CITY OF BLOOMINGTON MINNESOTA

Foundations/Footings Information Sheet

Drainage

Lots shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of 6 inches within the first 10 feet. Where slopes or physical barriers prevent this, drains or swales shall be provided.

Minimum size R403.1.1

Minimum sizes for concrete and masonry footings shall be as set forth in Table R403.1 *(see below)* and Figure R403.1.1 *(see reverse)* The footing width "W" shall be based on the load-bearing value of the soil in accordance with Table R401.4.1 *(see right)* Spread footings shall be at least 6 inches in thickness. Footing projections "P" shall be at least 2 inches and shall not exceed the thickness of the footing. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1.

Foundation anchorage R403.1.6

Wood sole/sill plate shall be anchored to the foundation/slab with anchor bolts spaced a maximum 6 ft on center and a maximum 12" from any end/splice. Bolts shall be at least 1/2" diameter and extend a minimum of 7" into concrete or masonry. Nuts and washers tightly applied. Where vertical reinforcing of walls is required, anchor devices shall align with the reinforcing.

Table R401.4.1
Presumptive load-bearing values of foundation materials [a]

Class of materials	Load-bearing pressure (Pounds per square foot)
Crystalline bedrock	12,000
Sedimentary and foliated rock	4,000
Sandy gravel and/or gravel (GW and GP)	3,000
Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000
Clay, sandy clay, silty clay, clayey silt, silt and sandy silt (CI, ML, MH and CH)	1,500[b]

For SI: 1 pound per square foot = 0.0479 k Pa.

[a] When soil tests are required by Section R401.4, the allowable bearing capacities of the soil shall be part of the recommendations.

[b] Where the building official determines that in-place soils with an allowable bearing capacity of less than 1,500psf are likely to be present at the site, the allowable bearing capacity shall be determined by a soils investigation.

NOTE: Provide soil type on plans submitted for permit.

Table R403.1
Minimum width of concrete, precast or masonry footings in (inches[a])

	Load-bearing value or soil (psf)			
	1,500	2,000	3,000	≥ 4,000
Conventional light-frame construction				
1-story	12	12	12	12
2-story	15	12	12	12
3-story	23	17	12	12
4-inch brick veneer over light frame or 8-inch hollow concrete masonry				
1-story	12	12	12	12
2-story	21	16	12	12
3-story	32	24	16	12
8-inch solid or fully grouted masonry				
1-story	16	12	12	12
2-story	29	21	14	12
3-story	42	32	21	16

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 k Pa.

a. Where minimum footing width is 12", use of a single wythe of solid or fully grouted concrete masonary units is permitted.

Table R402.2
Minimum specified compressive strength of concrete[a] (f'_c)

	Weathering potential[b]		
Type or locations of concrete construction	**Negligible**	**Moderate**	**Severe**
Footings[g]	5,000	5,000	5,000
Basement walls, foundations and other concrete not exposed to the weather	2,500	2,500	2,500[c]
Basement slabs and interior slabs on grade, except garage floor slabs	2,500	2,500	2,500[c]
Basement walls, foundation walls, exterior walls and other vertical concrete work exposed to the weather	2,500	3,000[d]	3,000[d]
Porches, carport slabs and steps exposed to the weather, and garage floor slabs	2,500	3,000[d,e,f]	3,500[d,e,f]

For SI: 1 pound per square inch = 6.895kPa.

[a] At 28 days psi.

[b] Minnesota is categorized Severe.

[c] Concrete subject to freezing and thawing during construction shall be air-entrained concrete in accordance with Footnote d.

[d] Concrete shall be air-entrained. Total air content (percent by volume of concrete) shall not be less than 5 percent or more than 7 percent.

[e] See Section R402.2 for minimum cement content.

[f] For garage floors with a steel trowel finish, reduction of the total air content (% by volume of concrete) to not less than 3% is permitted if the specified compressive strength of the concrete is increased to not less than 4,000 psi.

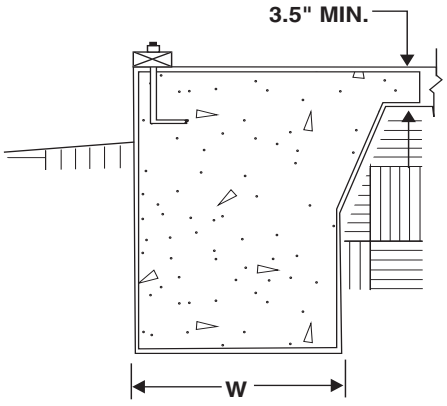
[g] Compressive strength (f'_c) of 2,500 psi, with an approved admixture that provides a water and vapor resistance at least equivalent to 5,000 psi concrete.

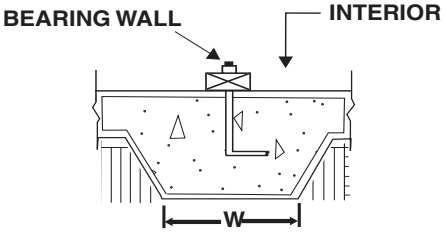
R506.2.3 Vapor retarder. In heated areas, an approved vapor retarder with joints lapped not less than 6" (153 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where no base course exists.

FIGURE 403.1.1
Concrete and masonry foundation details

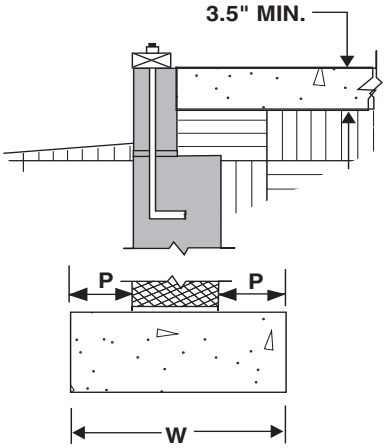
W = Load bearing value of soil per table 401.4.1 and table 403.1

P = A minimum 2 inches and not to exceed the thickness of the footing.

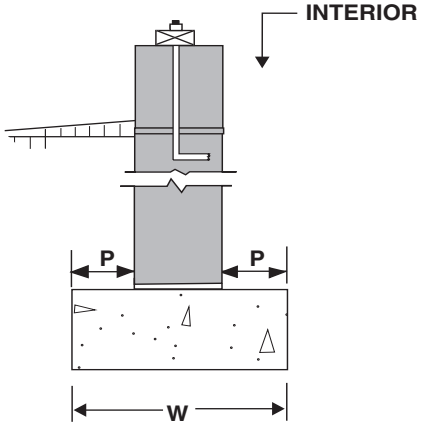




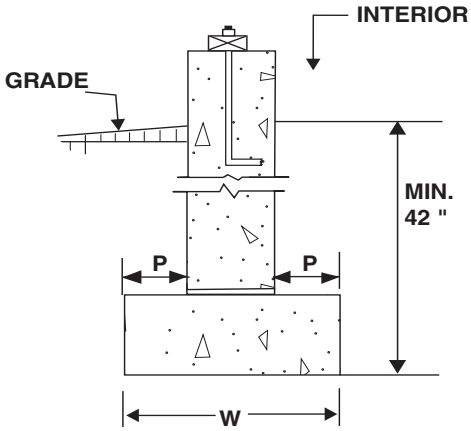
Monolithic slab with integral footing



Ground support slab with masonry wall and spread footing



Basement or crawl space with masonry wall and spread footing



Basement or crawl space with concrete wall and spread footing