

General Residential Code Information & Requirements

Provided for your reference is a basic (partial) listing of the building requirements under the current residential building code. For complete code information, please refer to the 2006 International Residential Code (IRC).

Building

Footing Inspection:

- Frost Depth - minimum of 36"
- Concrete mix - minimum 2500 psi/3000 psi if exposed
- Reinforcement (if required) - minimum of two #4 rods supported on *approved supports*. All joints shall overlap a minimum of 15". Please Note: Wet setting of rods is not permitted.
- Bulk mixing of concrete materials is not permitted on site.

Foundation Inspection (Basement wall requirements):

- Concrete masonry block with greater than 4 feet of backfill shall be reinforced per Tables R404.1.1(2)(3)(4), attached hereto.
- Concrete masonry block foundation walls minimum thickness Per Table R404.1.1(1), attached hereto.
- Foundation walls that are below grade shall be damp-proofed with minimum 3/8" thick parq. (Portland Based Product) with bituminous base coating, or any approved damp-proofing method.
- French drains shall be provided around foundations that enclose habitable or usable spaces.
- Concrete floors shall be a minimum 3.5" thick at minimum 2500 psi.
- All vegetation shall be removed prior to pouring of concrete.
- A 6 mil vapor barrier shall be installed.
- Sill plates shall be anchored to the foundation with approved anchor bolts per Table R404.1(2), attached hereto.
- Foundation walls that support beams or girders shall have a minimum 4" solid masonry under the beam or girder.
- Columns that support beams or girders shall have footings separate from the floor slab.
- Masonry foundation walls shall be laterally supported per Tables R404.1(1)(2)(3), attached hereto.
- Underground building drains for sanitary waste shall be left exposed for testing and inspection.
- Rain water removal (down spouts) shall *not* terminate into French drain pipe.

Rough Inspection - Framing

- Inspect size, spacing and span of all floor, wall and floor/ceiling framing members.
- Inspect size and span of load bearing headers and girders.
- Horizontal framing members are required to have hanger support (If they are not bearing on a wall).
- All roof/floor truss systems are to have documents showing design, spacing, bracing and applicable load designs on site (site built trusses are not permitted).
- Holes and notches of framing members are permitted per Section R502.8 and R602.6.
- Inspect minimum energy requirements: R-18 exterior walls, R-38 ceiling/attic spaces, R-21 floors over crawl spaces and R-10 basement walls (conditioned).
- Ice guard is required on roofs.
- Asphalt shingles on roofs sloped < 4:12 pitch are required to have a double underlay (felt paper).
- Inspect attic spaces for ventilation.
- Attics that are 30" or greater in height are required to have an access opening (minimum 22" x 30").
- Inspect exterior wall bracing.
- Inspect for fire blocking.
- Inspect where the opening of an operable window is located more than 72" above the finished grade or surface below the lowest part of the clear opening of the window shall be a minimum of 24" above the finished floor of the room in which the window is located.

Rough Inspection - Means of Egress

- At least one exit (exterior door) is required with a minimum 36" wide x 80" height. *This required exit cannot be through a garage.*
- All means of egress stairs (interior and exterior) are required to have a maximum 7 3/4" rise and a minimum 10" tread (measured from nose to nose).
- All means of egress stairs must have a minimum 80" head clearance height.
- Hallways in means of egress are required to have a minimum 36" clear width.
- Hand rails shall have a 34" minimum to 38" maximum height.
- Decks, porches and landings > 30" shall have guard rails (36" minimum height).
- All basements and bedrooms shall have a means of emergency escape. *This required exit cannot be through a garage.*

Plumbing

Rough & Final Inspection

- Underground piping shall be supported continuously for its entire length.
- Reduction of drain pipe size in the direction of flow is prohibited.

- Fittings for drains and vents shall be directional type.
- Pipes shall be supported with approved supports i.e., strapping or hooks (tie wire and blocking is prohibited).
- All threaded fittings shall be sealed with approved thread sealant.
- Cleanouts shall be installed in all drains before they penetrate concrete slabs.
- Horizontal drains shall be supported a maximum 48" between supports.
- All fixture traps shall be vented. NOTE: S-traps are prohibited.
- Slip joints in drains shall have a minimum 12" x 12" access.
- Water and drain lines shall be protected where subject to freezing (heat tape or insulation).
- Holes for pipes in framing members shall be protected with a metal guard where hole is 1 ¼ " or less from the face of the framing member.
- A minimum ¾" water service line shall be provided.
- Hot water tanks shall be installed per manufacturer's instructions.
- Hot water tank pressure/temperature relief valve shall terminate undiminished in size to the floor or receptor.
- A thermal expansion tank shall be installed on hot water tanks.
- All hose bibs shall have a means to protect from anti-siphon.
- All valves in concealed spaces shall have an access.

Mechanical

Rough and Final Inspection -

- Inspect for access to all appliances (Installation per manufactures instructions).
- Appliances installed in attic area shall have a solid floor (minimum 24" wide) from the access opening to the appliance.
- A light switch shall be installed at the access opening.
- Condensation from evaporator coils shall drain to an indirect waste receptor (floor drain, stand pipe). Direct connection to a waste or vent pipe is prohibited.
- Secondary drain and/or pan is required for equipment above framing.
- Bathroom exhaust fans must terminate to the outside of the building either through the roof or exterior wall is discharge pipe is not permitted in soffit eaves.
- Ducts shall be sealed with approved mastic or tape.
- No duct openings are permitted in garages.
- Ducts shall be sized and installed per manufacturer's instructions and in accordance with the International Mechanical Code.
- Ducts in attics and conditioned crawl spaces shall be insulated.
- Vents and vent connectors shall be installed per manufacturer's instructions.
- Single wall vent connectors shall have it 6" minimum clearance from combustible material.

Electrical

Service Inspection -

- Minimum 100 amp service shall be installed in Single Family Dwellings and shall be in accordance with the local power authority's requirements.)
- Occupants must have access to disconnecting means.
- Illumination required for indoor equipment (e.g., service panel disconnect).
- Service panels and sub-panels are not permitted in clothes closets and bathrooms.
- Antioxidant required on aluminum conductors.
- Missing knockouts must have fill plates; Tape is NOT permitted.
- Panel directory must be labeled.

Rough Wire & Final Inspection-

- A minimum of one switched light outlet is required in a garage.
- A minimum of one general purpose receptacle outlet that is GFCI protected is required in a garage.
- All general purpose receptacles in garages and unfinished basements are required to be GFCI protected.
- Bathroom receptacles are required to be GFCI protected.
- All 120 VAC receptacles within 6ft. of the edge of sinks and laundry tubs are required to be GFCI Protected.
- Hydro massage and whirlpool tubs are required to be GFCI protected (Minimum 12" x 12" access is required for pump and motor removal and replacement). Removal of tub or structural members is not permitted as access.
- All 120/240 VAC appliances require 4 wire branch circuit. (e.g. dryers and ranges).
- All exterior receptacles are required to be GFCI protected with approved covers installed in damp and wet locations.
- Receptacles serving counter tops are required to be GFCI protected (includes islands and peninsulas).
- Wires #8 and smaller are not permitted to be run directly on bottom of floor joist. Holes must be drilled in joist or a running board must be provided.
- Non-metallic wire (Romex) is not permitted to be exposed on basement walls.
- A disconnect, within sight, must be provided to A/C condensers.
- A disconnect, within sight, must be provided for hot water tanks. A lock-out breaker is acceptable.
- All 120 VAC outlets (e.g., lighting, receptacles and smoke detectors installed in bedrooms must be on a AFCI branch circuit.
- Smoke detectors must be installed in all bedrooms, outside vicinity (hall) of each bedroom and at least one installed on each floor level and basement. Smoke detectors must be hard wired and interconnected with a battery back-up.

ENERGY Req. Residential

ENERGY EFFICIENT

TABLE N1102.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT*

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT ^a U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE AND DEPTH	CRAWL SPACE WALL R-VALUE
1	1.2	0.75	0.40	30	13	3	13	0	0	0
2	0.75	0.75	0.40	30	13	4	13	0	0	0
3	0.65	0.65	0.40 ^e	30	13	5	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	5	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	19 or 13 + 5 ^g	5	30'	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	19 or 13 + 5 ^g	15	30'	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19	30'	10/13	10, 4 ft	10/13

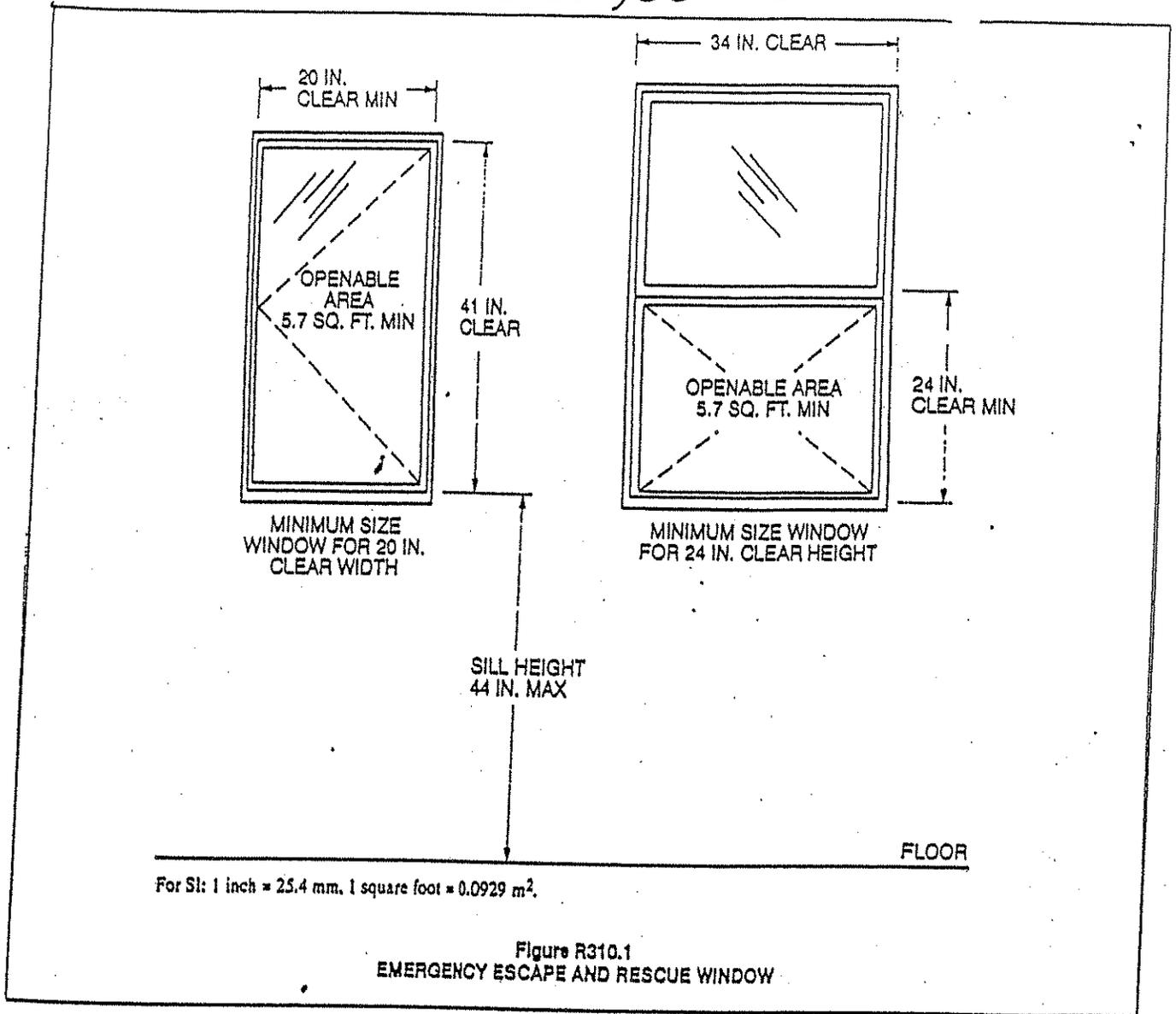
- a. R-values are minimums. U-factors and SHGC are maximums. R-19 insulation shall be permitted to be compressed into a 2 x 6 cavity.
- b. The fenestration U-factor column excludes skylights. The solar heat gain coefficient (SHGC) column applies to all glazed fenestration.
- c. The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
- d. R-5 shall be added to the required slab edge R-values for heated slabs.
- e. There are no solar heat gain coefficient (SHGC) requirements in the Marine Zone.
- f. Or insulation sufficient to fill the framing cavity, R-19 minimum.
- g. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

TABLE N1102.1.2
EQUIVALENT U-FACTORS*

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.060	0.06	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.059	0.065

- a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

Basements and Bedrooms



R310.1.1 Minimum opening area. All emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet (0.530 m²).

Exception: Grade floor openings shall have a minimum net clear opening of 5 square feet (0.465 m²).

- ❖ The minimum net clear opening area of 5 square feet (0.465 m²) is necessary so that fire fighters in full gear can enter through the opening.

R310.1.2 Minimum opening height. The minimum net clear opening height shall be 24 inches (610 mm).

- ❖ The minimum opening height for emergency escape and rescue opening is 24 inches (610 mm), based on the minimum dimension of a fire fighter with full rescue equipment.

R310.1.3 Minimum opening width. The minimum net clear opening width shall be 20 inches (508 mm).

- ❖ This section establishes a minimum width of 20 inches (508 mm) for emergency escape and rescue openings,

based on the minimum dimension of a fire fighter with full rescue equipment.

R310.1.4 Operational constraints. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.

- ❖ Openings for emergency escape and rescue must be operational from the inside. Keys or special tools must not be needed to operate these openings. If keys or tools were necessary, they might not be readily available in an emergency or panic situation, and an individual might not be able to use them, so the opening would be unusable. Section R310.1 also requires the opening size to be obtained by the normal operation of the window. See the commentary for Section R310.1

R310.2 Window wells. The minimum horizontal area of the window well shall be 9 square feet (0.84 m²), with a minimum horizontal projection and width of 36 inches (914 mm). The area of the window well shall allow the emergency escape and rescue opening to be fully opened.

**SECTION R404
FOUNDATION AND RETAINING WALLS**

R404.1 Concrete and masonry foundation walls. Concrete and masonry foundation walls shall be selected and constructed in accordance with the provisions of Section R404 or in accordance with ACI 318, ACI 332, NCMA TR68-A or ACI 530/ASCE 5/TMS 402 or other approved structural standards. When ACI 318, ACI 332 or ACI 530/ASCE 5/TMS 402 or the provisions of Section R404 are used to design concrete or masonry foundation 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.

Foundation walls that meet all of the following shall be considered laterally supported:

1. Full basement floor shall be 3.5 inches (89 mm) thick concrete slab poured tight against the bottom of the foundation wall.
2. Floor joists and blocking shall be connected to the sill plate at the top of wall by the prescriptive method called out in Table R404.1(1), or; shall be connected with an approved connector with listed capacity meeting Table R404.1(1).
3. Bolt spacing for the sill plate shall be no greater than per Table R404.1(2).
4. Floor shall be blocked perpendicular to the floor joists. Blocking shall be full depth within two joist spaces of the

**TABLE R404.1(1)
TOP REACTIONS AND PRESCRIPTIVE SUPPORT FOR FOUNDATION WALLS***

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)	HORIZONTAL REACTION TO TOP (plf)		
		Soil Classes (Letter indicates connection types ^b)		
		GW, GP, SW and SP soils	GM, GC, SM-SC and ML soils	SC, MH, ML-CL and Inorganic CL soils
7	4	45.7 A	68.6 A	91.4 A
	5	89.3 A	133.9 B	178.6 B
	6	154.3 B	231.4 C	308.6 C
	7	245.0 C	367.5 C	490.0 D
8	4	40.0 A	60.0 A	80.0 A
	5	78.1 A	117.2 B	156.3 B
	6	135.0 B	202.5 B	270.0 C
	7	214.0 B	321.6 C	428.8 C
	8	320.0 C	480.0 C	640.0 D
9	4	35.6 A	53.3 A	71.1 A
	5	69.4 A	104.2 B	138.9 B
	6	120.0 B	180.0 B	240.0 C
	7	190.6 B	285.8 C	381.1 C
	8	284.4 C	426.7 C	568.9 D
	9	405.0 C	607.5 D	810.0 D

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 plf = pounds per linear foot = 1.488 kg/m.

- a. Loads are pounds per linear foot of wall. Prescriptive options are limited to maximum joist and blocking spacing of 24 inches on center
- b. Prescriptive Support Requirements:

- | | |
|------|---|
| Type | Joist/blocking Attachment Requirement |
| A | 3-8d per joist per Table R602.3(1). |
| B | 1-20 gage angle clip each joist with 5-8d per leg. |
| C | 1-1/4-inch thick steel angle. Horizontal leg attached to sill bolt adjacent to joist/blocking, vertical leg attached to joist/blocking with 1/2-inch minimum diameter bolt. |
| D | 2-1/4-inch thick steel, angles, one on each side of joist/blocking. Attach each angle to adjacent sill bolt through horizontal leg. Bolt to joist/blocking with 1/2-inch minimum diameter bolt common to both angles. |

TABLE R404.1(2)
MAXIMUM PLATE ANCHOR-BOLT SPACING FOR SUPPORTED FOUNDATION WALL*

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)	ANCHOR BOLT SPACING (Inches)		
		Soil Classes		
		GW, GP, SW and SP soils	GM, GC, SM-SC and ML soils	SC, MH, ML-CL and Inorganic CL soils
7	4	72	58	43
	5	44	30	22
	6	26	17	13
	7	16	11	8
8	4	72	66	50
	5	51	34	25
	6	29	20	15
	7	18	12	9
9	8	12	8	6
	4	72	72	56
	5	57	38	29
	6	33	22	17
	7	21	14	10
	8	14	9	7
	9	10	7	5

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Spacing is based on 1/2-inch diameter anchor bolts. For 5/8-inch diameter anchor bolts, spacing may be multiplied by 1.27, with a maximum spacing of 72 inches.

foundation wall, and be flat-blocked with minimum 2-inch by 4-inch (51 mm by 102 mm) blocking elsewhere.

5. Where foundation walls support unbalanced load on opposite sides of the building, such as a daylight basement, the building aspect ratio, L/W, shall not exceed the value specified in Table R404.1(3). For such foundation walls, the rim board shall be attached to the sill with a 20 gage metal angle clip at 24 inches (610 mm) on center, with five 8d nails per leg, or an approved connector supplying 230 pounds per linear foot (3.36 kN/m) capacity.

R404.1.1 Masonry foundation walls. Concrete masonry and clay masonry foundation walls shall be constructed as set forth in Table R404.1.1(1), R404.1.1(2), R404.1.1(3) or R404.1.1(4) and shall also comply with the provisions of Section R404 and the applicable provisions of Sections R606, R607 and R608. In Seismic Design Categories D₀, D₁ and D₂, concrete masonry and clay masonry foundation walls shall also comply with Section R404.1.4. Rubble stone masonry foundation walls shall be constructed in accordance with Sections R404.1.8 and R607.2.2. Rubble stone masonry walls shall not be used in Seismic Design Categories D₀, D₁ and D₂.

R404.1.2 Concrete foundation walls. Concrete foundation walls shall be constructed as set forth in Table R404.1.1(5) and shall also comply with the provisions of Section R404 and the applicable provisions of Section R402.2. In Seismic Design Categories D₀, D₁ and D₂, concrete foundation walls shall also comply with Section R404.1.4.

R404.1.3 Design required. Concrete or masonry foundation walls shall be designed in accordance with accepted engineering practice when either of the following conditions exists:

1. Walls are subject to hydrostatic pressure from groundwater.

2. Walls supporting more than 48 inches (1219 mm) of unbalanced backfill that do not have permanent lateral support at the top or bottom.

R404.1.4 Seismic Design Categories D₀, D₁ and D₂. In addition to the requirements of Tables R404.1.1(1) and R404.1.1(5), plain concrete and plain masonry foundation walls located in Seismic Design Categories D₀, D₁ and D₂, as established in Table R301.2(1), shall comply with the following.

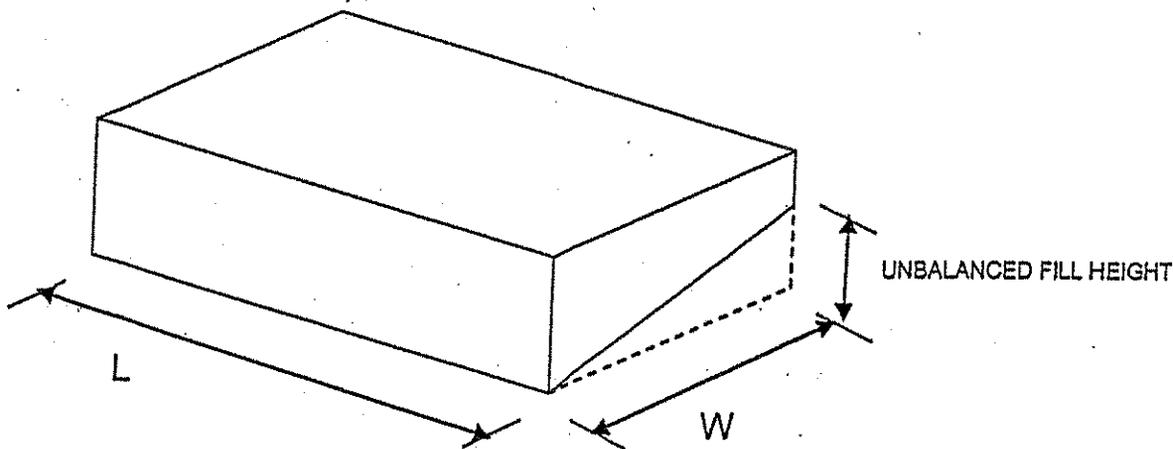
1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum reinforcement for plain concrete foundation walls shall consist of one No. 4 (No. 13) horizontal bar located in the upper 12 inches (305 mm) of the wall.
4. Minimum thickness for plain concrete foundation walls shall be 7.5 inches (191 mm) except that 6 inches (152 mm) is permitted when the maximum height is 4 feet, 6 inches (1372 mm).
5. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).
6. Masonry stem walls shall have a minimum vertical reinforcement of one No. 3 (No. 10) bar located a maximum of 4 feet (1220 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.

Foundation walls located in Seismic Design Categories D₀, D₁ and D₂, as established in Table R301.2(1), supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4) for masonry, or Table R404.1.1(5) for con-

TABLE R404.1(3)
MAXIMUM ASPECT RATIO, L/W FOR UNBALANCED FOUNDATIONS

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT (feet)	SOIL CLASSES		
		GW, GP, SW and SP soils	GM, GC, SM-SC and ML soils	SC, MH, ML-CL and Inorganic CL soils
7	4	4.0	4.0	4.0
	5	4.0	3.4	2.6
	6	3.0	2.0	1.5
	7	1.9	1.2	0.9
8	4	4.0	4.0	4.0
	5	4.0	3.9	2.9
	6	3.4	2.3	1.7
	7	2.1	1.4	1.1
9	8	1.4	1.0	0.7
	4	4.0	4.0	4.0
	5	4.0	4.0	3.3
	6	3.8	2.6	1.9
	7	2.4	1.6	1.2
	8	1.6	1.1	0.8
	9	1.1	0.8	0.6

For SI: 1 foot = 304.8 mm.



crete. Where Table R404.1.1(5) permits plain concrete walls, not less than No. 4 (No. 13) vertical bars at a spacing not exceeding 48 inches (1219 mm) shall be provided. Insulating concrete form foundation walls shall be reinforced as required in Table R404.4(1), R404.4(2), R404.4(3), R404.4(4) or R404.4(5). Where no vertical reinforcement is required by Table R404.4(2), R404.4(3) or R404.4(4) there shall be a minimum of one No. 4 (No. 13) bar at 48 inches (1220 mm) on center. All concrete and masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.

R404.1.5 Foundation wall thickness based on walls supported. The thickness of concrete and masonry foundation walls shall not be less than the thickness of the wall supported, except that foundation walls of at least 8-inch (203 mm) nominal thickness shall be permitted under brick-veneered frame walls and under 10-inch-wide (254 mm) cavity walls where the total height of the wall supported, including gables, is not more than 20 feet (6096 mm), provided the requirements of Sections R404.1.1 and R404.1.2 are met.

R404.1.5.1 Pier and curtain wall foundations. Use of Pier and curtain wall foundations shall be permitted to support light-frame construction not more than two stories in height, provided the following requirements are met:

1. All load-bearing walls shall be placed on continuous concrete footings placed integrally with the exterior wall footings.
2. The minimum actual thickness of a load-bearing masonry wall shall be not less than 4 inches (102 mm) nominal or 3³/₈ inches (92 mm) actual thickness, and shall be bonded integrally with piers spaced in accordance with Section R606.9.
3. Piers shall be constructed in accordance with Section R606.6 and Section R606.6.1, and shall be bonded into the load-bearing masonry wall in accordance with Section R608.1.1 or Section R608.1.1.2.
4. The maximum height of a 4-inch (102 mm) load-bearing masonry foundation wall supporting

TABLE R404.1.1(1)
PLAIN MASONRY FOUNDATION WALLS

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT ^a (feet)	PLAIN MASONRY ^a MINIMUM NOMINAL WALL THICKNESS (Inches)		
		Soil classes ^b		
		GW, GP, SW and SP	GM, GC, SM, SM-SC and ML	SC, MH, ML-CL and Inorganic CL
5	4	6 solid ^d or 8	6 solid ^d or 8	6 solid ^d or 8
	5	6 solid ^d or 8	8	10
6	4	6 solid ^d or 8	6 solid ^d or 8	6 solid ^d or 8
	5	6 solid ^d or 8	8	10
	6	8	10	12
7	4	6 solid ^d or 8	8	8
	5	6 solid ^d or 8	10	10
	6	10	12	10 solid ^d
	7	12	10 solid ^d	12 solid ^d
8	4	6 solid ^d or 8	6 solid ^d or 8	8
	5	6 solid ^d or 8	10	12
	6	10	12	12 solid ^d
	7	12	12 solid ^d	Footnote e
	8	10 solid ^d	12 solid ^d	Footnote e
9	4	6 solid ^d or 8	6 solid ^d or 8	8
	5	8	10	12
	6	10	12	12 solid ^d
	7	12	12 solid ^d	Footnote e
	8	12 solid ^d	Footnote e	Footnote e
	9	Footnote e	Footnote e	Footnote e

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

- Mortar shall be Type M or S and masonry shall be laid in running bond. UngROUTED hollow masonry units are permitted except where otherwise indicated.
- Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.
- Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.
- Solid grouted hollow units or solid masonry units.
- Wall construction shall be in accordance with Table R404.1.1(2) or a design shall be provided.

wood-frame walls and floors shall not be more than 4 feet (1219 mm).

- Anchorage shall be in accordance with Section R403.1.6, Figure R404.1.5(1), or as specified by engineered design accepted by the building official.
- The unbalanced fill for 4-inch (102 mm) foundation walls shall not exceed 24 inches (610 mm) for solid masonry or 12 inches (305 mm) for hollow masonry.
- In Seismic Design Categories D₀, D₁ and D₂, prescriptive reinforcement shall be provided in the horizontal and vertical direction. Provide minimum horizontal joint reinforcement of two No.9 gage wires spaced not less than 6 inches (152 mm) or one 1/4 inch (6.4 mm) diameter wire at 10 inches (254 mm) on center vertically. Provide minimum vertical reinforcement of one No. 4 bar at 48 inches (1220 mm) on center horizontally grouted in place.

R404.1.6 Height above finished grade. Concrete and masonry foundation walls shall extend above the finished grade adjacent to the foundation at all points a minimum of 4 inches (102 mm) where masonry veneer is used and a minimum of 6 inches (152 mm) elsewhere.

R404.1.7 Backfill placement. Backfill shall not be placed against the wall until the wall has sufficient strength and has been anchored to the floor above, or has been sufficiently braced to prevent damage by the backfill.

Exception: Bracing is not required for walls supporting less than 4 feet (1219 mm) of unbalanced backfill.

R404.1.8 Rubble stone masonry. Rubble stone masonry foundation walls shall have a minimum thickness of 16 inches (406 mm), shall not support an unbalanced backfill exceeding 8 feet (2438 mm) in height, shall not support a soil pressure greater than 30 pounds per square foot per foot (4.71 kPa/m), and shall not be constructed in Seismic Design Categories D₀, D₁, D₂ or townhouses in Seismic Design Category C, as established in Figure R301.2(2).

TABLE R404.1.1(2)
8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING
WHERE $d > 5$ INCHES^a

WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL ^b	MINIMUM VERTICAL REINFORCEMENT ^{b,c}		
		Soil classes and lateral soil load ^d (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and Inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	5 feet	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	6 feet 8 inches	#4 at 48" o.c.	#5 at 48" o.c.	#6 at 48" o.c.
7 feet 4 inches	4 feet (or less)	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	5 feet	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	6 feet	#4 at 48" o.c.	#5 at 48" o.c.	#5 at 48" o.c.
	7 feet 4 inches	#5 at 48" o.c.	#6 at 48" o.c.	#6 at 40" o.c.
8 feet	4 feet (or less)	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	5 feet	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	6 feet	#4 at 48" o.c.	#5 at 48" o.c.	#5 at 48" o.c.
	7 feet	#5 at 48" o.c.	#6 at 48" o.c.	#6 at 40" o.c.
	8 feet	#5 at 48" o.c.	#6 at 48" o.c.	#6 at 32" o.c.
8 feet 8 inches	4 feet (or less)	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	5 feet	#4 at 48" o.c.	#4 at 48" o.c.	#5 at 48" o.c.
	6 feet	#4 at 48" o.c.	#5 at 48" o.c.	#6 at 48" o.c.
	7 feet	#5 at 48" o.c.	#6 at 48" o.c.	#6 at 40" o.c.
	8 feet 8 inches	#6 at 48" o.c.	#6 at 32" o.c.	#6 at 24" o.c.
9 feet 4 inches	4 feet (or less)	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	5 feet	#4 at 48" o.c.	#4 at 48" o.c.	#5 at 48" o.c.
	6 feet	#4 at 48" o.c.	#5 at 48" o.c.	#6 at 48" o.c.
	7 feet	#5 at 48" o.c.	#6 at 48" o.c.	#6 at 40" o.c.
	9 feet 4 inches	#6 at 40" o.c.	#6 at 24" o.c.	#6 at 16" o.c.
10 feet	4 feet (or less)	#4 at 48" o.c.	#4 at 48" o.c.	#4 at 48" o.c.
	5 feet	#4 at 48" o.c.	#4 at 48" o.c.	#5 at 48" o.c.
	6 feet	#4 at 48" o.c.	#5 at 48" o.c.	#6 at 48" o.c.
	7 feet	#5 at 48" o.c.	#6 at 48" o.c.	#6 at 32" o.c.
	8 feet	#6 at 48" o.c.	#6 at 32" o.c.	#6 at 24" o.c.
	10 feet	#6 at 32" o.c.	#6 at 16" o.c.	#6 at 16" o.c.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

- a. Mortar shall be Type M or S and masonry shall be laid in running bond.
- b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches.
- c. Vertical reinforcement shall be Grade 60 minimum. The distance from the face of the soil side of the wall to the center of vertical reinforcement shall be at least 5 inches.
- d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.
- e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

R404.2 Wood foundation walls. Wood foundation walls shall be constructed in accordance with the provisions of Sections R404.2.1 through R404.2.6 and with the details shown in Figures R403.1(2) and R403.1(3).

R404.2.1 Identification. All load-bearing lumber shall be identified by the grade mark of a lumber grading or inspection agency which has been approved by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted. Wood structural panels shall conform to DOC PS 1 or DOC PS 2 and shall be identified by a grade

mark or certificate of inspection issued by an approved agency.

R404.2.2 Stud size. The studs used in foundation walls shall be 2-inch by 6-inch (51 mm by 152 mm) members. When spaced 16 inches (406 mm) on center, a wood species with an F_b value of not less than 1,250 pounds per square inch (8612 kPa) as listed in AF&PA/NDS shall be used. When spaced 12 inches (305 mm) on center, an F_b of not less than 875 psi (6029 kPa) shall be required.

R404.2.3 Height of backfill. For wood foundations that are not designed and installed in accordance with AF&PA Report

No.7, the height of backfill against a foundation wall shall not exceed 4 feet (1219 mm). When the height of fill is more than 12 inches (305 mm) above the interior grade of a crawl space or floor of a basement, the thickness of the plywood sheathing shall meet the requirements of Table R404.2.3.

R404.2.4 Backfilling. Wood foundation walls shall not be backfilled until the basement floor and first floor have been constructed or the walls have been braced. For crawl space construction, backfill or bracing shall be installed on the interior of the walls prior to placing backfill on the exterior.

R404.2.5 Drainage and dampproofing. Wood foundation basements shall be drained and dampproofed in accordance with Sections R405 and R406, respectively.

R404.2.6 Fastening. Wood structural panel foundation wall sheathing shall be attached to framing in accordance with Table R602.3(1) and Section R402.1.1.

R404.3 Wood sill plates. Wood sill plates shall be a minimum of 2-inch by 4-inch (51 mm by 102 mm) nominal lumber. Sill plate anchorage shall be in accordance with Sections R403.1.6 and R602.11.

TABLE R404.1.1(3)
10-INCH FOUNDATION WALLS WITH REINFORCING
WHERE d > 6.75 INCHES^a

WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL ^b	MINIMUM VERTICAL REINFORCEMENT ^{b,c}		
		Soil classes and later soil load ^d (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, MH, ML-CL and Inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	5 feet	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	6 feet 8 inches	#4 at 56" o.c.	#5 at 56" o.c.	#5 at 56" o.c.
7 feet 4 inches	4 feet (or less)	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	5 feet	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	6 feet	#4 at 56" o.c.	#4 at 56" o.c.	#5 at 56" o.c.
	7 feet 4 inches	#4 at 56" o.c.	#5 at 56" o.c.	#6 at 56" o.c.
8 feet	4 feet (or less)	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	5 feet	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	6 feet	#4 at 56" o.c.	#4 at 56" o.c.	#5 at 56" o.c.
	7 feet	#4 at 56" o.c.	#5 at 56" o.c.	#6 at 56" o.c.
	8 feet	#5 at 56" o.c.	#6 at 56" o.c.	#6 at 48" o.c.
8 feet 8 inches	4 feet (or less)	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	5 feet	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	6 feet	#4 at 56" o.c.	#4 at 56" o.c.	#5 at 56" o.c.
	7 feet	#4 at 56" o.c.	#5 at 56" o.c.	#6 at 56" o.c.
9 feet 4 inches	4 feet (or less)	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	5 feet	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	6 feet	#4 at 56" o.c.	#5 at 56" o.c.	#5 at 56" o.c.
	7 feet	#4 at 56" o.c.	#5 at 56" o.c.	#6 at 56" o.c.
	8 feet	#5 at 56" o.c.	#6 at 56" o.c.	#6 at 40" o.c.
10 feet	4 feet (or less)	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	5 feet	#4 at 56" o.c.	#4 at 56" o.c.	#4 at 56" o.c.
	6 feet	#4 at 56" o.c.	#5 at 56" o.c.	#5 at 56" o.c.
	7 feet	#5 at 56" o.c.	#6 at 56" o.c.	#6 at 48" o.c.
	8 feet	#5 at 56" o.c.	#6 at 48" o.c.	#6 at 40" o.c.
	9 feet	#6 at 56" o.c.	#6 at 40" o.c.	#6 at 24" o.c.
10 feet	#6 at 48" o.c.	#6 at 32" o.c.	#6 at 24" o.c.	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

- a. Mortar shall be Type M or S and masonry shall be laid in running bond.
- b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches.
- c. Vertical reinforcement shall be Grade 60 minimum. The distance from the face of the soil side of the wall to the center of vertical reinforcement shall be at least 6.75 inches.
- d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.
- e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

TABLE R404.1.1(4)
12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING
WHERE $d > 8.75$ INCHES*

WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL ^a	MINIMUM VERTICAL REINFORCEMENT ^{b, c}		
		Soil classes and lateral soil load ^d (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and Inorganic CL soils 60
6 feet 8 inches	4 feet (or less)	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	5 feet	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	6 feet 8 inches	#4 at 72" o.c.	#4 at 72" o.c.	#5 at 72" o.c.
7 feet 4 inches	4 feet (or less)	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	5 feet	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	6 feet	#4 at 72" o.c.	#4 at 72" o.c.	#5 at 72" o.c.
	7 feet 4 inches	#4 at 72" o.c.	#5 at 72" o.c.	#6 at 72" o.c.
8 feet	4 feet (or less)	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	5 feet	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	6 feet	#4 at 72" o.c.	#4 at 72" o.c.	#5 at 72" o.c.
	7 feet	#4 at 72" o.c.	#5 at 72" o.c.	#6 at 72" o.c.
	8 feet	#5 at 72" o.c.	#6 at 72" o.c.	#6 at 64" o.c.
8 feet 8 inches	4 feet (or less)	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	5 feet	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	6 feet	#4 at 72" o.c.	#4 at 72" o.c.	#5 at 72" o.c.
	7 feet	#4 at 72" o.c.	#5 at 72" o.c.	#6 at 72" o.c.
	8 feet 8 inches	#5 at 72" o.c.	#7 at 72" o.c.	#6 at 48" o.c.
9 feet 4 inches	4 feet (or less)	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	5 feet	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	6 feet	#4 at 72" o.c.	#5 at 72" o.c.	#5 at 72" o.c.
	7 feet	#4 at 72" o.c.	#5 at 72" o.c.	#6 at 72" o.c.
	8 feet	#5 at 72" o.c.	#6 at 72" o.c.	#6 at 56" o.c.
10 feet	9 feet 4 inches	#6 at 72" o.c.	#6 at 48" o.c.	#6 at 40" o.c.
	4 feet (or less)	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	5 feet	#4 at 72" o.c.	#4 at 72" o.c.	#4 at 72" o.c.
	6 feet	#4 at 72" o.c.	#5 at 72" o.c.	#5 at 72" o.c.
	7 feet	#4 at 72" o.c.	#6 at 72" o.c.	#6 at 72" o.c.
	8 feet	#5 at 72" o.c.	#6 at 72" o.c.	#6 at 48" o.c.
9 feet	9 feet	#6 at 72" o.c.	#6 at 56" o.c.	#6 at 40" o.c.
	10 feet	#6 at 64" o.c.	#6 at 40" o.c.	#6 at 32" o.c.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

- Mortar shall be Type M or S and masonry shall be laid in running bond.
- Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches.
- Vertical reinforcement shall be Grade 60 minimum. The distance from the face of the soil side of the wall to the center of vertical reinforcement shall be at least 8.75 inches.
- Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R405.1.
- Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground levels. Where an interior concrete slab-on-grade is provided and in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height is permitted to be measured from the exterior finish ground level to the top of the interior concrete slab is permitted.

R404.4 Insulating concrete form foundation walls. Insulating concrete form (ICF) foundation 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 foundation 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.

R404.4.1 Applicability limits. The provisions of this section shall apply to the construction of insulating concrete form foundation walls for buildings not more than 60 feet

(18 288 mm) in plan dimensions, and floors not more than 32 feet (9754 mm) or roofs not more than 40 feet (12 192 mm) in clear span. Buildings shall not exceed two stories in height above grade with each story not more than 10 feet (3048 mm) high. Foundation walls constructed in accordance with the provisions of this section shall be limited to buildings subjected to a maximum ground snow load of 70 psf (3.35 kN/m²) and located in Seismic Design Category A, B or C. In Seismic Design Categories D₀, D₁ and D₂, foundation walls shall comply with Section R404.1.4. Insulating concrete form foundation walls supporting above-grade concrete walls shall be reinforced as required for the above-

R602.3.4 Bottom (sole) plate. Studs shall have full bearing on a nominal 2-by (38 mm) or larger plate or sill having a width at least equal to the width of the studs.

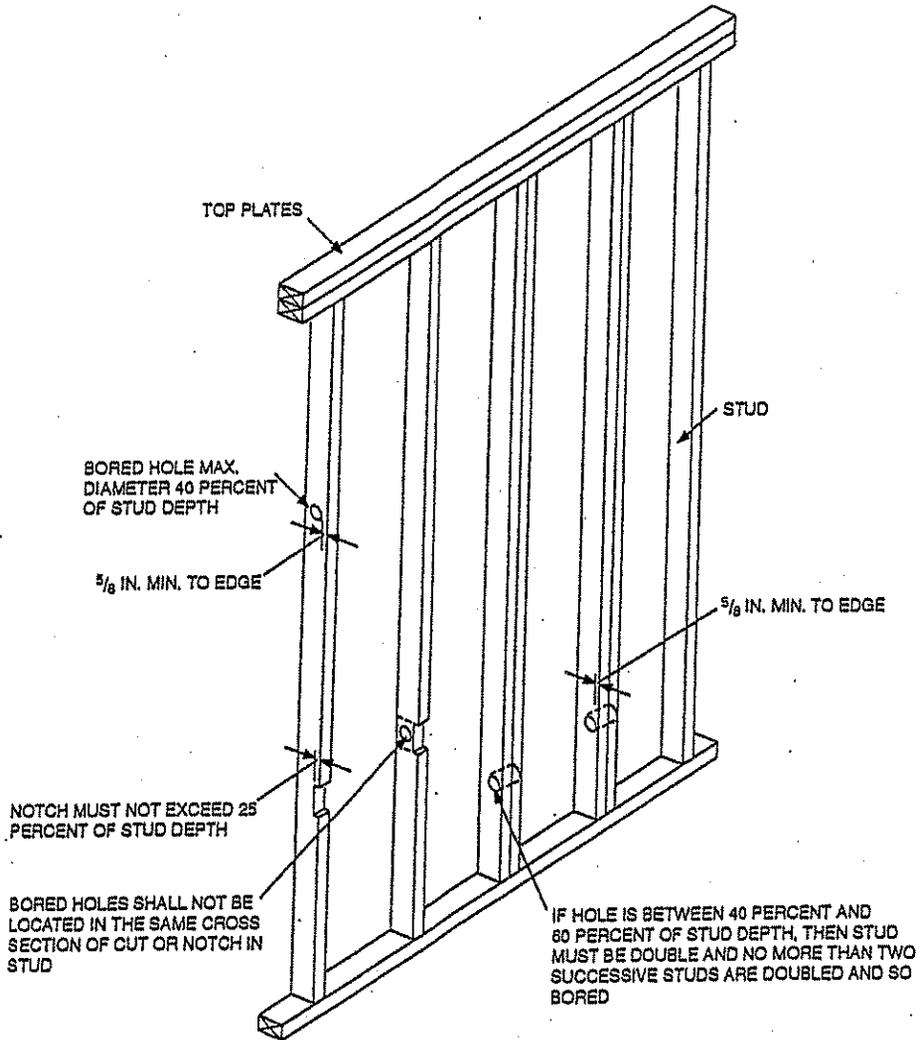
R602.4 Interior load-bearing walls. Interior load-bearing walls shall be constructed, framed and fireblocked as specified for exterior walls.

R602.5 Interior nonbearing walls. Interior nonbearing walls shall be permitted to be constructed with 2-inch-by-3-inch (51 mm by 76 mm) studs spaced 24 inches (610 mm) on center or, when not part of a braced wall line, 2-inch-by-4-inch (51 mm by 102 mm) flat studs spaced at 16 inches (406 mm) on center. Interior nonbearing walls shall be capped with at least a single top plate. Interior nonbearing walls shall be fireblocked in accordance with Section R602.8.

R602.6 Drilling and notching—studs. Drilling and notching of studs shall be in accordance with the following:

1. Notching. Any stud in an exterior wall or bearing partition may be cut or notched to a depth not exceeding 25 percent of its width. Studs in nonbearing partitions may be notched to a depth not to exceed 40 percent of a single stud width.
2. Drilling. Any stud may be bored or drilled, provided that the diameter of the resulting hole is no more than 60 percent of the stud width, the edge of the hole is no more than $\frac{5}{16}$ inch (16 mm) to the edge of the stud, and the hole is not located in the same section as a cut or notch. Studs located in exterior walls or bearing partitions drilled over 40 percent and up to 60 percent shall also be doubled with no more than two successive doubled studs bored. See Figures R602.6(1) and R602.6(2).

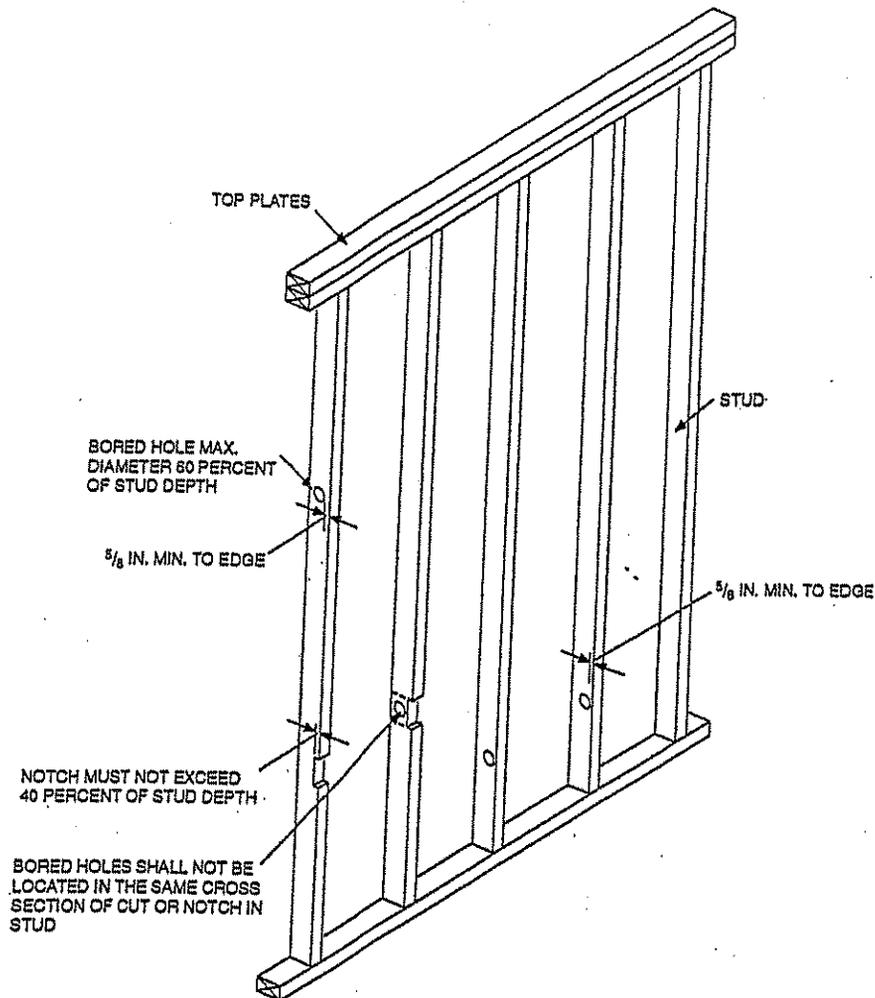
Exception: Use of approved stud shoes is permitted when they are installed in accordance with the manufacturer's recommendations.



For SI: 1 inch = 25.4 mm.

NOTE: Condition for exterior and bearing walls.

FIGURE R602.6(1)
NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS



For SI: 1 inch = 25.4 mm.

FIGURE R602.6(2)
NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS

R602.6.1 Drilling and notching of top plate. When piping or ductwork is placed in or partly in an exterior wall or interior load-bearing wall, necessitating cutting, drilling or notching of the top plate by more than 50 percent of its width, a galvanized metal tie of not less than 0.054 inch thick (1.37 mm) (16 ga) and 1 1/2 inches (38 mm) wide shall be fastened across and to the plate at each side of the opening with not less than eight 16d nails at each side or equivalent. See Figure R602.6.1.

Exception: When the entire side of the wall with the notch or cut is covered by wood structural panel sheathing.

R602.7 Headers. For header spans see Tables R502.5(1) and R502.5(2).

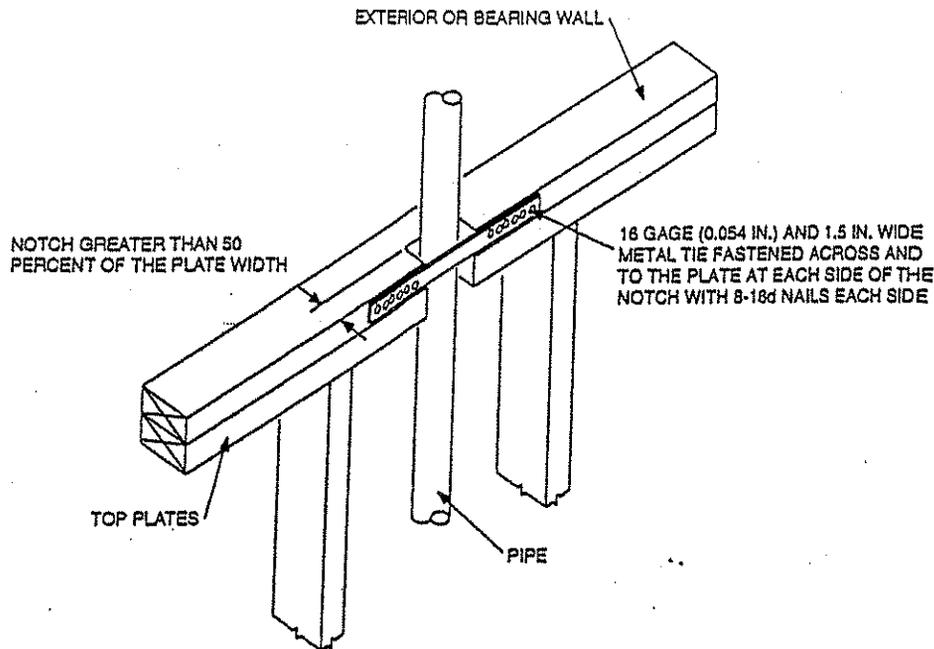
R602.7.1 Wood structural panel box headers. Wood structural panel box headers shall be constructed in accordance with Figure R602.7.2 and Table R602.7.2.

R602.7.2 Nonbearing walls. Load-bearing headers are not required in interior or exterior nonbearing walls. A single

flat 2-inch-by-4-inch (51 mm by 102 mm) member may be used as a header in interior or exterior nonbearing walls for openings up to 8 feet (2438 mm) in width if the vertical distance to the parallel nailing surface above is not more than 24 inches (610 mm). For such nonbearing headers, no cripples or blocking are required above the header.

R602.8 Fireblocking required. Fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top story and the roof space. Fireblocking shall be provided in wood-frame construction in the following locations.

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs; as follows:
 - 1.1. Vertically at the ceiling and floor levels.
 - 1.2. Horizontally at intervals not exceeding 10 feet (3048 mm).



For SI: 1 inch = 25.4 mm.

FIGURE R602.6.1
TOP PLATE FRAMING TO ACCOMMODATE PIPING

2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section R311.2.2.
4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion.
5. For the fireblocking of chimneys and fireplaces, see Section R1003.19.
6. Fireblocking of cornices of a two-family dwelling is required at the line of dwelling unit separation.

R602.8.1 Materials. Except as provided in Section R602.8, Item 4, fireblocking shall consist of 2-inch (51 mm) nominal lumber, or two thicknesses of 1-inch (25.4 mm) nominal lumber with broken lap joints, or one thickness of $\frac{23}{32}$ -inch (19.8 mm) wood structural panels with joints backed by $\frac{23}{32}$ -inch (19.8 mm) wood structural panels or one thickness of $\frac{3}{4}$ -inch (19.1 mm) particleboard with joints backed by $\frac{3}{4}$ -inch (19.1 mm) particleboard, $\frac{1}{2}$ -inch (12.7 mm) gypsum board, or $\frac{1}{4}$ -inch (6.4 mm) cement-based millboard. Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place shall be permitted as an acceptable fire block. Batts or blankets of mineral or glass fiber or other approved nonrigid materials shall be permitted for compliance with the 10 foot horizontal fireblocking in walls constructed using parallel rows of studs or staggered studs.

Loose-fill insulation material shall not be used as a fire block unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.

R602.8.1.1 Unfaced fiberglass. Unfaced fiberglass batt insulation used as fireblocking shall fill the entire cross section of the wall cavity to a minimum height of 16 inches (406 mm) measured vertically. When piping, conduit or similar obstructions are encountered, the insulation shall be packed tightly around the obstruction.

R602.8.1.2 Fireblocking integrity. The integrity of all fireblocks shall be maintained.

R602.9 Cripple walls. Foundation cripple walls shall be framed of studs not smaller than the studding above. When exceeding 4 feet (1219 mm) in height, such walls shall be framed of studs having the size required for an additional story.

Cripple walls with a stud height less than 14 inches (356 mm) shall be sheathed on at least one side with a wood structural panel that is fastened to both the top and bottom plates in accordance with Table R602.3(1), or the cripple walls shall be constructed of solid blocking. Cripple walls shall be supported on continuous foundations.

R602.10 Wall bracing. All exterior walls shall be braced in accordance with this section. In addition, interior braced wall lines shall be provided in accordance with Section R602.10.1.1. For buildings in Seismic Design Categories D_0 , D_1 , and D_2 , walls shall be constructed in accordance with the additional requirements of Sections R602.10.9, R602.10.11, and R602.11.