

1309.0404 SECTION R404, FOUNDATION AND RETAINING WALLS.

Subpart 1. **IRC section R404.1.** Section R404.1 is amended to read as follows:

R404.1 Concrete and masonry foundation walls. Concrete foundation walls shall be selected and constructed in accordance with the provisions of section R404.1.2. Masonry foundation walls shall be selected and constructed in accordance with the provisions of section R404.1.1. Concrete and masonry foundation walls shall be laterally supported at the top and bottom. 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 with an approved connector with listed capacity meeting the top of wall reaction in Table R404.1(1). Maximum spacing of floor joists shall be 24 inches on center. Spacing of blocking shall be in accordance with Table R404.1(1).
3. Bolt spacing for the sill plate shall be no greater than the requirements in Table R404.1(1).
4. The floor shall be blocked perpendicular to the floor joists. Blocking shall be full depth within three joist spaces of the foundation wall. Floor sheathing shall be fastened to blocking in accordance with Table R602.3(1).
5. Where foundation walls support unbalanced load on opposite sides of the building, such as a daylight basement, the rim board shall be attached to the sill with a 20-gage metal angle clip at 24 inches on center, with five 8d nails per leg, or an approved connector supplying 230 pounds per lineal foot capacity.

Exception: Cantilevered concrete and masonry foundation walls that do not have permanent lateral support at the top shall be constructed according to Table R404.1.1(5), Table R404.1.1(6), or Table R404.1.1(7).

Subp. 2. **IRC Table R404.1(1).** Section R404.1 is amended by adding Table R404.1(1) as follows:

TABLE R404.1(1)

MAXIMUM ANCHOR BOLT AND BLOCKING SPACING FOR SUPPORTED
FOUNDATION WALL

Max. Wall Height	Max. Unbalanced Backfill Height	Soil Classes	Soil Load (pcf/ft)	Top of Wall Reaction (plf) ^b	1/2" diameter Anchor Bolt Spacing (inches) ^a	Spacing of Blocking Perpendicular To Floor Joists (inches)
8'-0"	7'-4"	GW, GP, SW, & SP	30	250	72	60
		GM, GC, SM-SC, & ML	45	370	72	40
		SC, MH, ML-CL, & I-CL	60	490	48	30
9'-0"	8'-4"	GW, GP, SW, & SP	30	320	72	48
		GM, GC, SM-SC, & ML	45	480	48	32
		SC, MH, ML-CL, & I-CL	60	640	40	24

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

^a Sill plate shall be 2 x 6 minimum. Anchor bolt shall be minimum 0.5" diameter cast-in-place with 7" embed. Anchor bolt shall have a 2" diameter by 0.125" thick washer tightened and countersunk 0.25" into the top of the sill plate.

^b Minimum load to be used for sizing of accepted anchors or fasteners if bolts are not used.

Subp. 3. [Repealed, 39 SR 91]

Subp. 4. [Repealed, 39 SR 91]

Subp. 5. [Repealed, 39 SR 91]

Subp. 6. **IRC Table R404.1.1(5)**. Section R404 is amended by adding a new table as follows:

TABLE R404.1.1(5)

CANTILEVERED CONCRETE AND MASONRY FOUNDATION WALLS

Maximum Wall Height ^j (feet)	Maximum Unbalanced Backfill Height ^e (feet)	Minimum Vertical Reinforcement Size and Spacing for 8-Inch Nominal Wall Thickness ^{a,b,c,e,f,i,k}		
		Soil Classes ^d		
		GW, GP, SW, and SP	GM, GC, SM, SM-SC, and ML	SC, MH, ML-CL, and inorganic CL
4	3	None required	None required	None required
	4	None required	None required	No. 4 @ 72 in. o.c.
5	3	None required	None required	None required
	4	No. 4 @ 72 in. o.c.	No. 4 @ 56 in. o.c. ^h	No. 4 @ 40 in. o.c. ^g
	5	No. 4 @ 72 in. o.c.	No. 4 @ 56 in. o.c. ^h	No. 4 @ 40 in. o.c. ^g

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Minimum unit compressive strength is 1,900 psi.

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 no greater than 2.5 inches.

d. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.

e. Interior concrete floor slab-on-grade shall be placed tight to the wall. The exterior grade level shall be 6 inches minimum below the top of wall. Maximum height from top of slab-on-grade to bottom of floor joists is 10 feet, 0 inches. Unbalanced backfill height is the difference in height of the exterior finish ground levels and the top of the interior concrete slab-on-grade.

f. Minimum footing size of 20 inches by 8 inches shall be placed on soil with a bearing capacity of 2,000 psf. Minimum concrete compressive strength of footing shall be 3,000 psi.

g. Provide propped cantilever wall: top of footing shall be 16 inches below the bottom of the concrete floor slab minimum.

h. Provide #5 Grade 60 dowels, 1 foot, 6 inches long, to connect footing to wall. Embed dowel 5 inches into footing. Place dowels in center of wall thickness spaced at 32 inches on center maximum. No dowels are required where length of the foundation wall between perpendicular walls is two times the foundation wall height or less.

i. This table is applicable where the length of the foundation wall between perpendicular walls is 35 feet or less, or where the length of the foundation laterally supported on only one end by a perpendicular wall is 17 feet or less.

j. Maximum wall height is measured from top of the foundation wall to the bottom of the interior concrete slab-on-grade.

k. Install foundation anchorage per section R403.1.6.

Subp. 7. **IRC Table R404.1.1(6)**. Section R404 is amended by adding a new table as follows:

TABLE R404.1.1(6)

CANTILEVERED CONCRETE AND MASONRY FOUNDATION WALLS

Maximum Wall Height ^j (feet)	Maximum Unbalanced Backfill Height ^e (feet)	Minimum Vertical Reinforcement Size and Spacing for 10-Inch Nominal Wall Thickness ^{a,b,c,e,f,i,k}		
		Soil Classes ^d		
		GW, GP, SW, and SP	GM, GC, SM, SM-SC, and ML	SC, MH, ML-CL, and inorganic CL
4	3	None required	None required	None required
	4	None required	None required	None required
5	3	None required	None required	None required
	4	None required	No. 4 @ 72 in. o.c.	No. 4 @ 64 in. o.c. ^g
	5	No. 4 @ 72 in. o.c.	No. 4 @ 72 in. o.c.	No. 4 @ 56 in. o.c. ^g
6	3	None required	No. 4 @ 72 in. o.c.	No. 4 @ 72 in. o.c.
	4	No. 4 @ 72 in. o.c.	No. 4 @ 72 in. o.c.	No. 4 @ 64 in. o.c. ^h

5	No. 4 @ 64 in. o.c. ^h	No. 4 @ 40 in. o.c. ^{g,h}	No. 5 @ 48 in. o.c. ^{g,h}
6	No. 4 @ 64 in. o.c. ^h	No. 4 @ 40 in. o.c. ^{g,h}	No. 5 @ 48 in. o.c. ^{g,h}

- a. Mortar shall be Type M or S and masonry shall be laid in running bond. Minimum unit compressive strength is 1,900 psi.
- 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 no greater than 2.5 inches.
- d. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.
- e. Interior concrete slab-on-grade shall be placed tight to the wall. The exterior grade level shall be 6 inches minimum below the top of wall. Maximum height from top of slab-on-grade to bottom of floor joists is 10 feet, 0 inches. Unbalanced backfill height is the difference in height of the exterior finish ground levels and the top of the interior concrete slab-on-grade.
- f. Minimum footing size of 20 inches by 8 inches shall be placed on soil with a bearing capacity of 2,000 psf. Minimum concrete compressive strength of footing shall be 3,000 psi.
- g. Provide propped cantilever wall: top of footing shall be 16 inches below the bottom of the concrete floor slab minimum.
- h. Provide #5 Grade 60 dowels, 1 foot, 6 inches long, to connect footing to wall. Embed dowel 5 inches into footing. Place dowels in center of wall thickness spaced at 32 inches on center maximum. No dowels are required where length of the foundation wall between perpendicular walls is two times the foundation wall height or less.
- i. This table is applicable where the length of the foundation wall between perpendicular walls is 35 feet or less, or where the length of the foundation laterally supported on only one end by a perpendicular wall is 17 feet or less.
- j. Maximum wall height is measured from top of the foundation wall to the bottom of the interior concrete slab-on-grade.
- k. Install foundation anchorage per section R403.1.6.

Subp. 8. **IRC Table R404.1.1(7)**. Section R404 is amended by adding a new table as follows:

TABLE R404.1.1(7)

CANTILEVERED CONCRETE AND MASONRY FOUNDATION WALLS

Maximum Wall Height ^j (feet)	Maximum Unbalanced Backfill Height ^e (feet)	Minimum Vertical Reinforcement Size and Spacing for 12-Inch Nominal Wall Thickness ^{a,b,c,e,f,i,k}		
		Soil Classes ^d		
		GW, GP, SW, and SP	GM, GC, SM, SM-SC, and ML	SC, MH, ML-CL, and inorganic CL
4	3	None required	None required	None required
	4	None required	None required	None required
5	3	None required	None required	None required
	4	None required	None required	No. 4 @ 72 in. o.c.
	5	No. 4 @ 72 in. o.c.	No. 4 @ 72 in. o.c.	No. 4 @ 72 in. o.c.
6	3	None required	None required	None required
	4	None required	None required	No. 4 @ 72 in. o.c.
	5	No. 4 @ 72 in. o.c.	No. 4 @ 56 in. o.c. ^h	No. 4 @ 40 in. o.c. ^g
	6	No. 4 @ 72 in. o.c.	No. 4 @ 56 in. o.c. ^g	No. 4 @ 32 in. o.c. ^{g,h}
7	3	None required	None required	None required
	4	None required	No. 4 @ 72 in. o.c.	No. 4 @ 72 in. o.c.
	5	No. 4 @ 72 in. o.c.	No. 4 @ 56 in. o.c. ^h	No. 4 @ 40 in. o.c. ^g
	6	No. 4 @ 48 in. o.c. ^h	No. 5 @ 48 in. o.c. ^{g,h}	No. 6 @ 48 in. o.c. ^{g,h}
	7	No. 4 @ 48 in. o.c. ^h	No. 5 @ 40 in. o.c. ^{g,h}	No. 6 @ 48 in. o.c. ^{g,h}

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Minimum unit compressive strength is 1,900 psi.

- 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 no greater than 3 inches.
- d. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R405.1.
- e. Interior concrete slab-on-grade shall be placed tight to the wall. The exterior grade level shall be 6 inches minimum below the top of wall. Maximum height from top of slab-on-grade to bottom of floor joists is 10 feet, 0 inches. Unbalanced backfill height is the difference in height of the exterior finish ground levels and the top of the interior concrete slab-on-grade.
- f. Minimum footing size of 20 inches by 8 inches shall be placed on soil with a bearing capacity of 2,000 psf. Minimum concrete compressive strength of footing shall be 3,000 psi.
- g. Provide propped cantilever wall: top of footing shall be 16 inches below the bottom of the concrete floor slab minimum.
- h. Provide #5 Grade 60 dowels, 1 foot, 6 inches long, to connect footing to wall. Embed dowel 5 inches into footing. Place dowels in center of wall thickness spaced at 32 inches on center maximum. No dowels are required where length of the foundation wall between perpendicular walls is two times the foundation wall height or less.
- i. This table is applicable where the length of the foundation wall between perpendicular walls is 35 feet or less, or where the length of the foundation laterally supported on only one end by a perpendicular wall is 17 feet or less.
- j. Maximum wall height is measured from top of the foundation wall to the bottom of the interior concrete slab-on-grade.
- k. Install foundation anchorage per section R403.1.6.

Subp. 9. **IRC section R404.1.3.** Section R404.1.3 is amended by adding the following exception to condition 2:

Exception: Cantilevered concrete and masonry foundation walls constructed in accordance with Table R404.1.1(5), R404.1.1(6), or R404.1.1(7).

Statutory Authority: *MS s 16B.59; 16B.61; 16B.64; 326B.02; 326B.101; 326B.106; 326B.13*

History: *27 SR 1475; 32 SR 12; L 2007 c 140 art 4 s 61; art 13 s 4; 39 SR 91*

Published Electronically: *January 26, 2015*