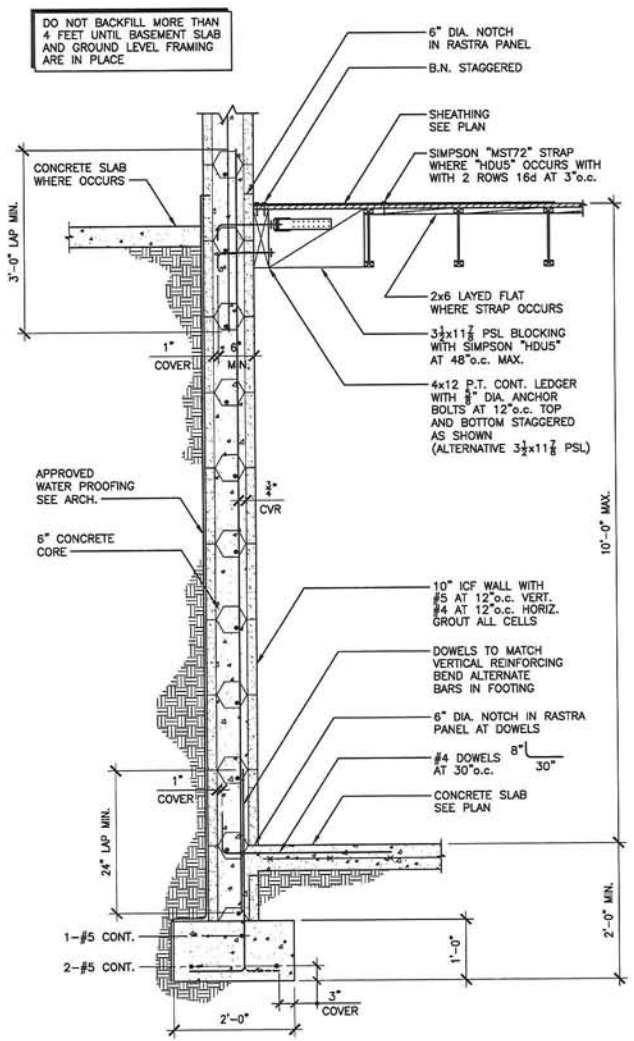
1

EFCORNER.DWG
12/11/09

EF BLOCK CORNER

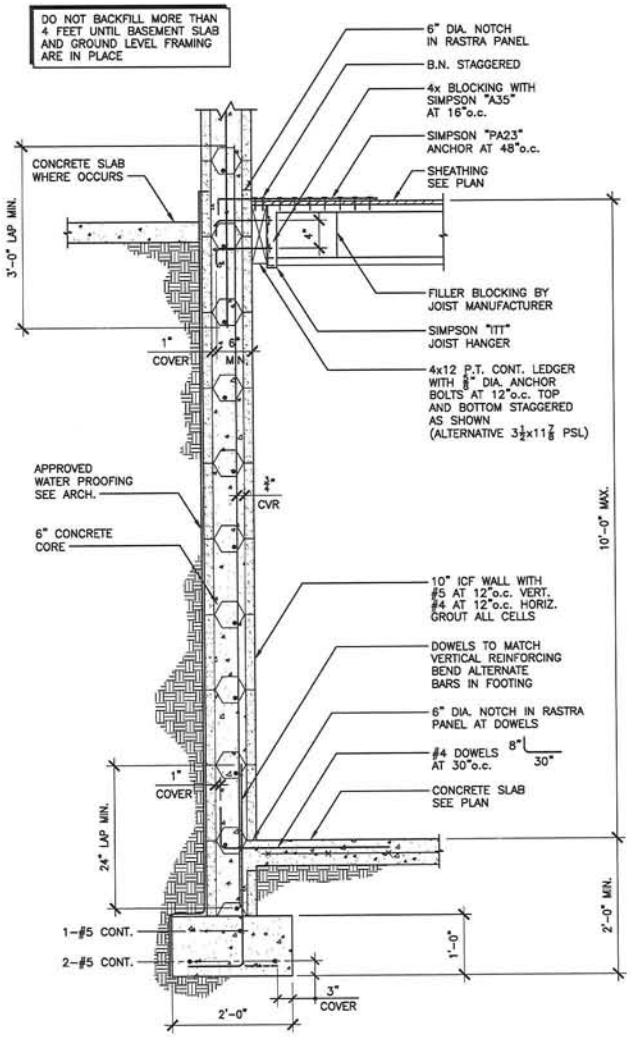
CORNER REBAR LAYOUT - PLAN VIEW

SCALE: 3/4"=1'-0"



TYPICAL BASEMENT WALL SK2

1/2"=1'



TYPICAL BASEMENT WALL SK1

1/2"=1'

No	DATE	REVISION DESCRIPTION
1	01-01-2010	PROGRESS

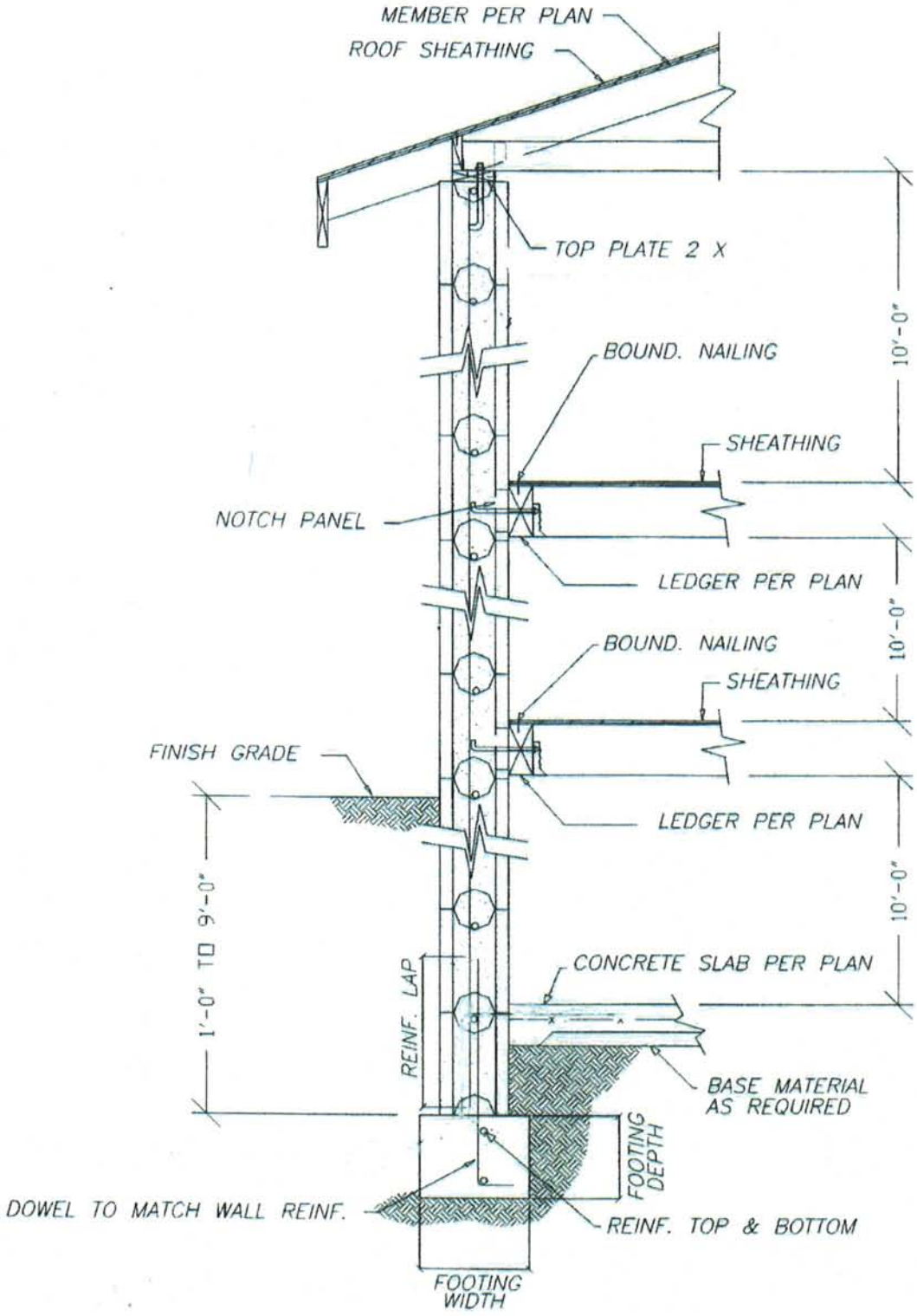
DATE ISSUED 01-01-2010

DRAW BY ML

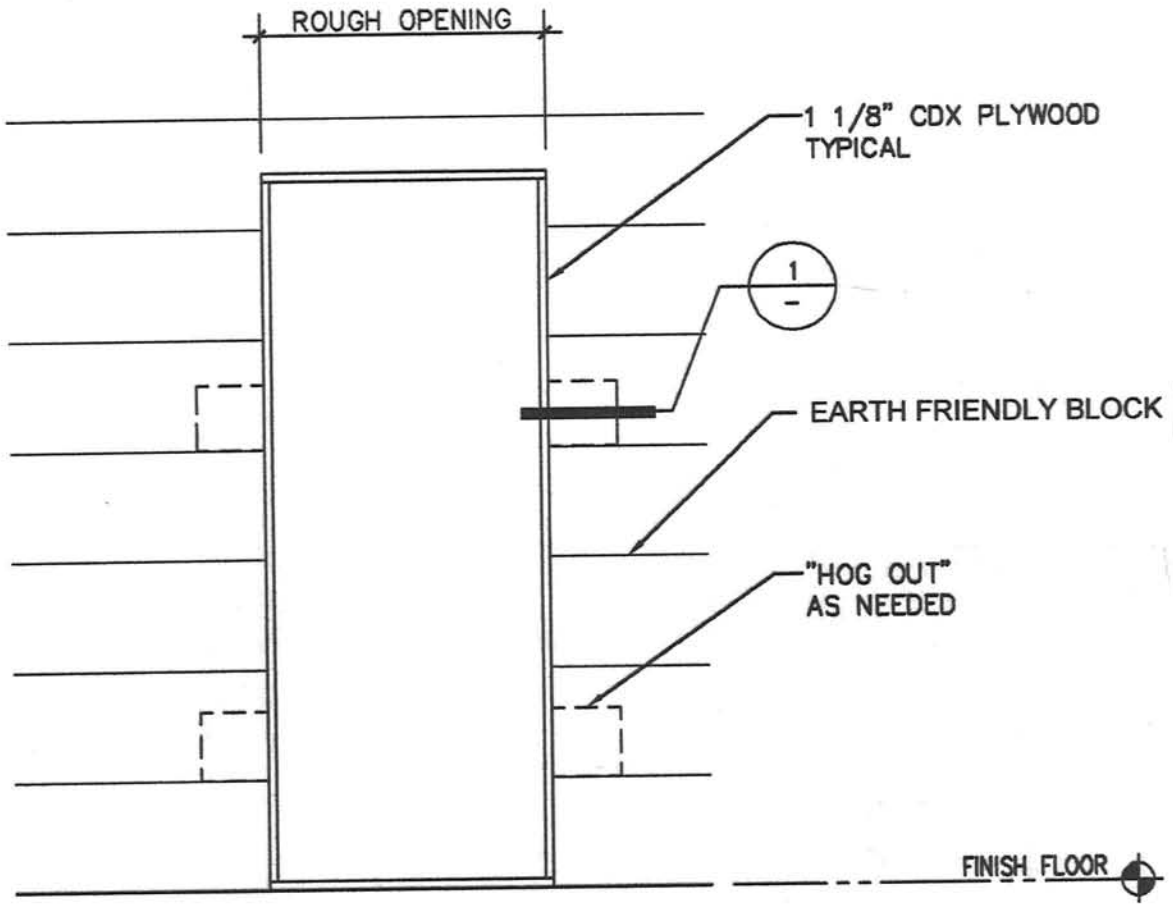
CHECKED BY TL

BASEMENT WALL DETAILS

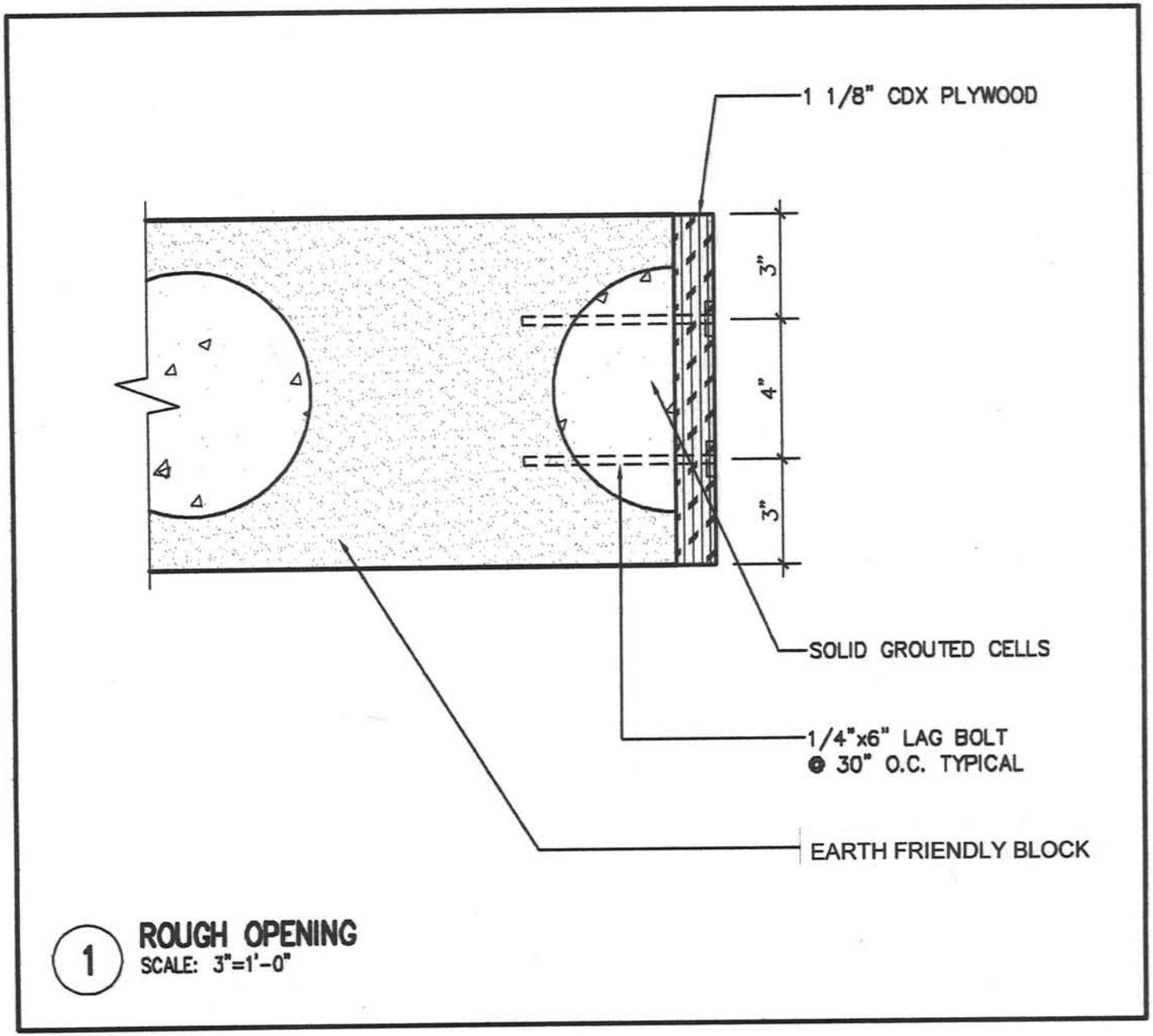
S1.0



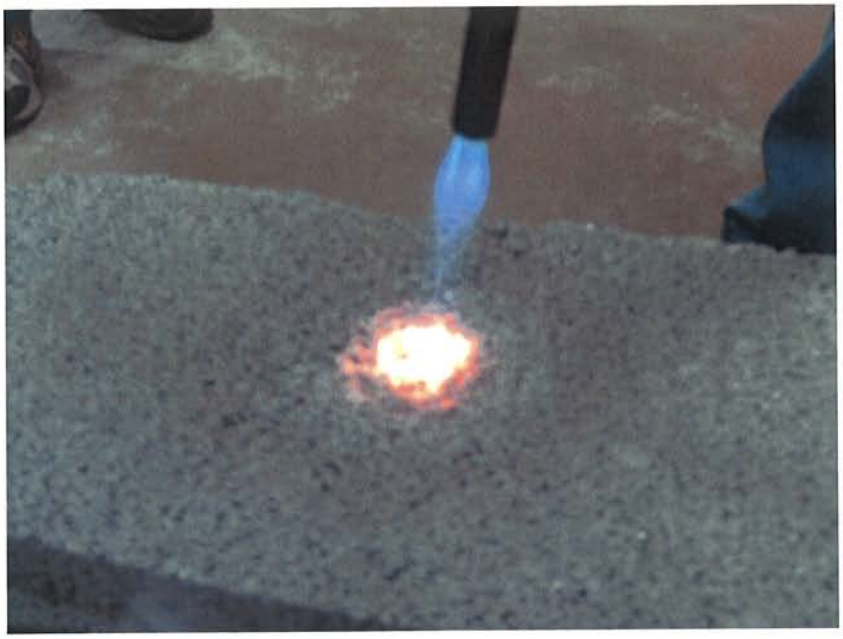
Earth Friendly Block Two Story With Basement Height Limit Detail When Using Prescriptive Design



2 **ROUGH OPENING ELEVATION**
SCALE: 1/2"=1'-0"



1 **ROUGH OPENING**
SCALE: 3"=1'-0"



5500 Degree

Fire Test

Measure It

Mark It

Scribe It

Cut It

Check Plumb

Glue It


EF BLOCK
EF BLOCK
EF BLOCK


ASU
RECYCLING
ASU

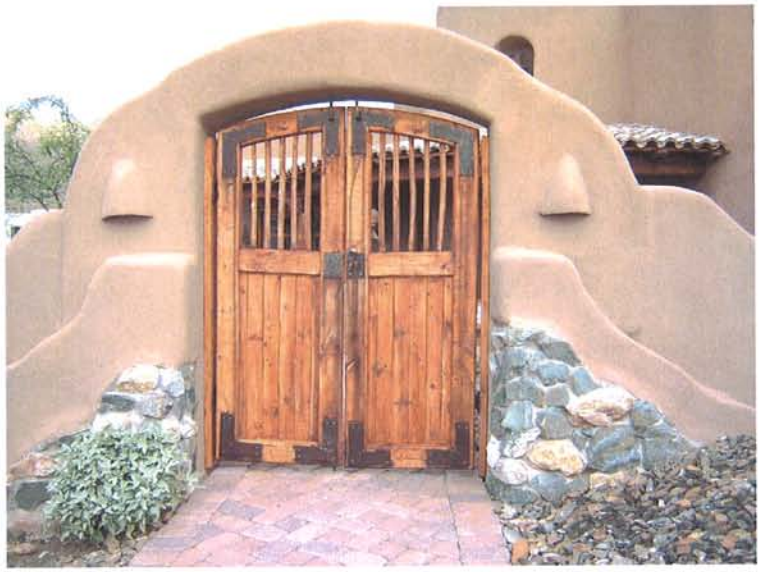

1205

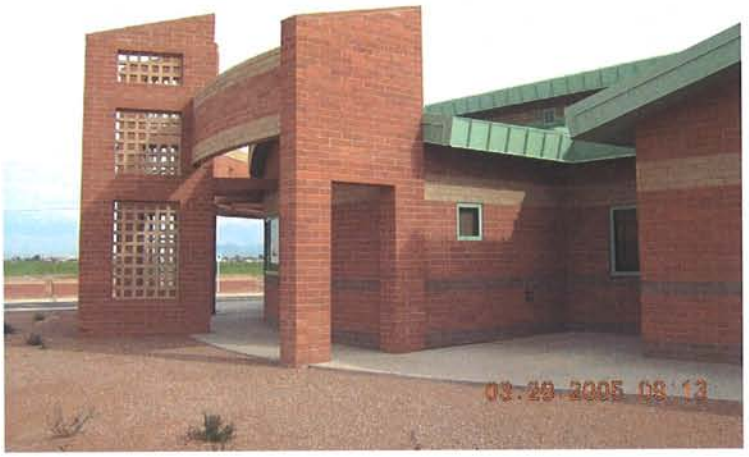

Phoenix Fire Station
54


GILBERT FIRE STATION No. 6
3595 EAST WARNER


3630 EAST GERMANN
03.28.2005 09:32


STATION No. 5

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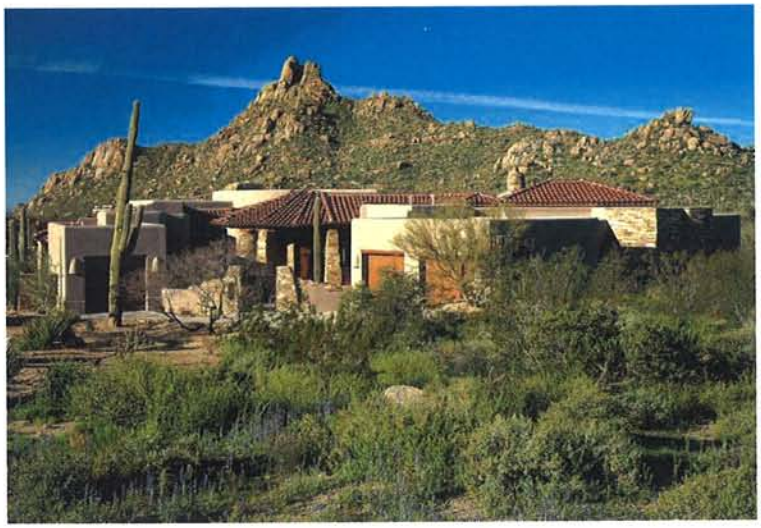
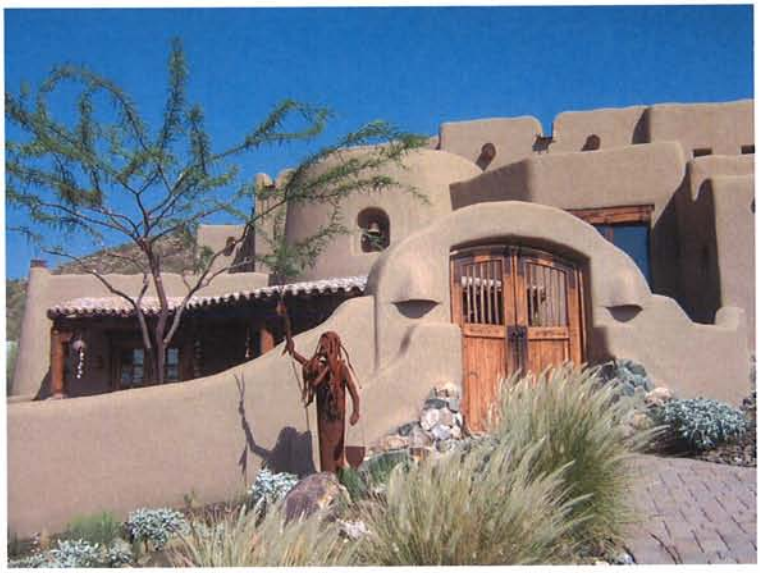




Introducing
"EF Block" ™

- Introduction to EF Block Building Materials
- Overview of EF Block and the competition
- The EF Block System Proprietary (Patent Pending)
- Plant, Product and Processes of the EF Block system
- Homes Built with the EF Block
- Commercial Buildings with EF Block
- Owning a Plant and Green Opportunities

Introduction to EF Block

A Truly Green Building Material

EF Block is manufactured from recycled post consumer and post industrial expanded polystyrene, which is then mixed with a binder. EF Block is 87% recycled material, which would otherwise end up in a landfill never to disintegrate. EF Block is a true "GREEN" building material.

EF Block is the building solution for economical, earth-friendly commercial and residential construction.

Our goal with the EF Block product is to develop, manufacture and build plants at millions less than similar concept's. While producing a single mold product from 23 years experience the inventor has brought the best block to the market for commercial, residential and institutional builders worldwide.

The EF Block concept has been used to build over 20,000 structures in the US and Mexico.

Over View of the Block

- Expanded Patent Pending Fully Molded Design Block
- Perfect weight to volume ratio.
- Incredibly lightweight – five foot block can be handled by 1 person
- Increased durability – resistance to wind, earthquakes, etc.
- Ease of use - modifications on site simply executed
- Recyclable – no wood - Save 141 trees per 1,500 sq ft home
- No mold, pests, warping, mildew and fire resistant
- Reduced on-site construction time- no waste

The EF Block Concept

Specifications

Uses: EF Block's are used as permanent form work for structural concrete walls in buildings of any type of construction.

Description: EF Block's are hollow core forms comprised of a mixture of polystyrene beads, Portland Cement, admixtures and water; containing approximately 87% by volume of expanded polystyrene beads with a density of between 20 and 24 pcf. A Block has a compressive strength of ≥ 56 psi and a tensile strength of ≥ 43 psi. The expansion of a Block is the same as standard concrete (.0018 inch/ft.).

Concrete fill: Normal weight concrete with 3/8 inch maximum aggregate size and minimum compressive strength of 2500 psi at 28 days.

Reinforcement: Deformed steel reinforcement bars with a minimum yield stress of 40 ksi complying with ASTM A 615.

Structural design: Structural analysis and design of the concrete fill, steel reinforcement, and waterproofing is prepared in accordance with Building Codes.

EF BLOCK BENIFITS

Design, Construction & Efficiency- During construction, EF Block's are dry stacked on top of each other without the need for mortared seams. The panels are easy to cut and shape to fit nearly any design. As the block's are stacked, steel rods (rebar) are inserted in grid-work fashion throughout the cores, and then the cores are filled with concrete. Curved walls, dimensional walls rounded corners, leaning walls and arched openings are now easy and economical. On-site changes can be carried out with a snap.

Strength & Durability-EF Block's structures are 700% stronger then 2' x 6' wood framed structures. Walls are designed to stand up to the challenges of severe climates including tornados, fires, hurricanes and earthquakes.

Energy Efficiency-EF Block buildings show on average a 40% improvement in heating loss. EF Block buildings have a tighter building envelope and a higher insulating value, leading to fewer drafts and a decrease in operating costs to maintain a comfortable interior environment.

Maintenance-EF Block buildings are dimensionally stable, offering lower maintenance costs. With no wood to rot, no insects, paint lasts longer and stucco cracks are practically eliminated. HVAC units turn on/off less often. Reduced maintenance costs contribute to a lower cost-of-ownership, a good feature when you sell.

Build Green, Build Smart

- Environmentally Friendly
- Recyclable
- Quicker Build
- Efficient
- Mold Resistant
- Fire Retardant
- Termite Resistant
- Reduced Noise
- Tax Breaks
- Low Labor Costs
- Seismic Level 4 Approved

The EF Block is easier to install, and has better qualities than traditional wood framing . With ease of use in building and lower construction labor, Name brand corporations are accepting this **GREEN** Concept today.

The EFBM LLC EF Block Plant

MEASURE IT

MARK IT

SCRIBE IT

CUT IT

The EF Block has integrated environmentally responsible designs and construction principles into the custom building industry. Making it an ideal Global Green Building solution. We have over 300 custom designs for water falls, doors, panels, all shapes and sizes to customize any project.

EF Block Endless Applications

Residential

- Low Income
- Planned Communities
- Custom Cabins
- Fencing

Industrial

- Warehouses
- Manufacturing Plants
- Distribution Centers
- Storage Sites

Military

- Offices
- Barracks
- Storage
- Fencing

Commercial

- Office Buildings
- Retail Buildings
- Apartments
- Condominiums

Institutional

- Schools
- Libraries
- Churches
- Convention Centers

Complete Kits

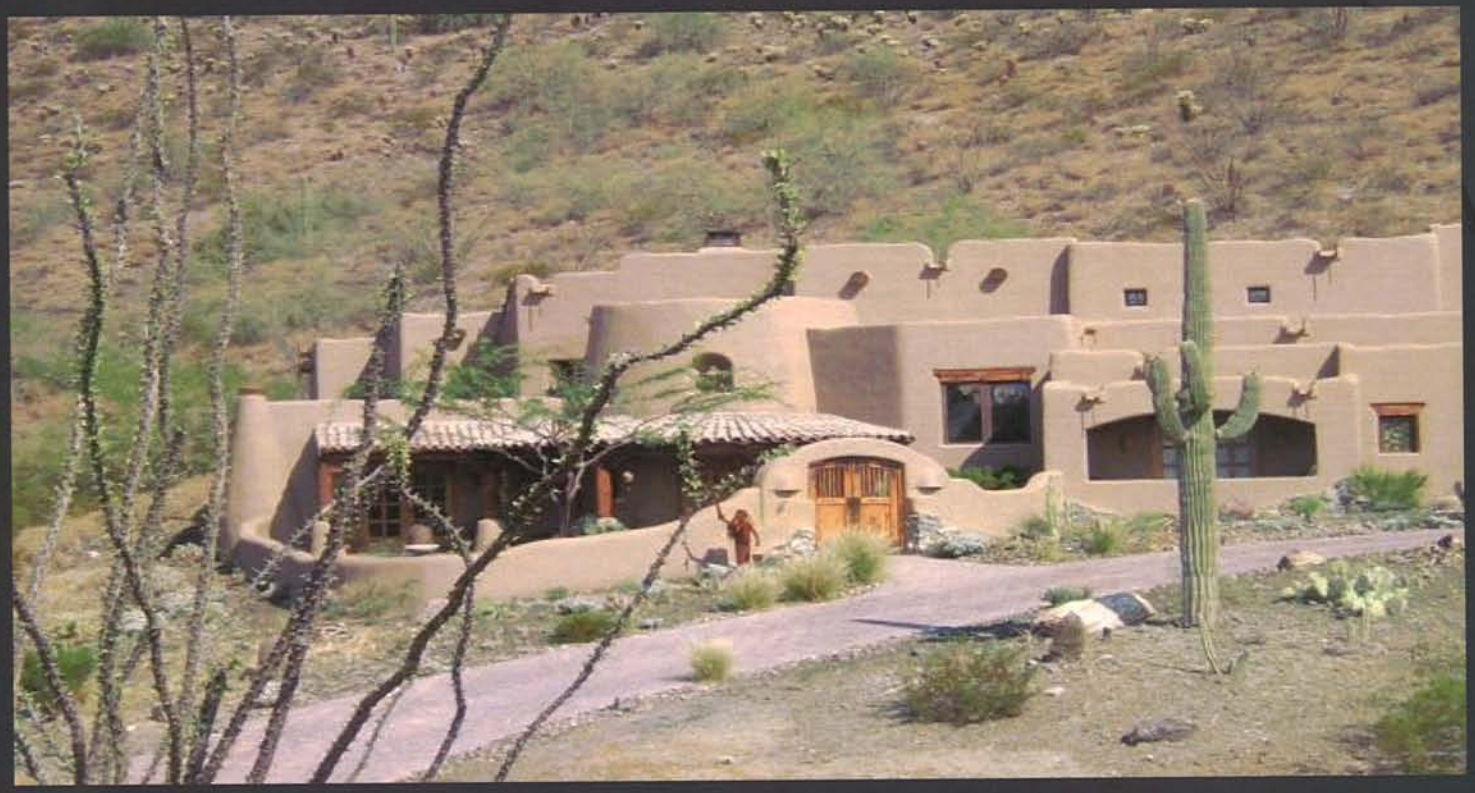
- Flex Lofts
- Flex Plex Multi-use
- Security Stations
- Guest Quarters


Phoenix Fire Station
54


STATION No. 5


3630 EAST GERMANN


03.29.2005 09:13



Investment and Opportunities for a EF Block Factory

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Mobile: 602-541-0791

Email: dan1@efbm.com

www.efbm.com or www.efblock.com