

PART **3**

Building Construction

Chapters 4 through 10



- **Chapter 4** Foundations
- **Chapter 5** Floors
- **Chapter 6** Wall Construction
- **Chapter 7** Wall Covering
- **Chapter 8** Roof-Ceiling Construction
No changes addressed
- **Chapter 9** Roof Assemblies
No changes addressed
- **Chapter 10** Chimneys and Fireplaces
No changes addressed

Chapters 4 through 10 address the prescriptive methods for building foundations, floor construction, wall construction, wall coverings, roof construction, roof assemblies, chimneys, and fireplaces. Concrete, masonry, and wood foundations; retaining walls; supporting soil properties; surface drainage; and foundation dampproofing and drainage are found in Chapter 4. Chapters 5, 6, and 8 contain the construction provisions for floors and decks, walls, and roofs, respectively, with most of the provisions addressing light-frame construction. Chapter 7 addresses interior finishes, such as drywall and plaster installations, and exterior wall coverings, including water-resistive barriers, flashings, siding, and veneer, to provide a durable weather-resistant exterior. Chapter 9 covers the various waterproof roof assemblies, including roofing underlayment, roof eave ice barrier, flashings, asphalt shingles, and other roof coverings. Site-built masonry fireplaces and chimneys as well as prefabricated fireplaces and chimneys, including their weather-tight roof terminations, are addressed in the provisions of Chapter 10. ■

TABLE R 403.3(1)

Insulation Requirements for Frost-Protected Footings

TABLE R 403.4

Crushed Stone Footings

R 408.3

Unvented Crawl Spaces

R 507

Decks

R 507.2

Deck Materials

R 507.3

Deck Footings

R 507.4

Deck Posts

R 507.5

Deck Beams

R 507.6

Deck Joists

R 507.7, R 507.8, R 507.9

Decking, Vertical and Lateral Support

TABLE R602.3(6)

Alternate Stud Height

TABLES R602.7(1), R602.7(2)

Girder and Header Spans

TABLE R602.7.5

Lateral Support for Headers

R703.2

Water-Resistive Barrier



CHANGE TYPE: Modification

CHANGE SUMMARY: Insulation thickness requirements for Type II and IX expanded polystyrene (EPS) have changed. The minimum *R*-value for specific types of EPS has been clarified while requirements for horizontal insulation were added.

2018 CODE:

TABLE R403.3 (1) Minimum Footing Depth and Insulation Requirements for Frost-Protected Footings in Heated Buildings

For SI: 1 inch = 25.4 mm, °C = [(°F) – 32]/1.8.

- a. Insulation requirements are for protection against frost damage in heated buildings. Greater values may be required to meet energy conservation standards.
- b. See Figure R403.3(2) or Table R403.3(2) for Air Freezing Index values.
- c. Insulation materials shall provide the stated minimum *R*-values under long-term exposure to moist, below-ground conditions in freezing climates. The following *R*-values shall be used to determine insulation thicknesses required for this application: Type II expanded polystyrene (EPS) 2.4 R 3.2 R per inch for vertical insulation and 2.6 R per inch for horizontal insulation; Type IX expanded polystyrene (EPS) 3.2 R 3.4 R per inch for vertical insulation and 2.8 R per inch for horizontal insulation; Type IV extruded polystyrene 4.5 R per inch; Type VI extruded polystyrene 4.5 R per inch; Types IV, V, VI, VII, and X extruded polystyrene (XPS) 4.5 R 4.5 R per inch for vertical insulation and 4.0 R per inch for horizontal insulation.
- d. Vertical insulation shall be expanded polystyrene insulation or extruded polystyrene insulation.
- e. Horizontal insulation shall be expanded polystyrene insulation or extruded polystyrene insulation.

(No changes to table values.)

R403.3(1) continues



Frost-protected shallow foundation

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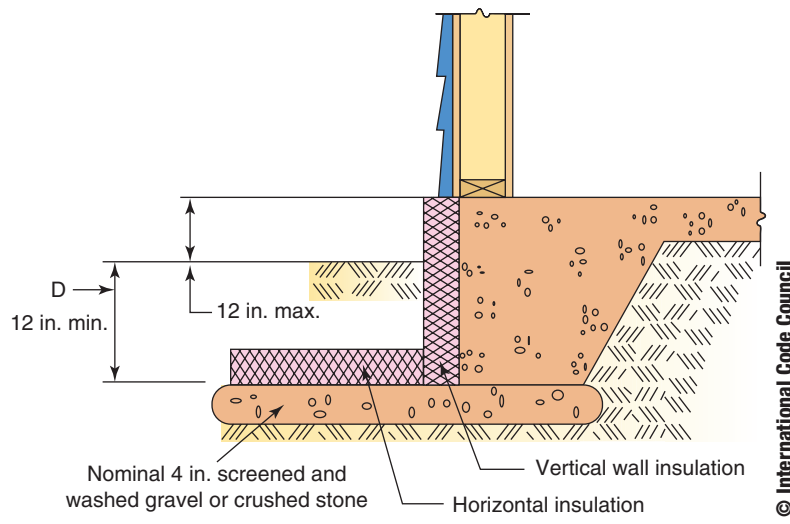
Table R403.3(1)

Insulation Requirements for Frost-Protected Footings

R403.3(1) continued

CHANGE SIGNIFICANCE: Section R403.3 of the IRC gives minimum requirements for frost-protected shallow foundations. These requirements come in part from conventional construction and in part from ASCE 32, *Design and Construction of Frost-Protected Shallow Foundations*. ASCE 32 addresses the design and construction of frost-protected shallow foundations in areas subject to seasonal ground freezing. Foundation insulation requirements to protect the footings of heated and unheated buildings from frost heave are presented with reference to design tables, climate maps and other necessary information to furnish a complete frost-protection design. Using the frost-protected shallow foundation method assists construction efficiency, increases energy efficiency, and minimizes site disturbance.

The 2018 IRC is updated with the published design values from ASCE 32 for insulation materials used on frost-protected shallow foundations (FPSF), using the 2001 edition of ASCE 32. The EPS minimum *R*-value requirements mirror the *International Building Code* (IBC) Section 1809.5, requiring foundations to be protected from frost. Item 2 of IBC Section 1809.5 calls for construction in accordance with ASCE 32.



EPS placement in a frost-protected shallow foundation

Crushed Stone Footings

Table R403.4

CHANGE TYPE: Modification

CHANGE SUMMARY: Table R403.4 is updated to include both the minimum depth and width of a crushed stone footing for a precast concrete wall.

2018 CODE:

TABLE R403.4 Minimum Depth (D) and Width (W) of Crushed Stone Footings^{a, b} (inches)

Number of Stories	Uniform Wall Load (plf)	Depth (D) and Width (W)	Load Bearing Value of Soil (psf)																	
			1500			2000			2500			3000			3500			4000		
			MH, CH, CL, ML ^c			SC, GC, SM, GM, SP, SW ^c			GP, GW ^c											
			Wall Width (inches)			Wall Width (inches)			Wall Width (inches)			Wall Width (inches)			Wall Width (inches)			Wall Width (inches)		
			8	10	12	8	10	12	8	10	12	8	10	12	8	10	12	8	10	12
Conventional light-frame construction																				
1-story	1100	D	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		W	13	15	17	13	15	17	13	15	17	13	15	17	13	15	17	13	15	17
2-story	1800	D	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		W	15	15	17	13	15	17	13	15	17	13	15	17	13	15	17	13	15	17
3-story	2900	D	14	12	10	9	7	5	6	4	4	4	4	4	4	4	4	4	4	4
		W	25	24	24	19	19	18	15	15	17	13	15	17	13	15	17	13	15	17
4-inch brick veneer over light-frame or 8-inch hollow concrete masonry																				
1-story	1500	D	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		W	13	15	17	13	15	17	13	15	17	13	15	17	13	15	17	13	15	17
2-story	2700	D	12	11	9	8	6	4	5	4	4	4	4	4	4	4	4	4	4	4
		W	22	23	23	18	17	17	14	15	17	13	15	17	13	15	17	13	15	17
3-story	4000	D	21	20	18	14	13	11	10	8	7	7	6	4	5	4	4	4	4	4
		W	33	34	33	25	26	25	20	20	21	17	17	17	14	15	17	13	15	17
8-inch solid or fully grouted masonry																				
1-story	2000	D	7	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		W	17	17	17	13	15	17	13	15	17	13	15	17	13	15	17	13	15	17
2-story	3600	D	19	17	15	12	11	9	9	7	5	6	4	4	4	4	4	4	4	4
		W	30	30	30	22	23	23	19	19	18	15	15	17	13	15	17	13	15	17
3-story	5300	D	30	29	27	21	19	18	16	14	12	12	10	8	9	8	6	7	6	4
		W	43	44	44	33	32	33	27	27	26	22	22	22	19	20	19	17	17	17

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 pound per square foot = 47.9 N/m².

- a. Linear interpolation of stone depth between wall widths is permitted within each Load-Bearing Value of Soil (psf).
- b. Crushed stone must be consolidated in 8-inch lifts with a plate vibrator.
- c. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R404.5.1.

R403.4 continues

R403.4 continued

CHANGE SIGNIFICANCE: The 2015 IRC Table R403.4 gave a minimum depth for a crushed stone footing below a precast concrete foundation wall supporting a wall of either wood, wood with veneer or masonry. The table gave depths based on soil load bearing values of 1500, 2000, 3000 or 4000 pounds per square foot (psf).

The updated table in the 2018 IRC now includes both a minimum depth (D) and width (W) for the crushed stone footings. A minimum depth of stone is necessary to spread the load of a precast concrete wall into the soil. Note that some depth values have increased or decreased by an inch in this new calculation of capacity. The new category of a minimum width is necessary to make sure the crushed rock extends sufficiently far horizontally to spread the load of the wall onto the supporting soil. The width dimension (W) has been added to the table to give a three-dimensional minimum footing size.

Cast-in-place concrete footing tables R403.1(1) through (3) already require both a minimum depth and width. To be consistent with the cast-in-place concrete footing tables, minimum width and two additional soil load bearing value options, 2500 and 3500 psf, are added to the precast concrete footing Table R403.4. Additionally, Footnote b is added at the bottom of the table to emphasize the requirement to compact crushed stone footings in lifts of 8 inches as stated in the text of Section R403.4.1, crushed stone footings.

Note that while it is standard practice for builders and precast foundation manufacturers to include crushed stone footing widths greater than the minimum widths required in Table R403.4, these depths and widths, which increase drainage both inside and outside the foundation, and create a stable base for the concrete slab, are beyond minimum code requirements.

