2021 IRC® Significant Changes

Based on the 2021 International Residential Code® (IRC®)

ICC LEARNING center

Course Description

- This seminar covers the significant changes within the *2021 International Residential Code*.
- Changes to building, energy, mechanical, fuel gas, plumbing and electrical requirements are discussed.

Course Goal

- Identify the significant changes to the *2021 International Residential Code*.

Course Objectives

- Upon completion, you will be better able to:
  - Identify the differences between 2018 IRC and 2021 IRC.
  - Determine if the change is an addition, deletion, modification or clarification.
  - Identify changes in format and technical requirements.
  - Explain the intent and application of the changes.

Course Overview

- Chapters 1 – 2 : Admin and Definitions
- Chapters 3 – 9 : Building
- Chapter 11 : Energy
- Chapters 12 – 23 : Mechanical
- Chapter 24 : Fuel Gas
- Chapters 25 – 33 : Plumbing
- Chapters 34 – 43 : Electrical
- Appendices : Radon, Cob and 3D

Selection of Topics

- Provisions addressed based primarily on:
  - Frequency of application
  - Special significance
  - Change in application

Marginal Markings within the International Residential Code

- **Solid vertical lines** in the margins within the body of the code indicate a technical change from the requirements of the 2018 edition.
- **Deletion indicators in the form of an arrow** are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted.
- **A single asterisk** [*] placed in the margin indicates that text or a table has been relocated within the code.
- **A double asterisk** [**] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code.

Letter Designations in Front of Section Numbers

- In each code development cycle, proposed changes to the code are considered at the Code Development Hearings.
- Proposed changes to a code section that has a number beginning with a letter in brackets are considered by a different code development committee.
- The content of sections in this code that begin with a letter designation is maintained by another code development committee:

Letter Designations in Front of Section Numbers

- [RB] = International Residential Code- Building Code Development Committee;
- [RE] = International Residential Energy Conservation Code Development Committee;
- [MP] = International Residential Code- Mechanical/ Plumbing Code Development Committee.

About me

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- Plans examiners
- Inspectors
- Building official
- Builders
- Designers
- Engineers or Architects

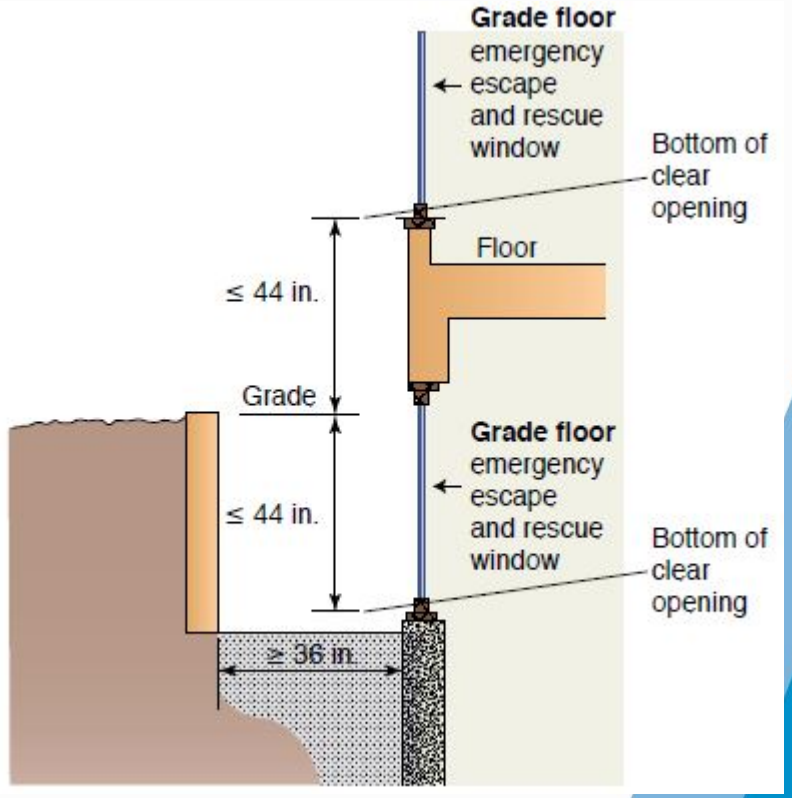
Chapter 1 – Admin
Chapter 2 - Definitions

R102.7.1 Additions, Alterations or Repairs

- Not cause an existing building to be less compliant with the code
- Comply with height limits of IRC
- Where alteration causes use or occupancy to be changed to one not within the scope of IRC, the provisions of the IEBC apply.

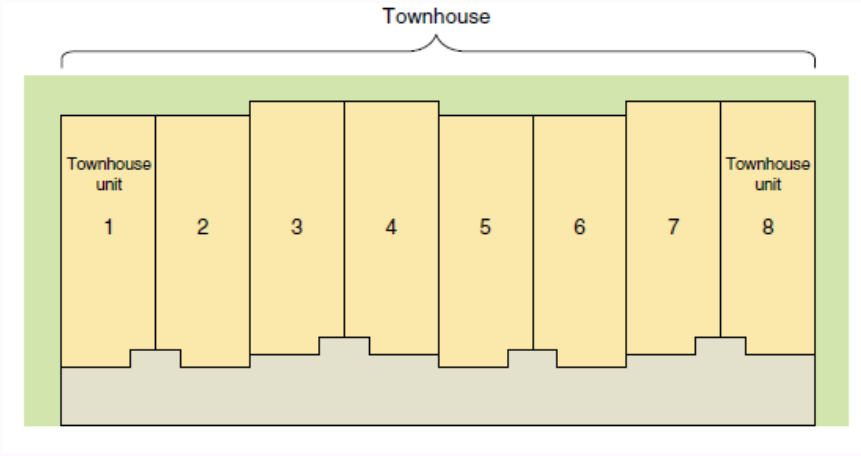
R202 Grade Floor EERO

- **Grade Floor <u>Emergency Escape And Rescue</u> Opening.** ~~A window or other~~ <u>An emergency escape and rescue</u> opening located such that the ~~sill height~~ <u>bottom</u> of the <u>clear</u> opening is not more than 44 inches above or below the finished ground level adjacent to the opening.



R202 Townhouse and Townhouse Unit

- **TOWNHOUSE.** Building that contains three or more attached townhouse units.
- **TOWNHOUSE UNIT.** A single-family dwelling unit in a townhouse that extends from foundation to roof and that has a yard or public way on not less than two sides.

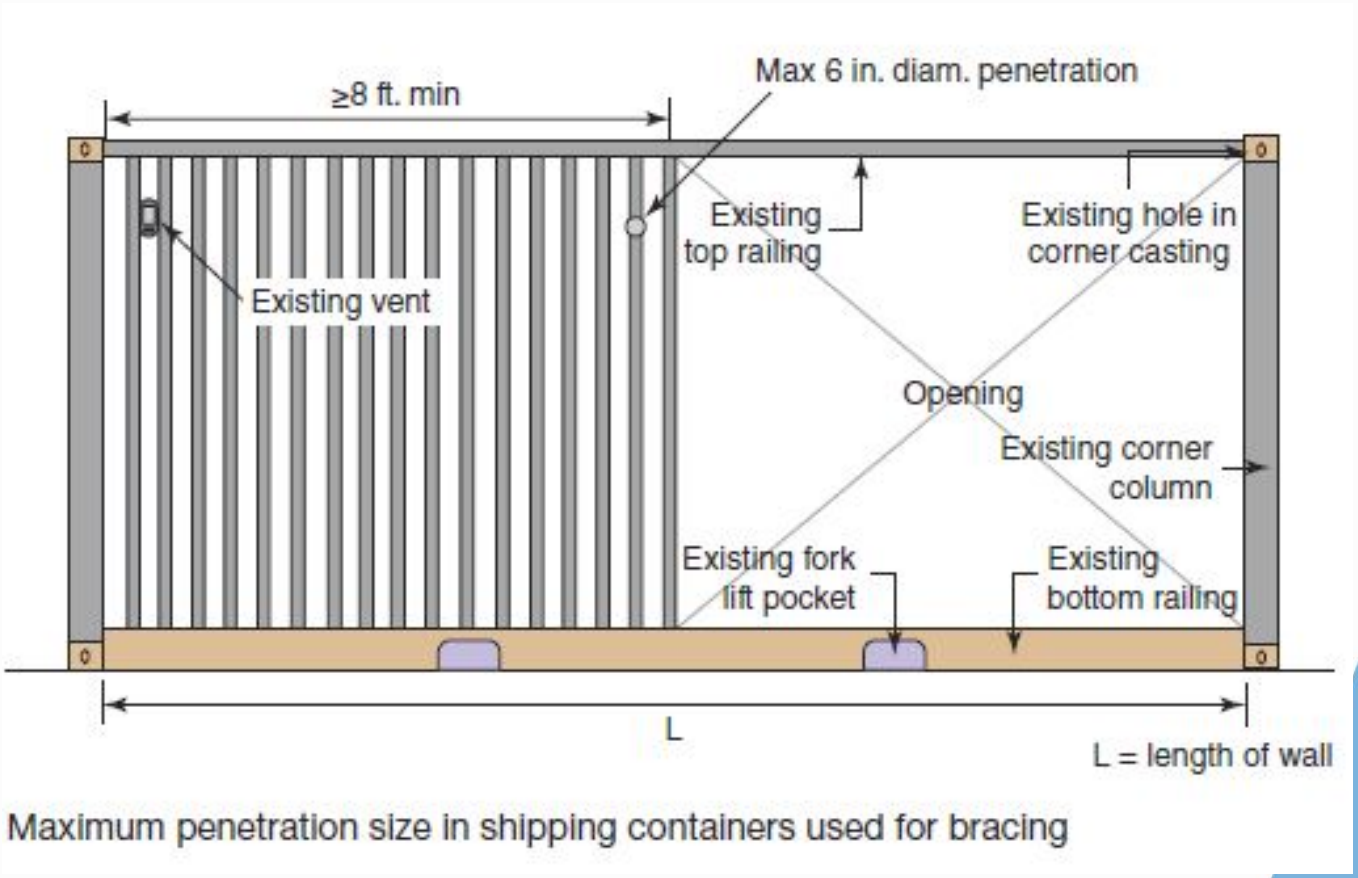


Chapter 3 – Loads

R301.1.4 Intermodal Shipping Containers

- Provisions for construction with intermodal shipping containers are added to the IRC by referencing IBC Section 3315 and ICC G5 – *Guideline for the Safe Use of ISO Shipping Containers Repurposed as Buildings and Building Components.*

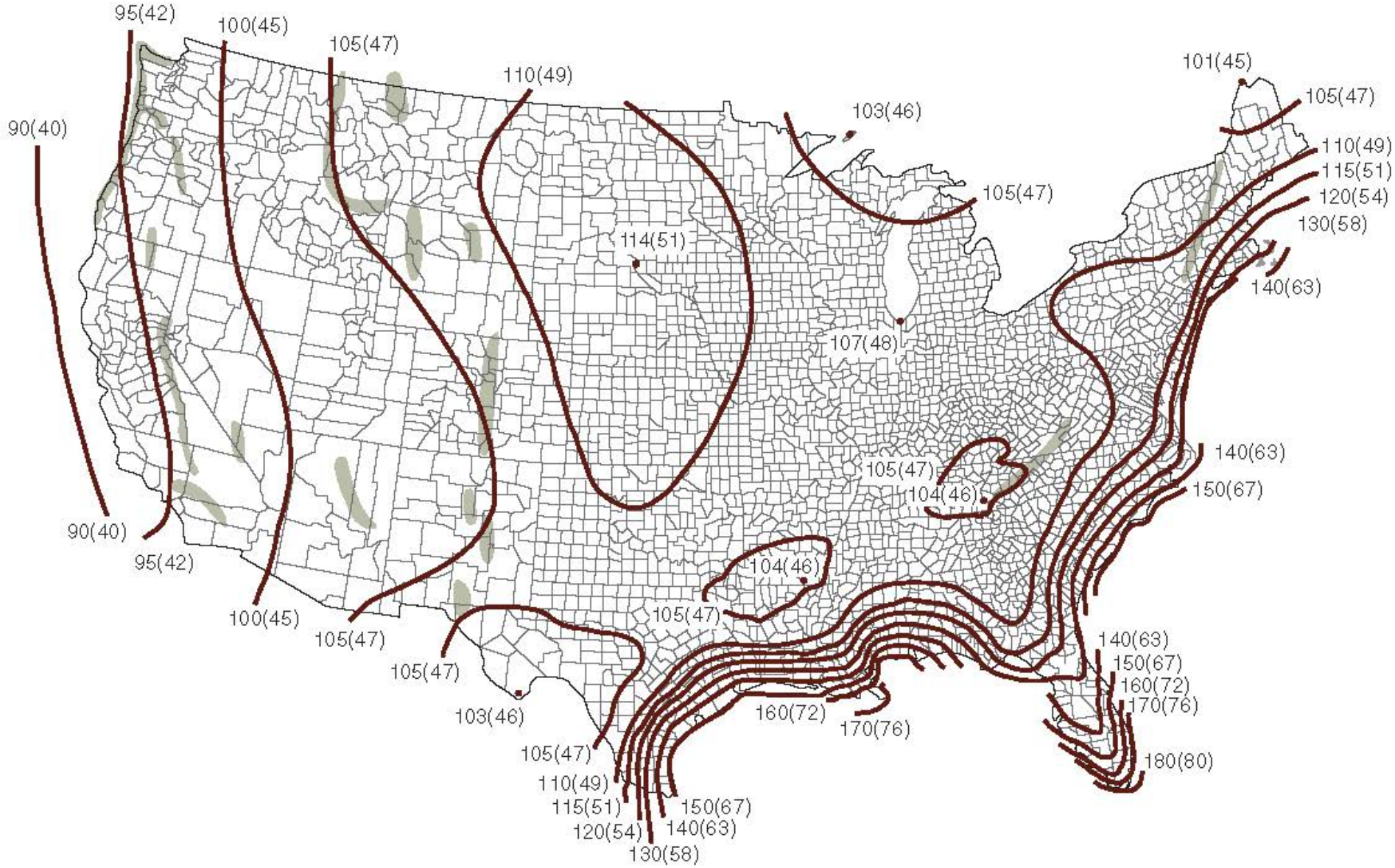
R301.1.4 Intermodal Shipping Containers



Maximum penetration size in shipping containers used for bracing

R301.2 Wind Design

- Updated Wind Speed maps match IBC and ASCE 7 maps with a large portion of the country having wind speeds less than 115 mph.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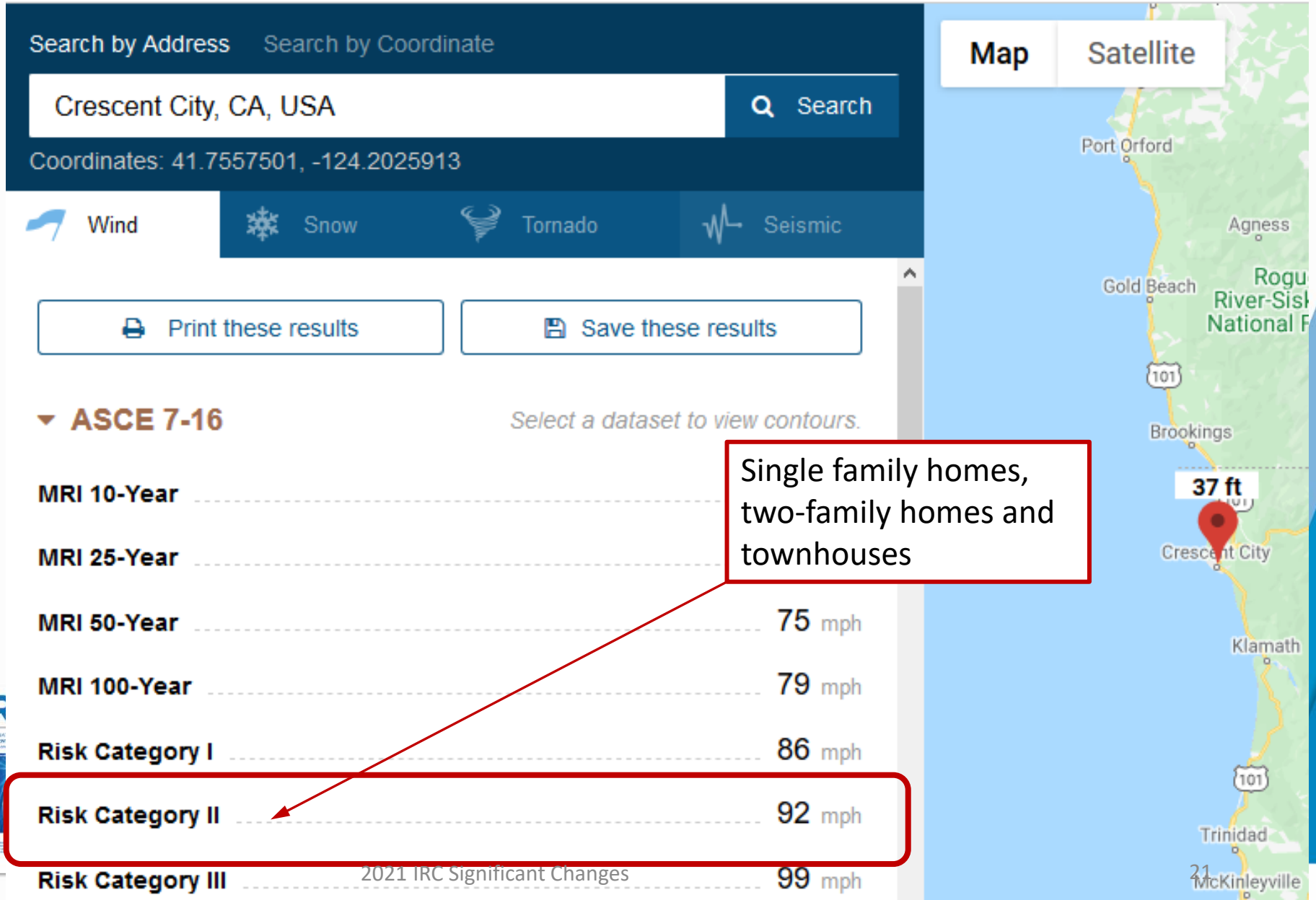

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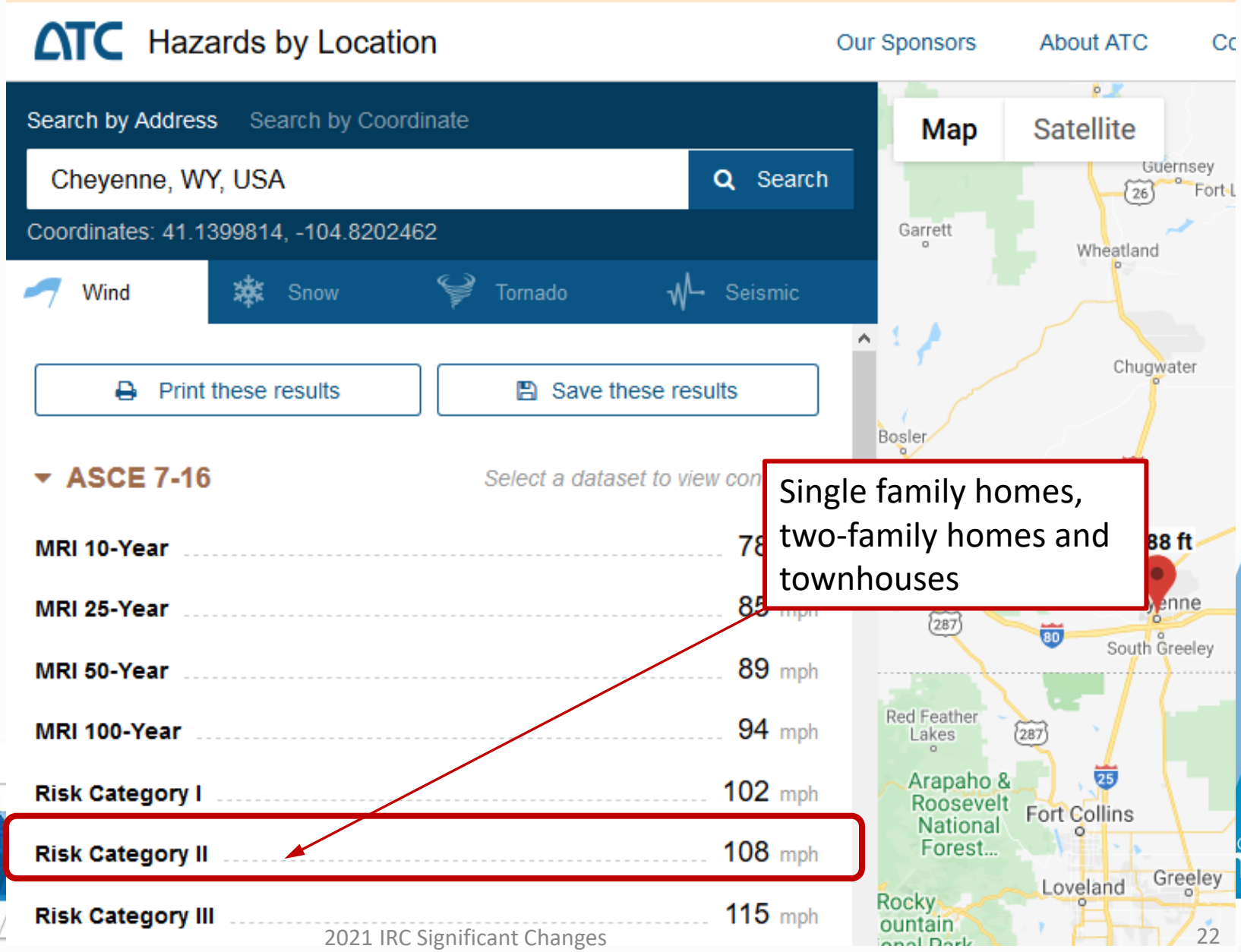

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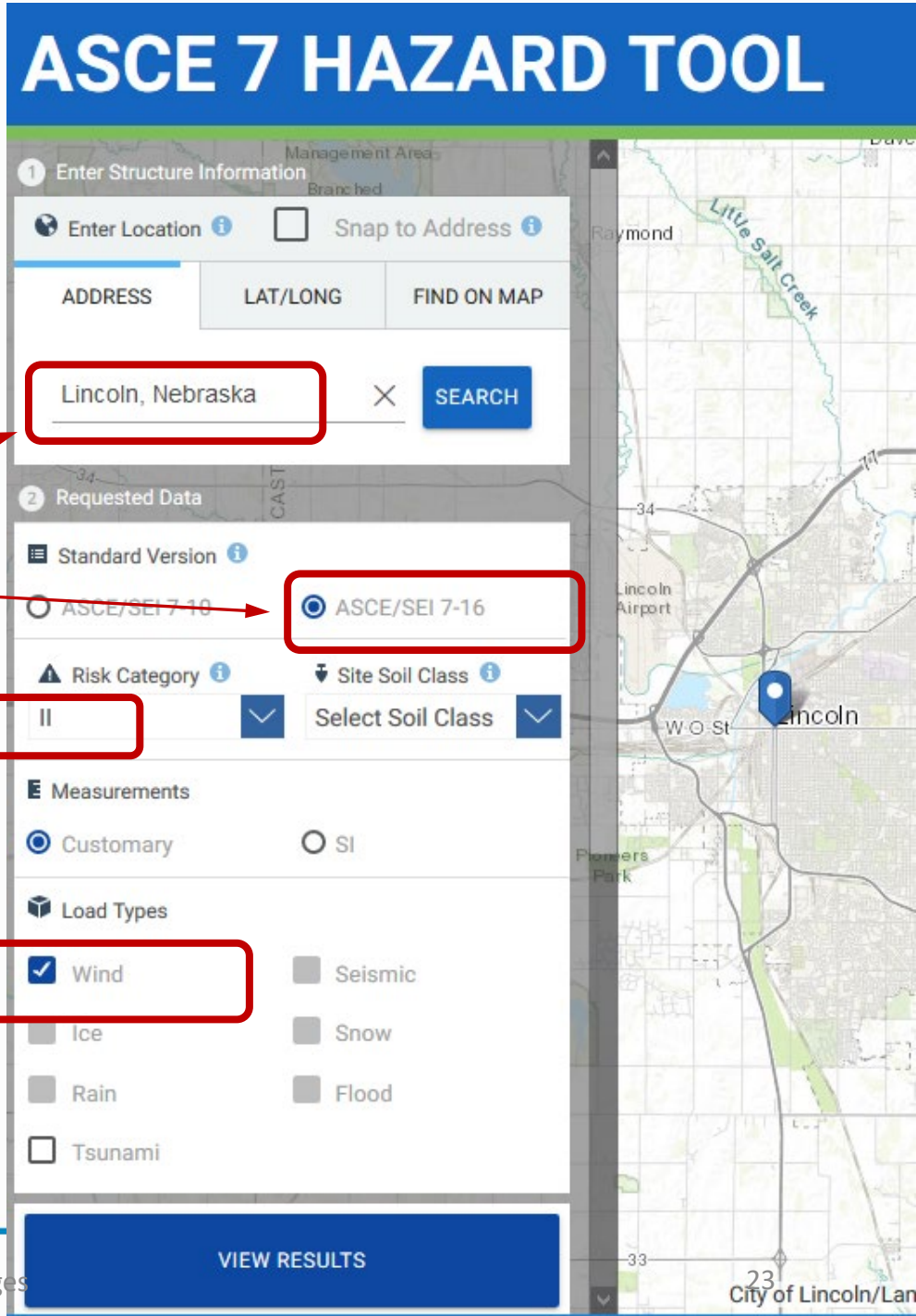
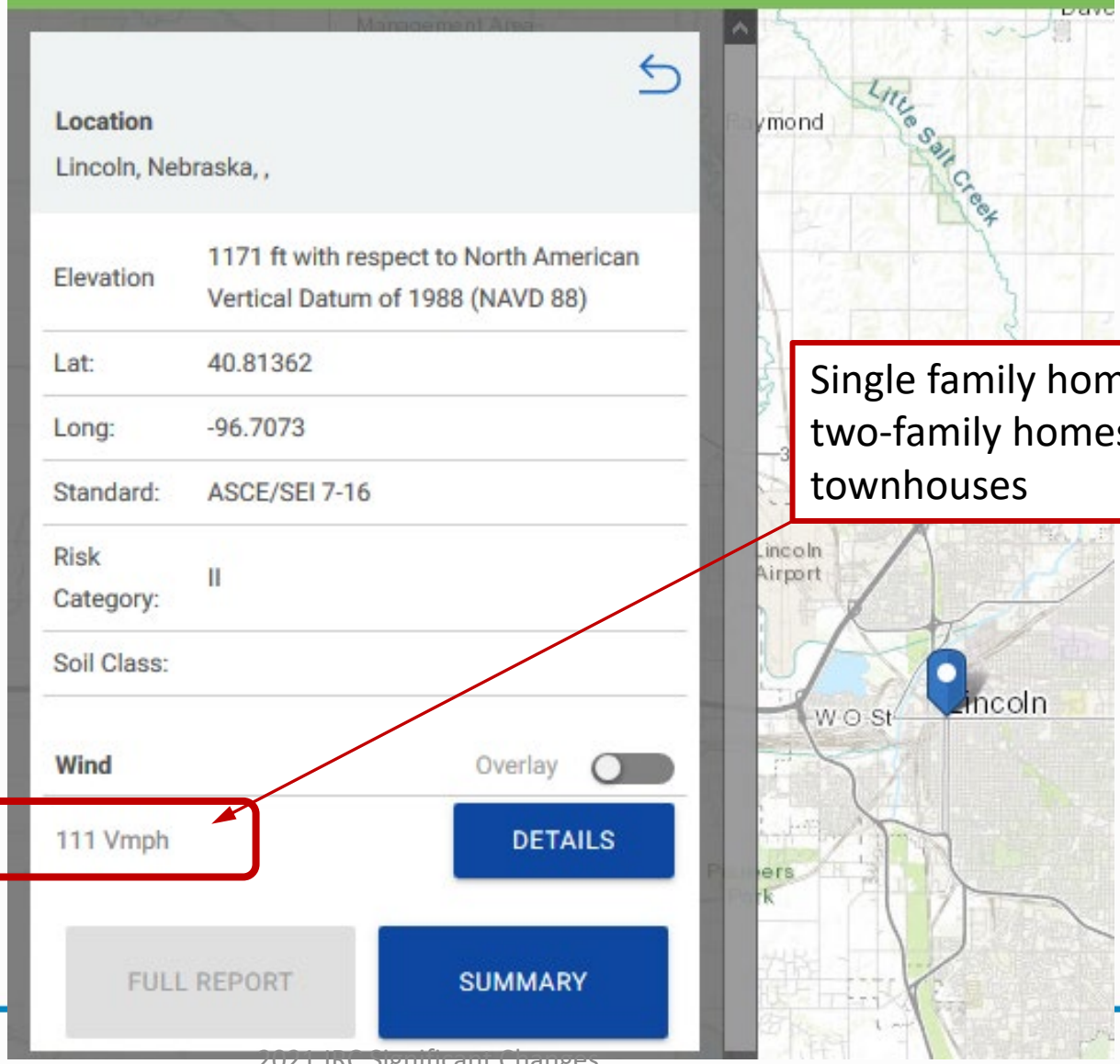
Inputs



ASCE 7 HAZARD TOOL



Single family homes, two-family homes and townhouses

Table R301.2.1(1) Components and Cladding

- Component and cladding wind pressures in Table R301.2.1(1) are updated for new design wind speeds and hip or gable roof profiles.

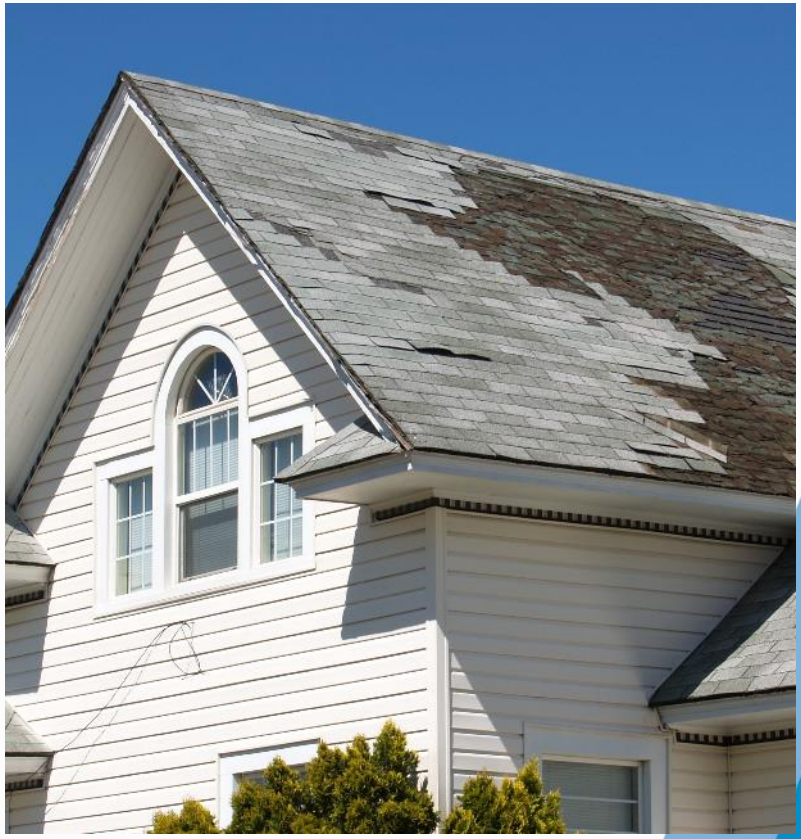


Table R301.2.1(1) Components and Cladding

	Zone	Effective Wind Areas (ft^2)	Ultimate Design Wind Speed, V_{ult}													
			90		95		100		105		110		...		180	
			Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Gable Roof >7 to 20 degrees	1, 2e	10	5.4	-16.2	6	-18.0	6.7	-19.9	7.4	-22	8.1	-24.1	...	...	21.6	-64.6
	1, 2e	20	4.9	-16.2	5.4	-18	6.0	-19.9	6.6	-22	7.2	-24.1	...	...	19.4	-64.6
	1, 2e	50	4.1	-9.9	4.6	-11	5.1	-12.2	5.6	-13.4	6.1	-14.7	...	...	16.4	-39.4
	1, 2e	100	3.6	-5	4	-5.6	4.4	-6.2	4.8	-6.9	5.3	-7.5	...	...	14.2	-20.2
	2n, 2r, 3e	10	5.4	-23.6	6	-26.3	6.7	-29.1	7.4	-32.1	8.1	-35.2	...	...	21.6	-94.2
	2n, 2r, 3e	20	4.9	-20.3	5.4	-22.7	6	-25.1	6.6	-27.7	7.2	-30.4	...	...	19.4	-81.4
	2n, 2r, 3e	50	4.1	-16	4.6	-17.9	5.1	-19.8	5.6	-21.8	6.1	-24	...	...	16.4	-64.2
	2n, 2r, 3e	100	3.6	-12.8	4	-14.3	4.4	-15.8	4.8	-17.4	5.3	-19.1	...	...	14.2	-51.3
	3r	10	5.4	-28	6	-30.2	6.7	-34.6	7.4	-38.1	8.1	-41.8	...	...	21.6	-112
	3r	20	4.9	-24	5.4	-26.7	6	-29.6	6.6	-32.7	7.2	-35.9	...	...	19.4	-96
	3r	50	4.1	-18.7	4.6	-20.8	5.1	-23.1	5.6	-25.4	6.1	-27.9	...	...	16.4	-74.7
	3r	100	3.6	-14.7	4	-16.3	4.4	-18.1	4.8	-20	5.3	-21.9	...	...	14.2	-58.7

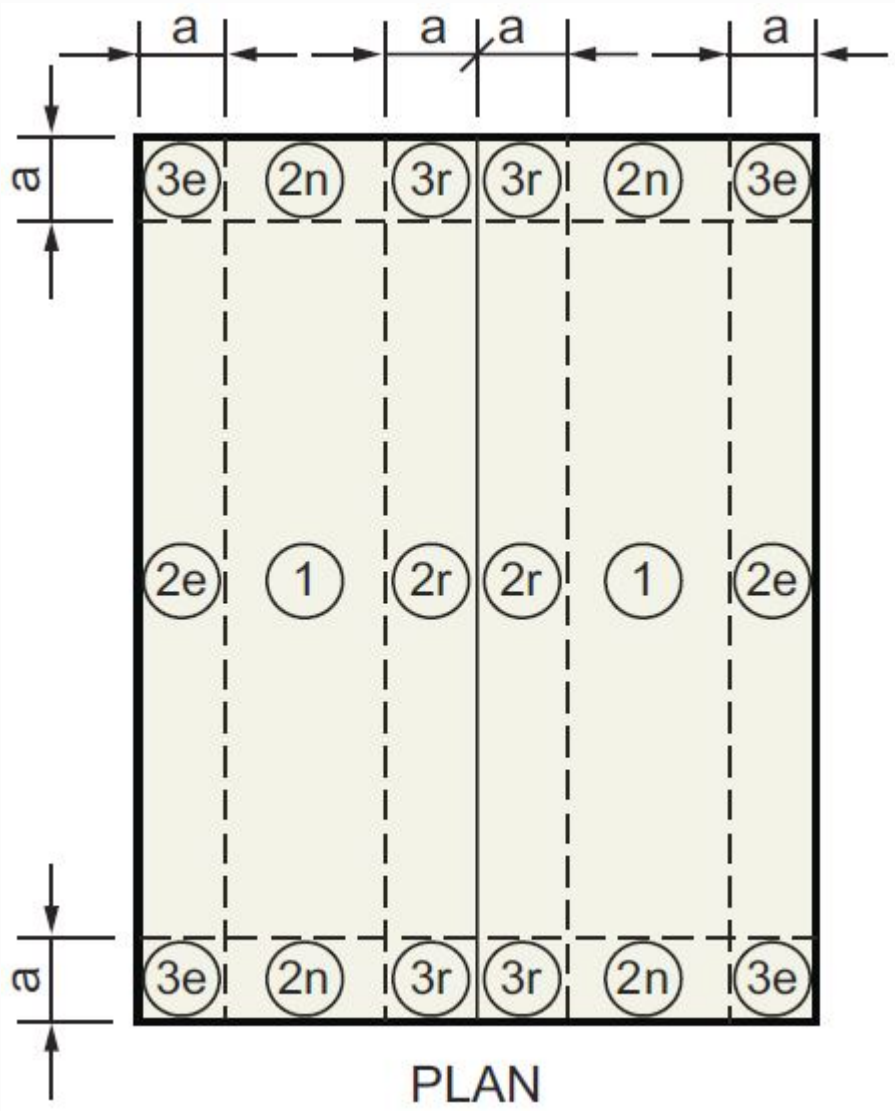
New vocabulary includes division of C&C corner and edge zones as follows:

2 – edge zones
2e – edge zone along bottom of roof above the soffit
2r – edge zone along roof peak
2n – edge zone along rake edge of gable roofs
3 – corner zones
3e – corner zone at bottom of roof above the soffit
3r – corner zone at roof peak

C&C interior zones:

1 – interior zone
1′ – central interior zone, flat or low slope roof

a = 4 feet

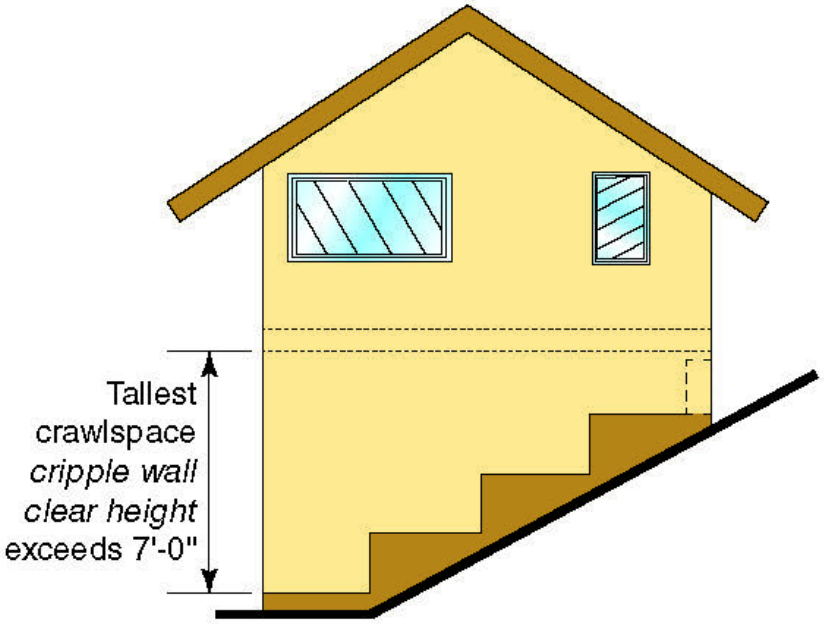


R301.2.1.1 Wind Limitations

- Engineered design requirements for special wind regions are explicitly stated in Section R301.2.1.1.
- Engineered design is required when winds are 140 mph or greater.

R301.2.2.6 Irregular Buildings Item 8

- Irregular building requirements for homes in high seismic regions now include limits for hillside light-frame construction.



R301.2.2.6 Irregular Buildings Item 8

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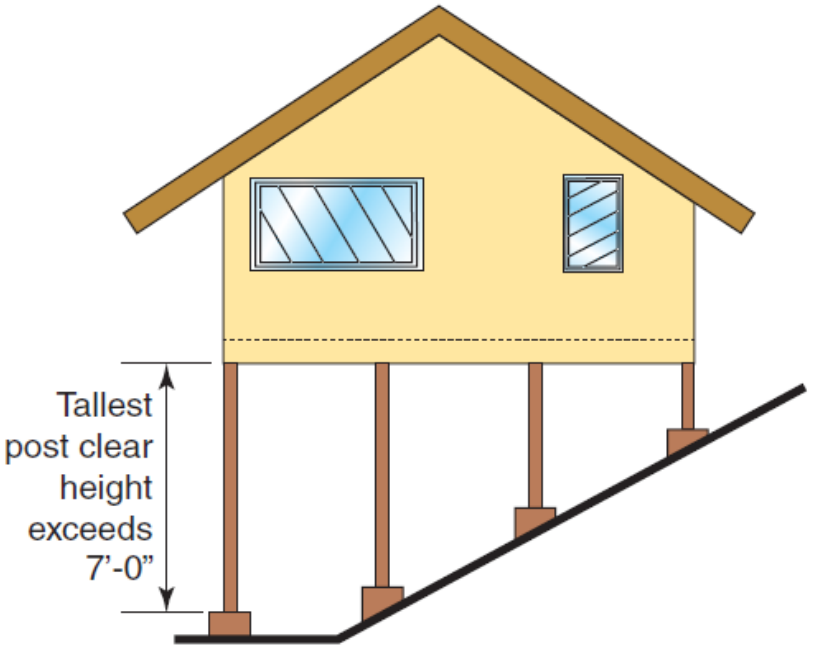
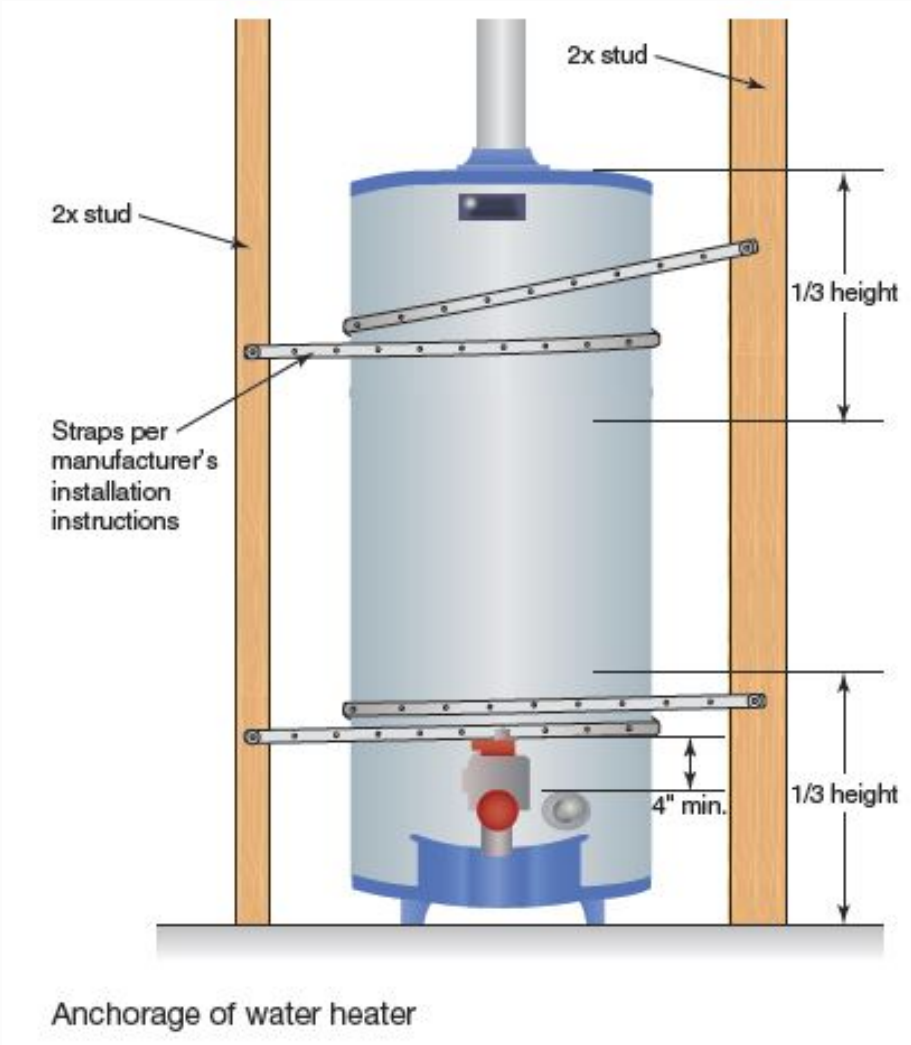


R301.2.2.10 Anchorage of Water Heaters

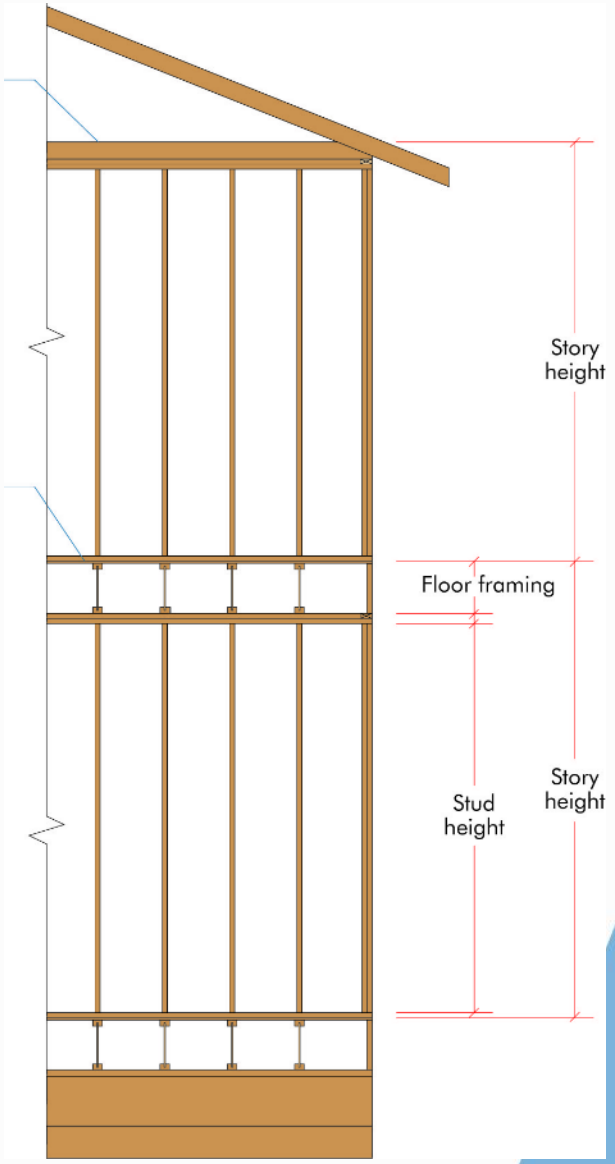
- Water heaters and thermal storage units in Townhouses in SDC C must be anchored.



Anchorage of water heater

R301.3 Story Height

- Maximum story height for wood wall framing is 13 feet 7 inches when the exception requirements are met.



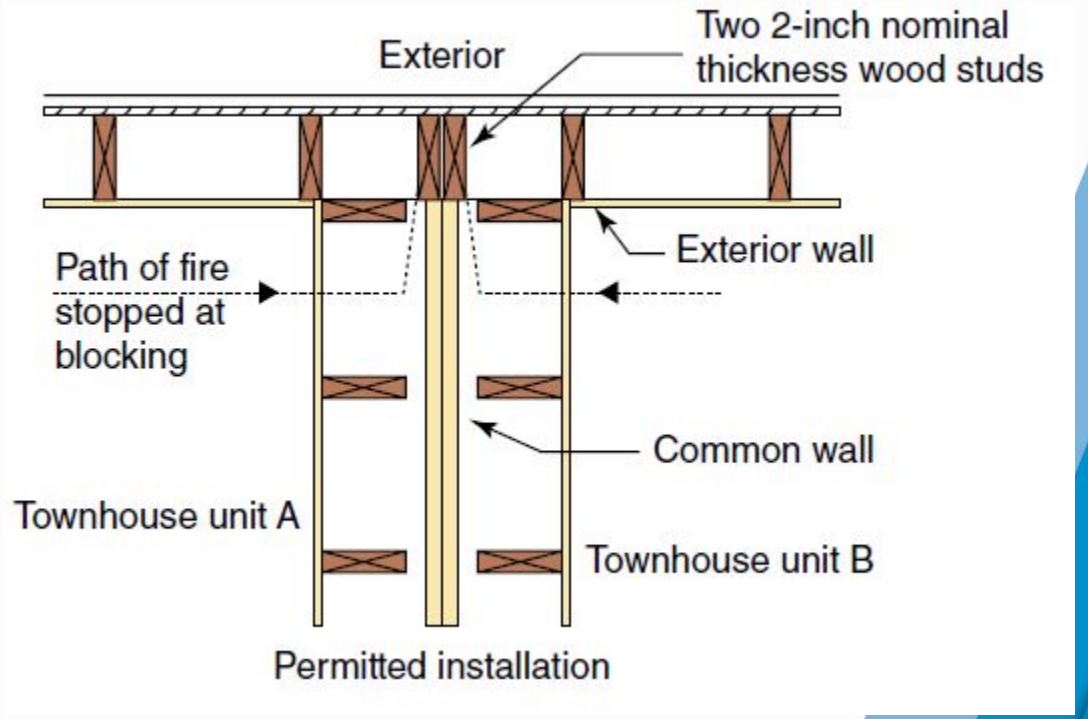
R301.3 Story Height

Load	Stud Height (feet)		
	≤ 10	10 to 12	≥ 12
Load Bearing Studs	No engineering required	Engineering required unless a Section R602.3.1 exception is met: Exc. 2 – snow load and tributary length limit Exc. 3 – snow load and span limits, only Exp B	Engineering always required
Non-loadbearing Studs	No engineering required	No engineering required for 2x4 and larger studs	Engineering required unless limits of Table R602.3(5) are met

Chapter 3 – Life Safety

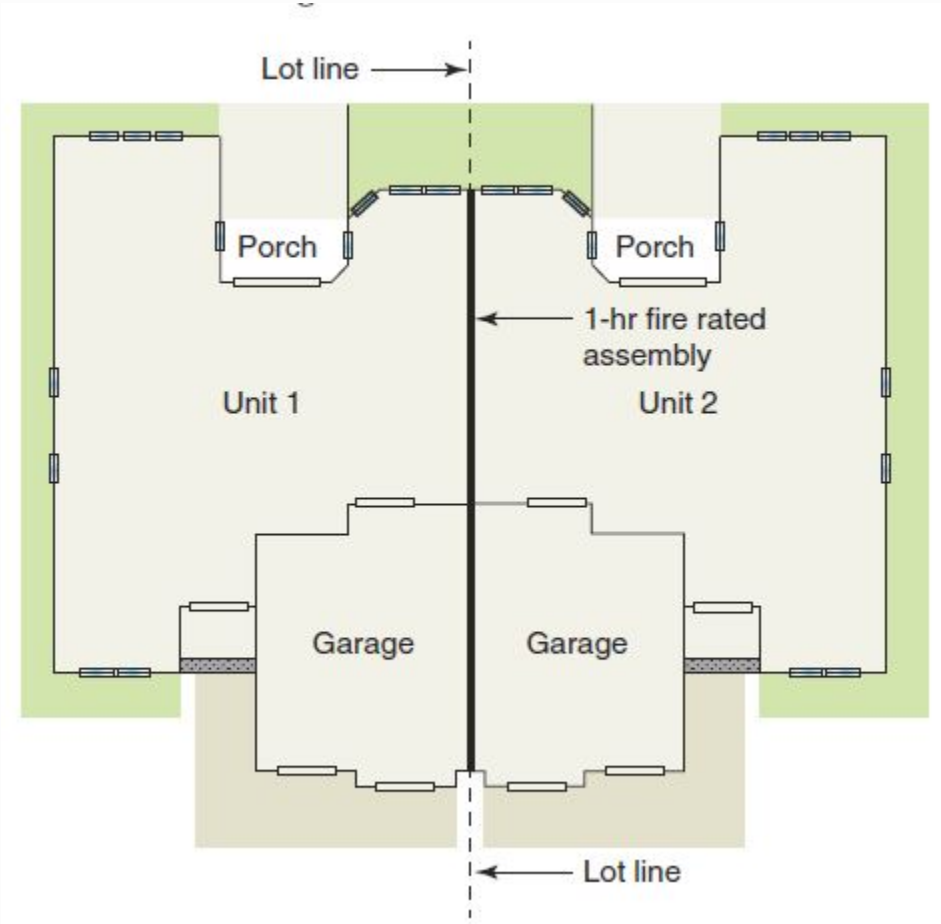
R302.2 Townhouse Common Wall

- Common walls separating townhouses can terminate at the inside of exterior walls:
  - Two 2 in. studs as fireblocking



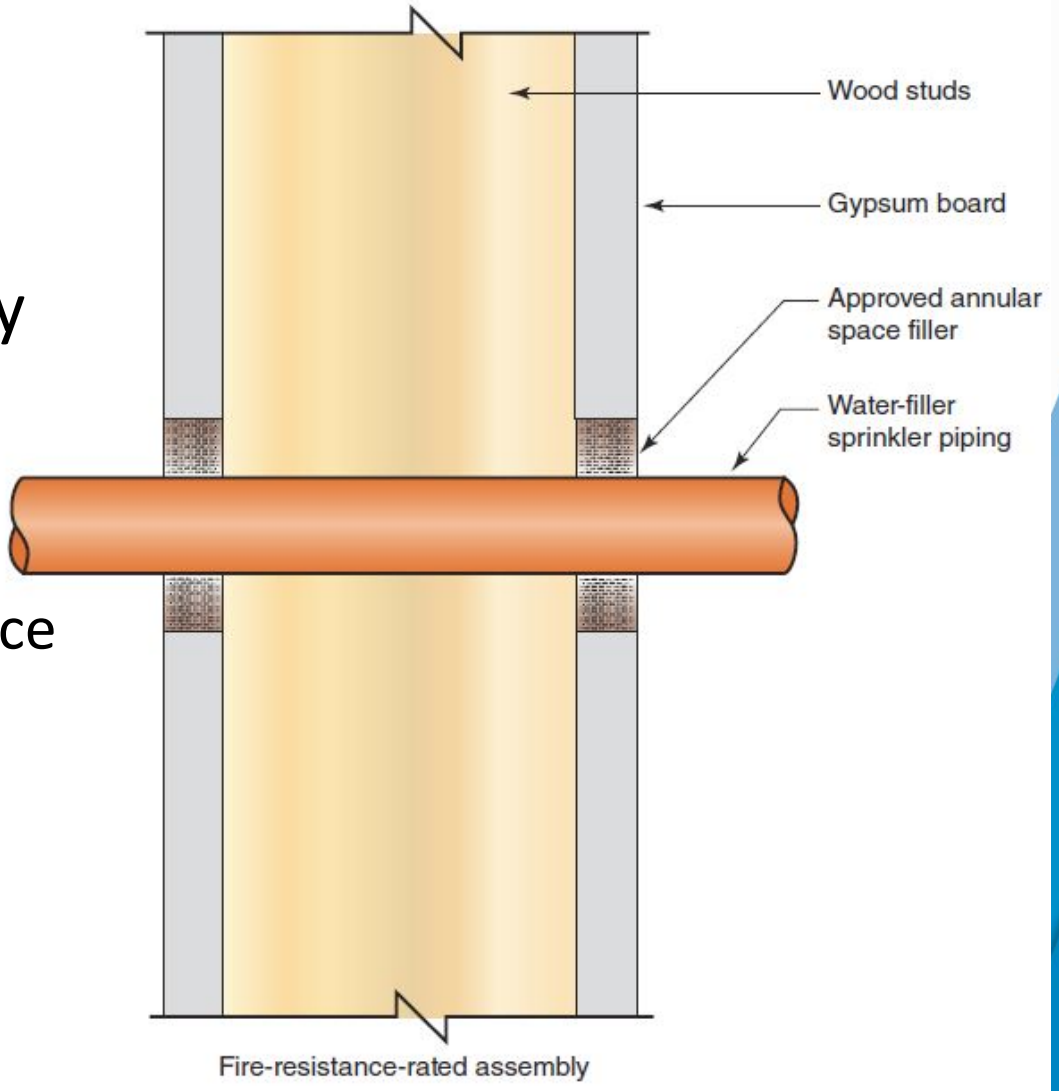
R302.3 Two-Family Dwelling Separation

- One-hour separation whether or not a lot line exists between units



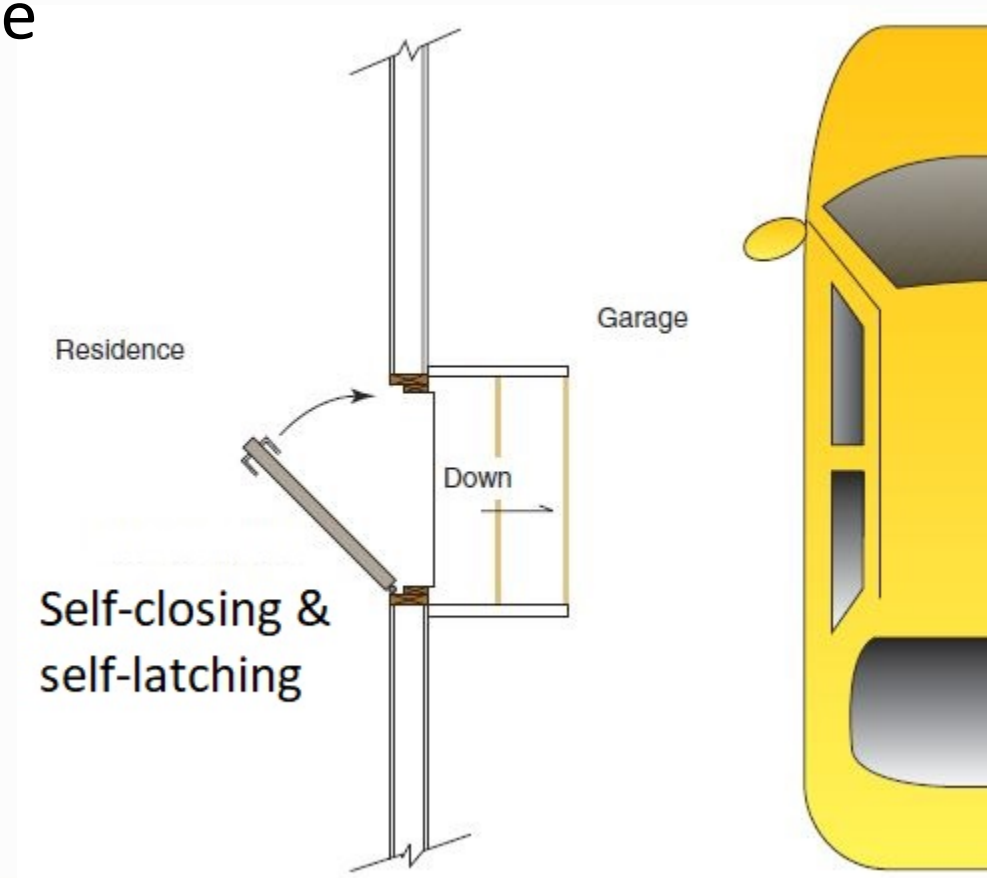
R302.4 Dwelling Unit Rated Penetrations

- Water-filled fire sprinkler piping of any approved material
  - does not require a firestop system
  - provided annular space is filled with the prescribed materials



R302.5 Dwelling-Garage Opening Protection

- Door between the garage and residence must be self-latching.

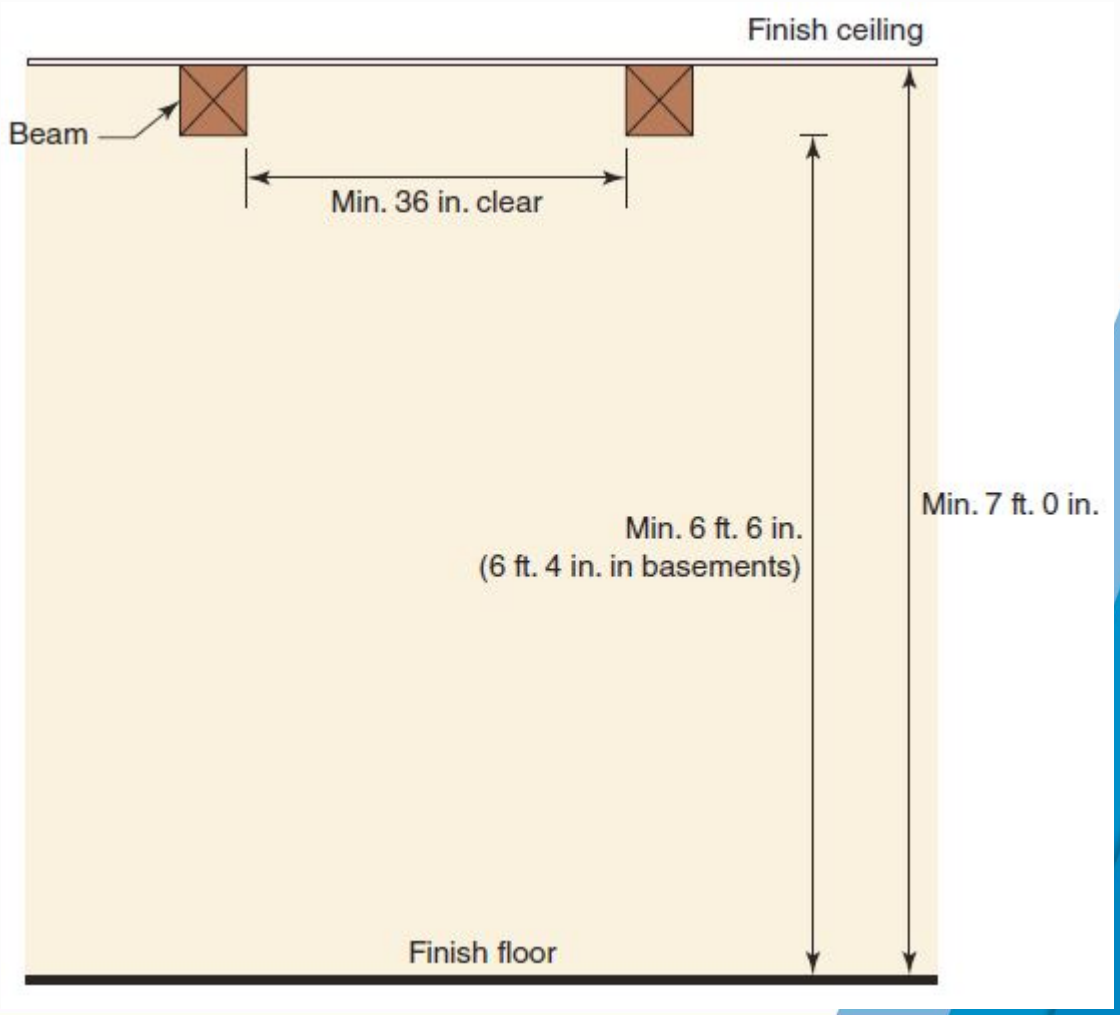


R303.1 Mechanical Ventilation

- Whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 ACH in habitable rooms
- A local exhaust system is an acceptable substitute for natural ventilation in kitchens.

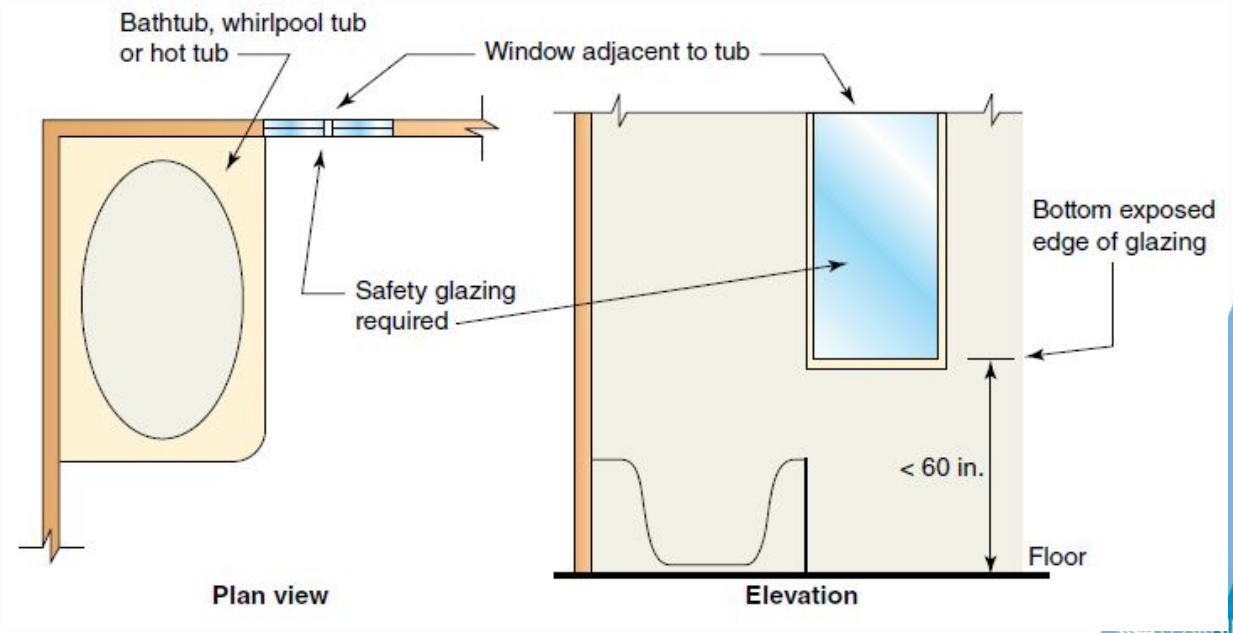
R305.1 Ceiling Height

- Minimum ceiling height reduced to 6 ft. 6 in. under beams spaced at least 36 in. apart.



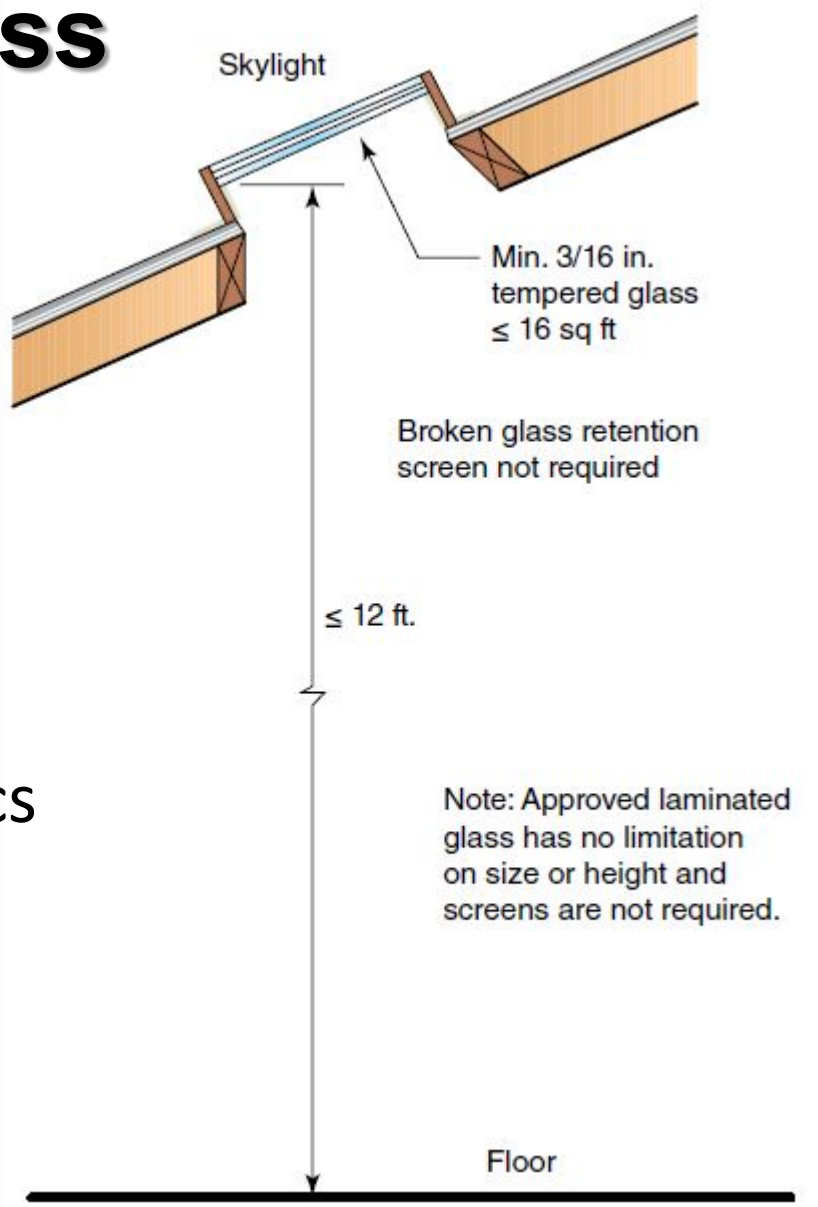
R308.4.5 Glazing and Wet Surfaces

- Replaced the word “facing” with the words “adjacent to” for those elements related to wet surfaces.

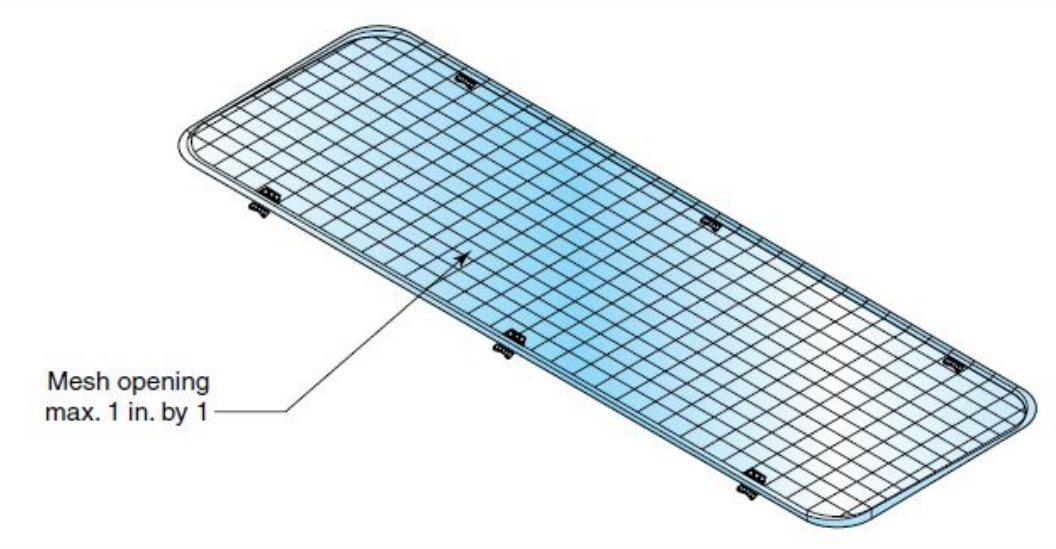


R308.6 Skylight Glass Retention Screens

- New terminology clarifies the broken glass retention screen requirements.
- Usually not required in IRC buildings.
- Laminated glass meeting specs does not require a retention screen.

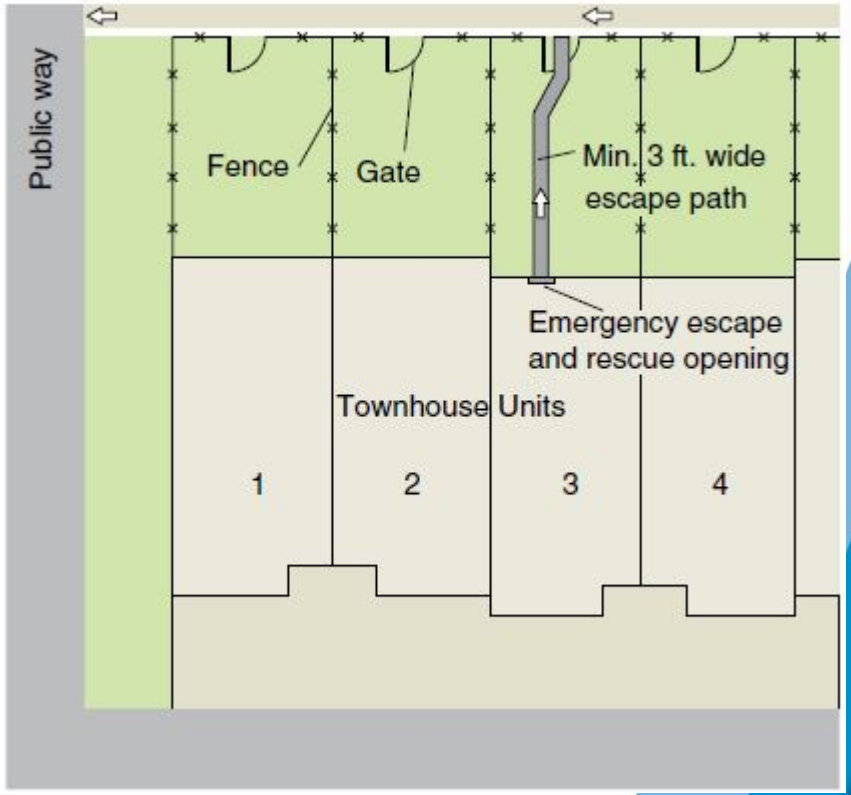


R308.6 Skylight Glass Retention Screens (Continued)



R310.1 Emergency Escape and Rescue Opening Required

- Emergency escape and rescue openings require a clear 36-inch-wide path to a public way.
- Operation requirements have been clarified.

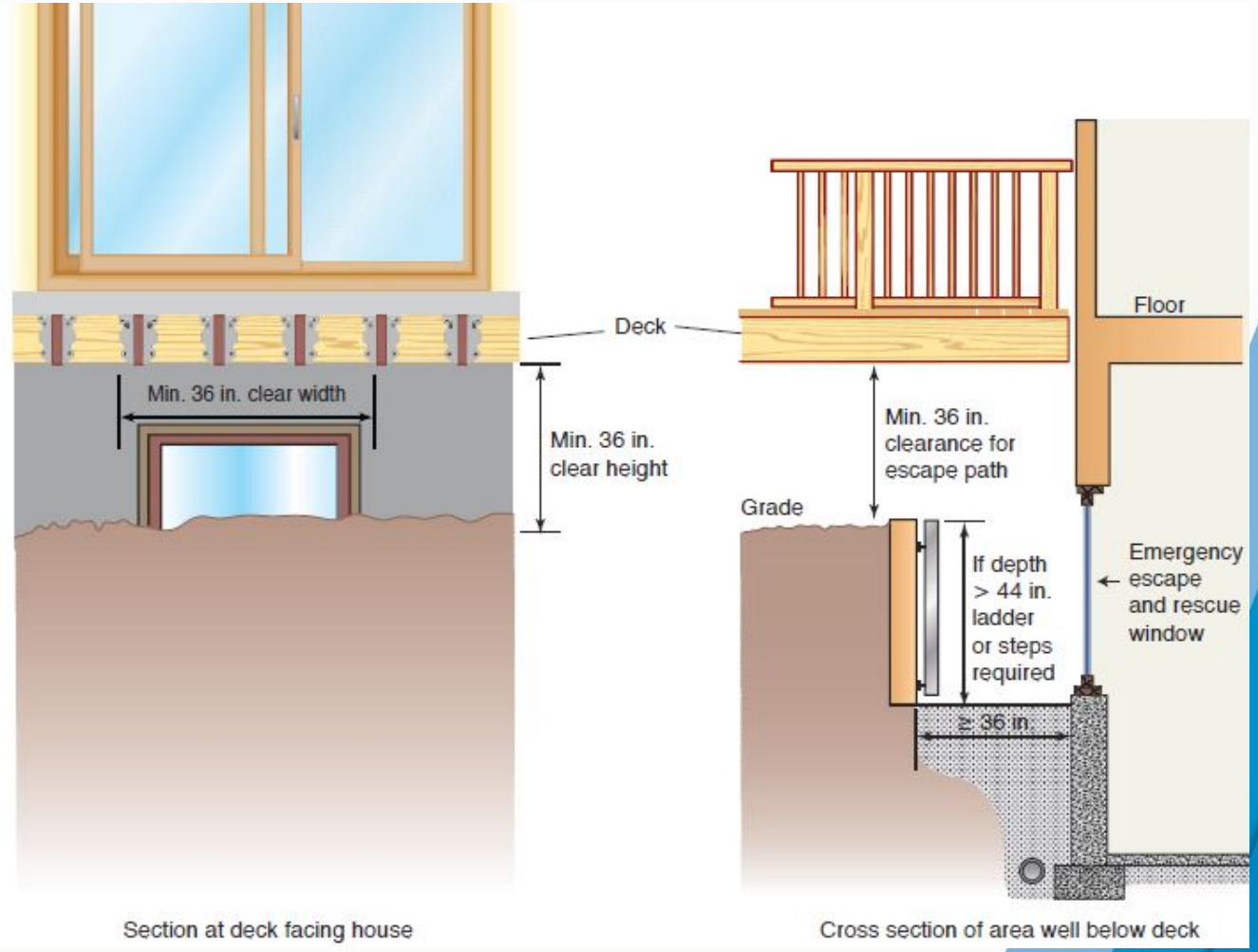


R310.2 Emergency Escape and Rescue Openings

- Emergency escape openings under decks, porches and cantilevers require a path not less than 36 in. in height and 36 in. in width.
- Dimensions have been clarified (placed in separate sections):
  - Minimum opening area
  - Minimum opening dimensions
  - Maximum ~~sill~~ height above floor

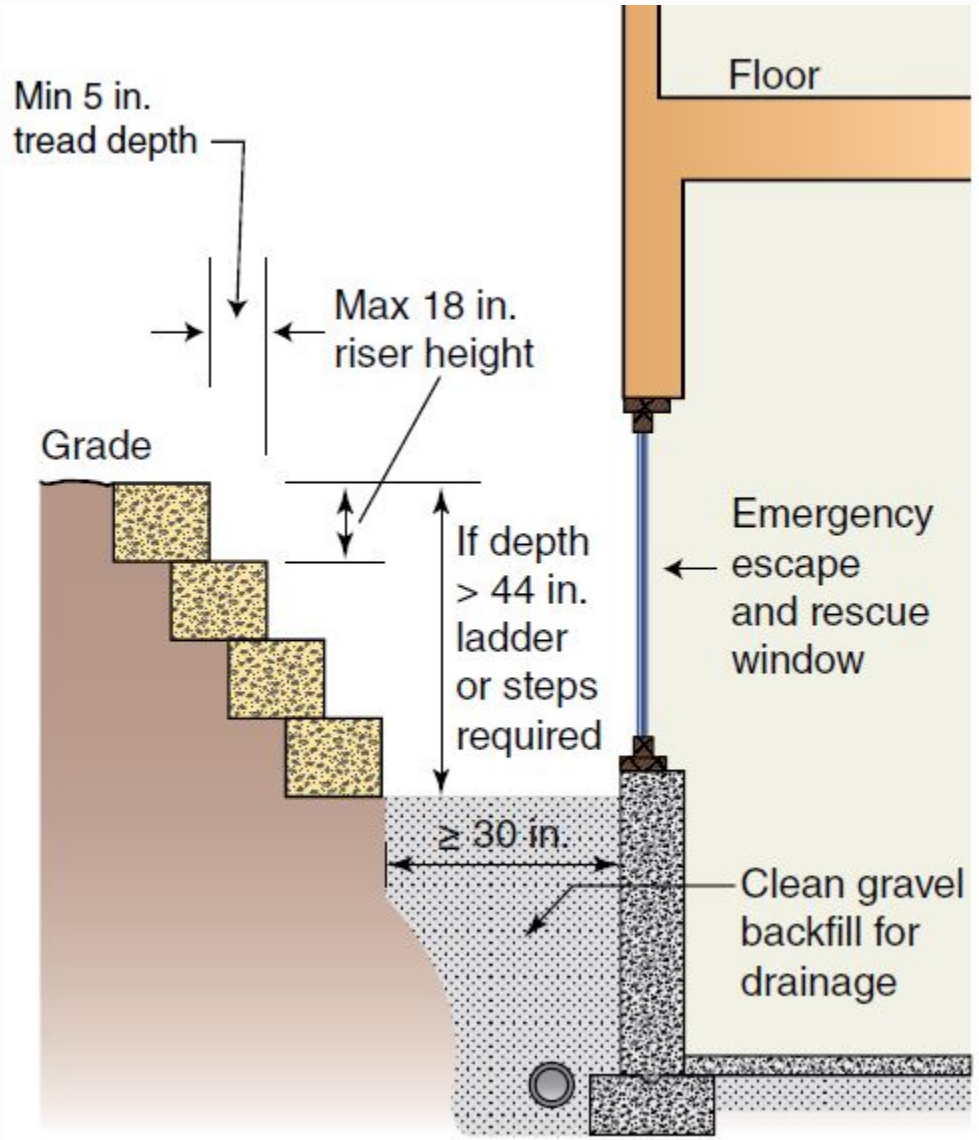
R310.2 Emergency Escape and Rescue Openings (Continued)

- 36 in. height
- 36 in. width



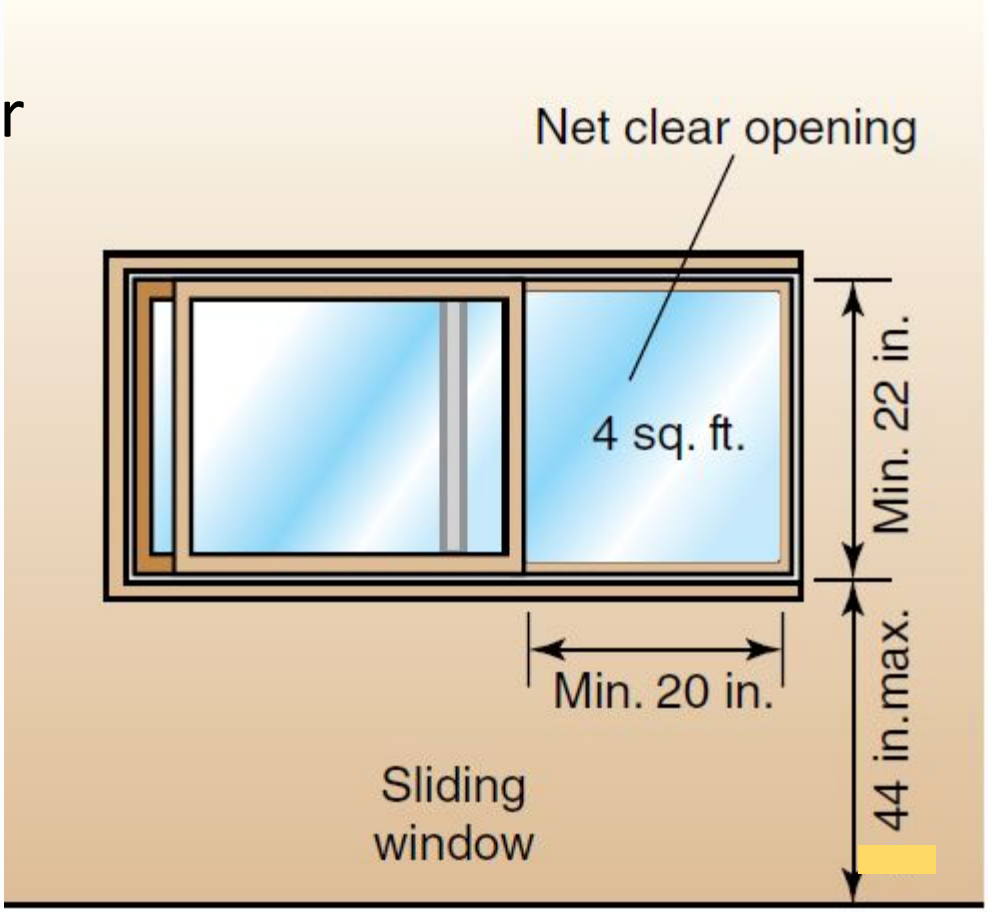
R310.3, R310.4 EERO Area Wells

- Window wells and area wells merged into area wells.
- Dimensions are given for steps:
  - 5 in. tread
  - 18 in. rise
  - 12 in. width

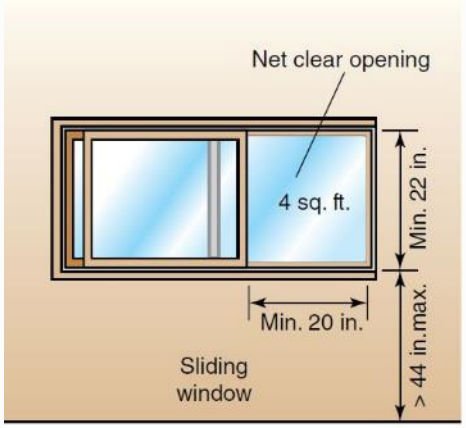


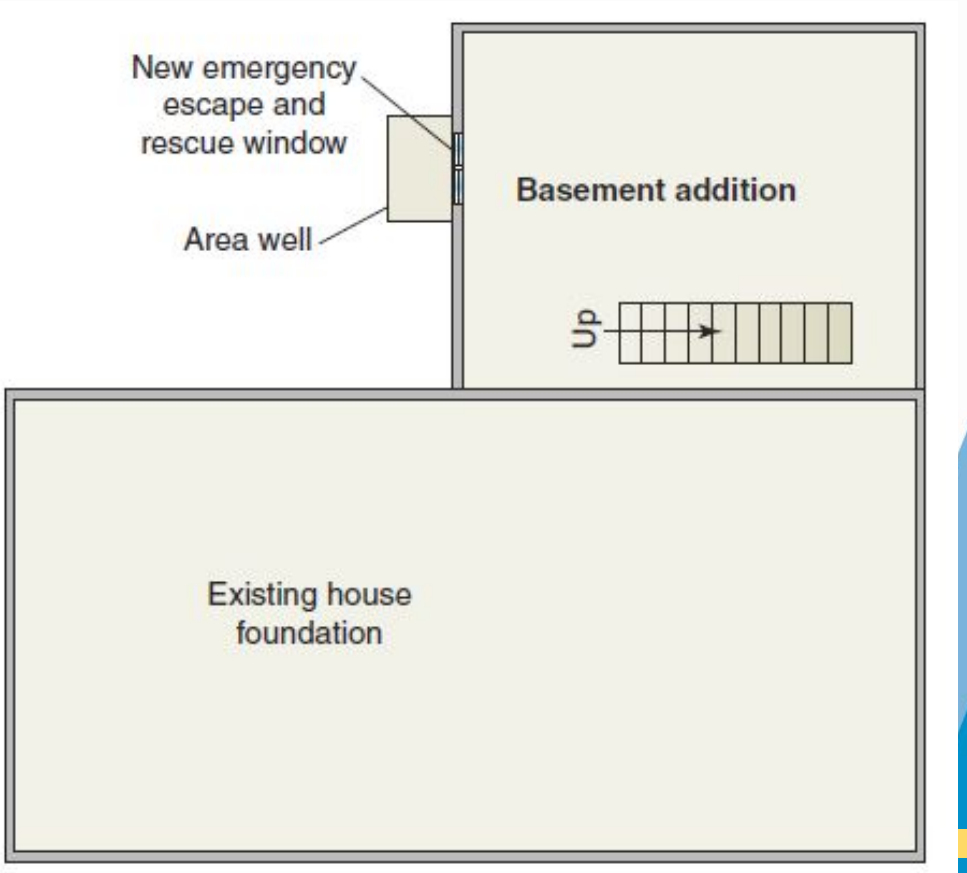
R310.5, R310.6, R310.7 EERO in Existing Buildings

- 4 sq. ft. clear opening for EERO for:
  - Basement remodel
  - Basement addition
  - Change of occupancy



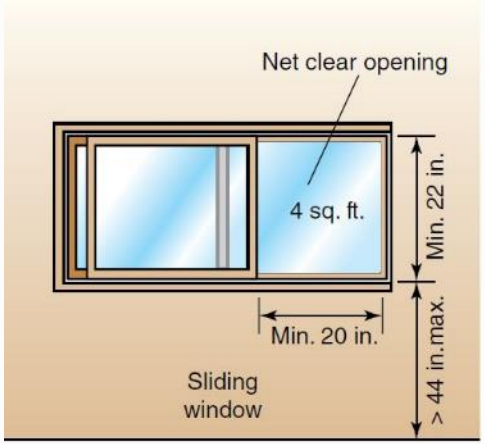
R310.5, R310.6, R310.7 EERO in Existing Buildings (continued)

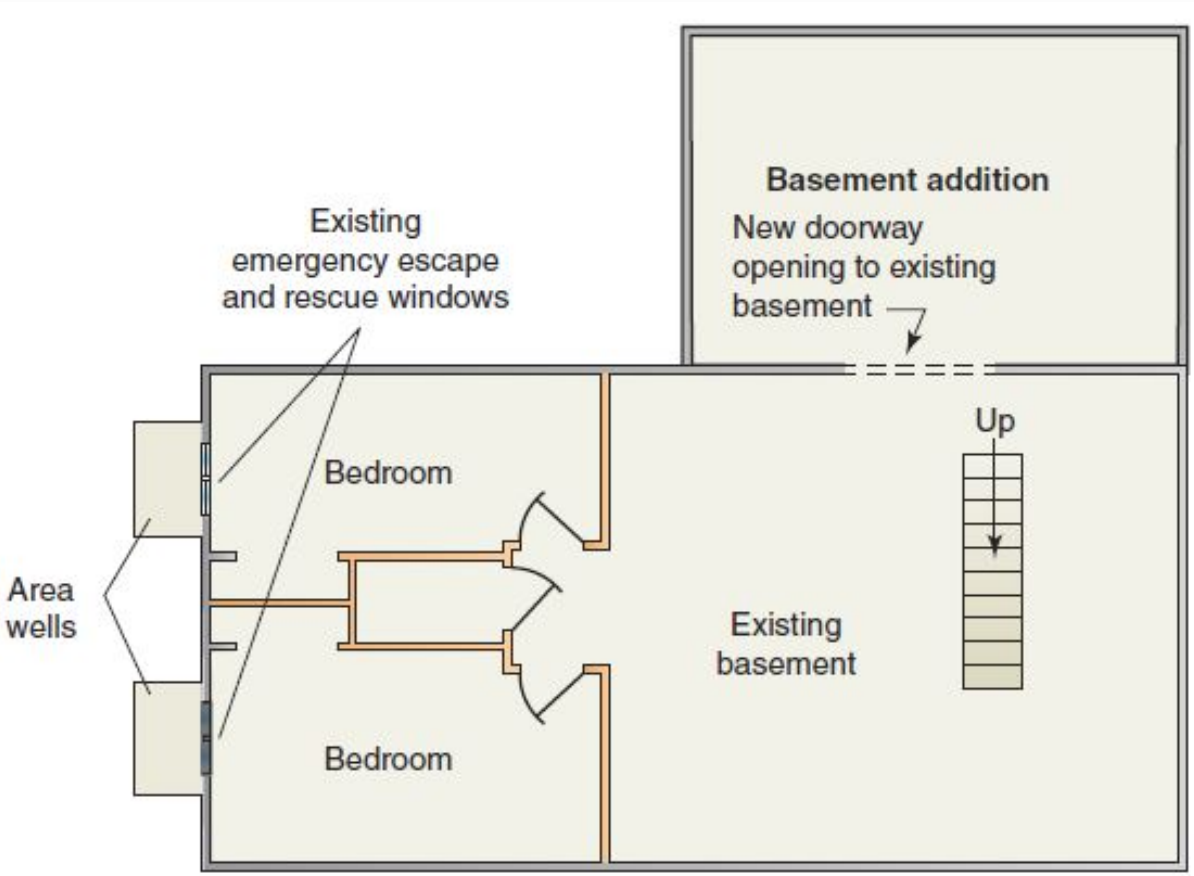




Basement addition with required emergency escape and rescue opening

R310.5, R310.6, R310.7 EERO in Existing Buildings (continued)

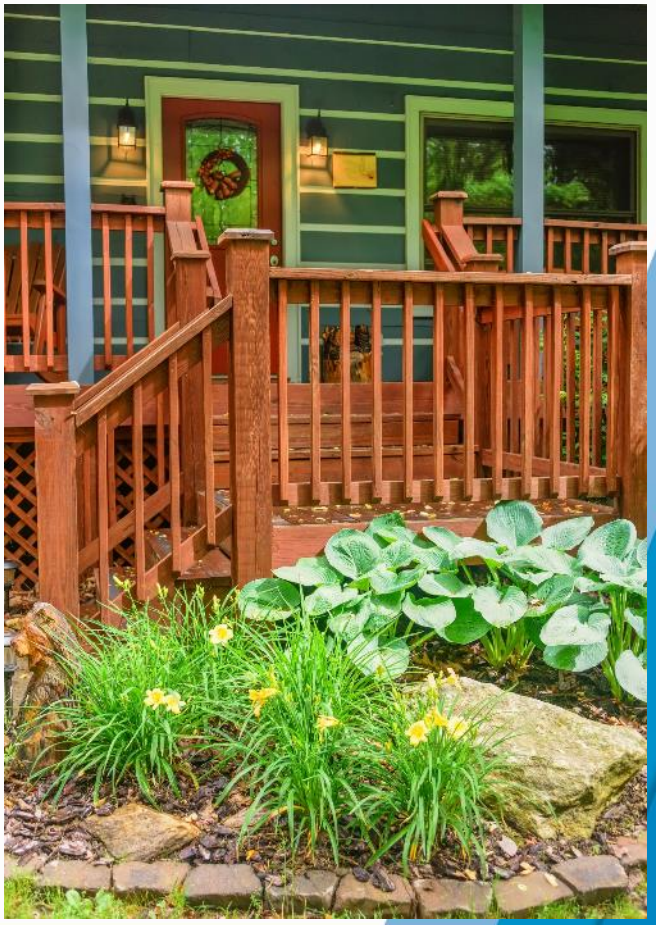




Basement addition with opening to existing basement

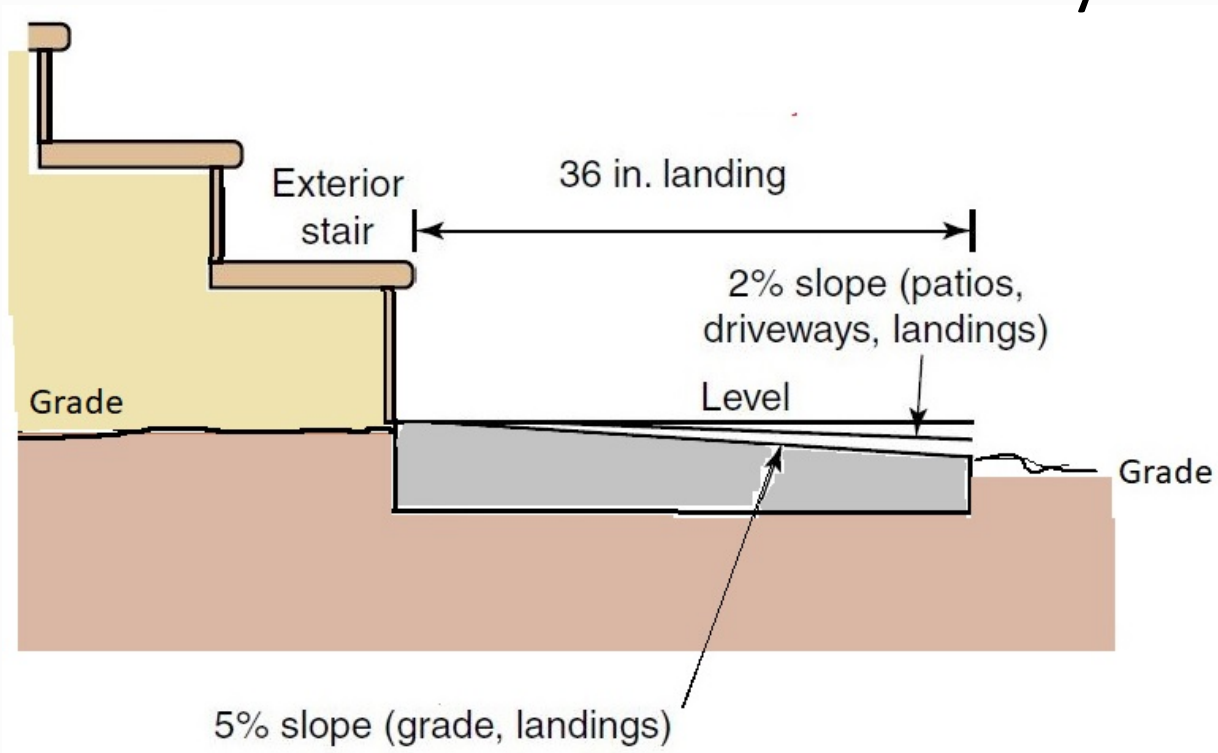
R311.7, R311.8 Stairways and Ramps

- The provisions of Sections R311.7 and R311.8 apply only to stairways and ramps within or serving:
  - Building
  - Porch or
  - Deck
- Stair exceptions:
  - nonhabitable attics
  - crawl spaces



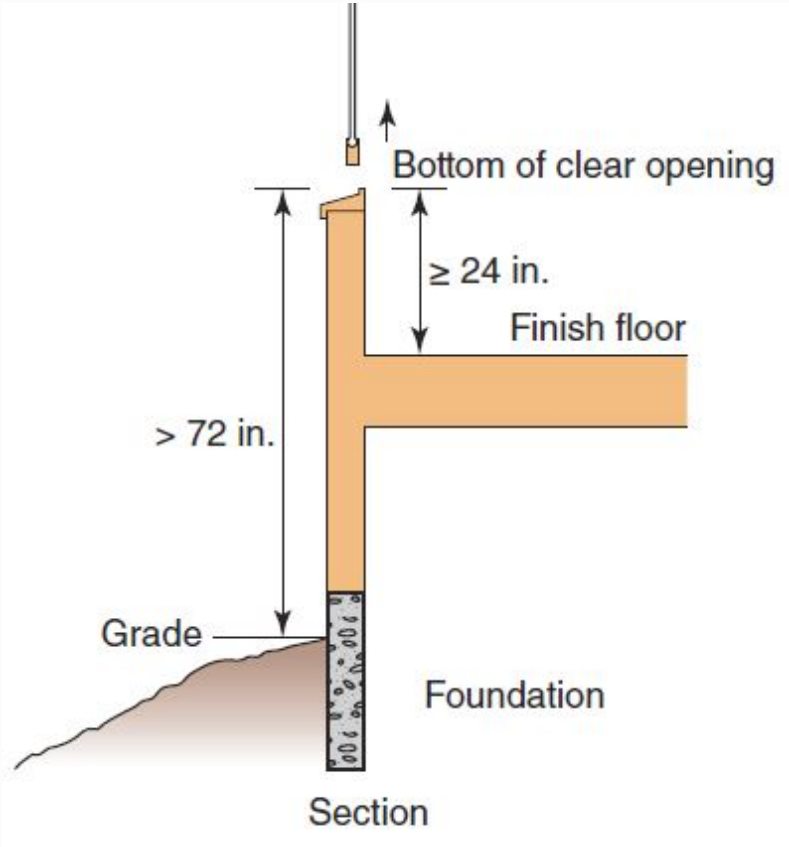
R311.7.7 Stairway and Landing Walking Surface

- New exception allows steeper slopes for exterior landings that also serve to drain surface water away from the building.



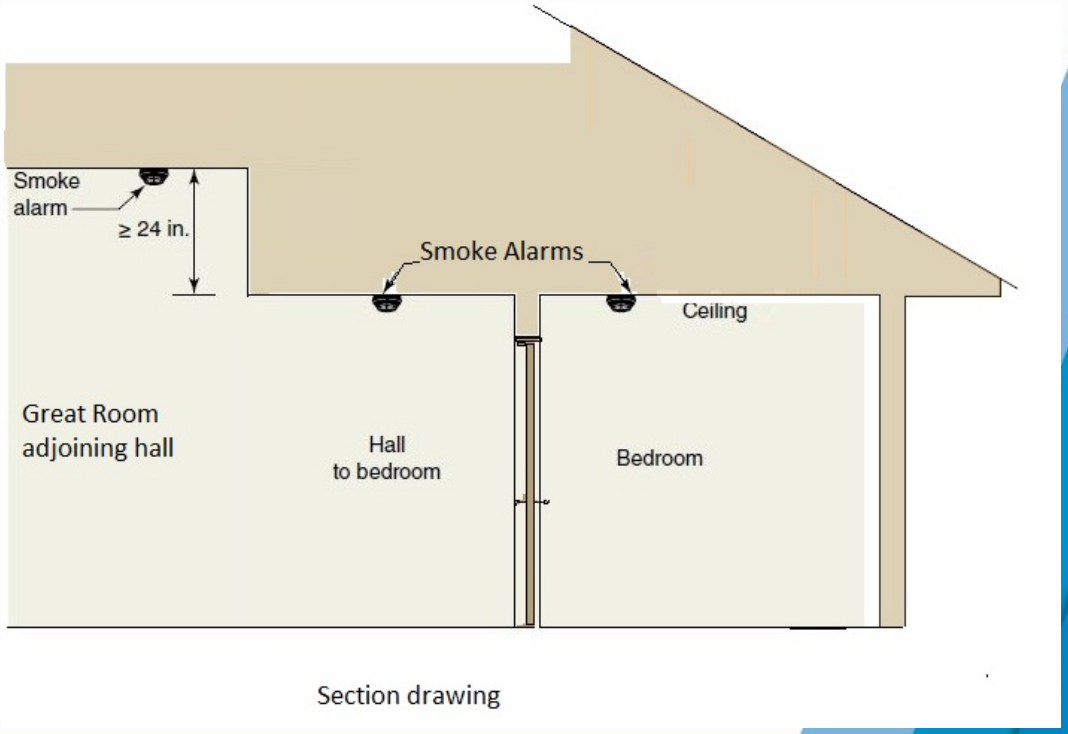
R312.2 Window Fall Protection

- Measurements for determining need for fall protection taken to bottom of clear opening of window.



R314.3 Smoke Alarm Locations

- A new location requirement addresses high ceilings adjacent to hallways serving bedrooms.



Section drawing

R314.3 Smoke Alarm Locations (Continued)

- Smoke alarms identified as having resistance to common nuisance alarms from cooking sources are now permitted to be as close as 6 feet from the cooking appliance.

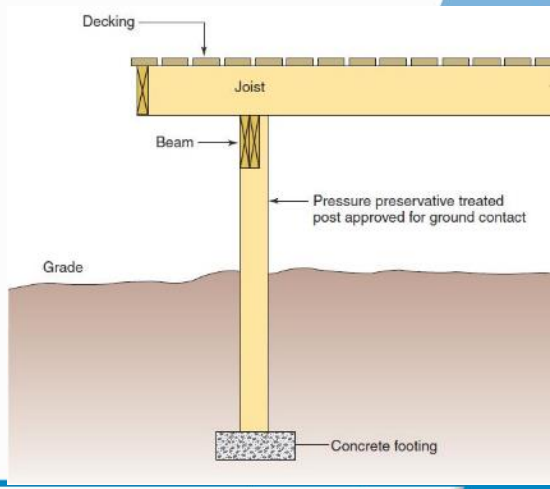
R315.2.2 Carbon Monoxide Alarms

- Repairs to an existing fuel-fired mechanical system now trigger the retroactive requirements for carbon monoxide alarms.

R317.1 Protection of Wood against Decay

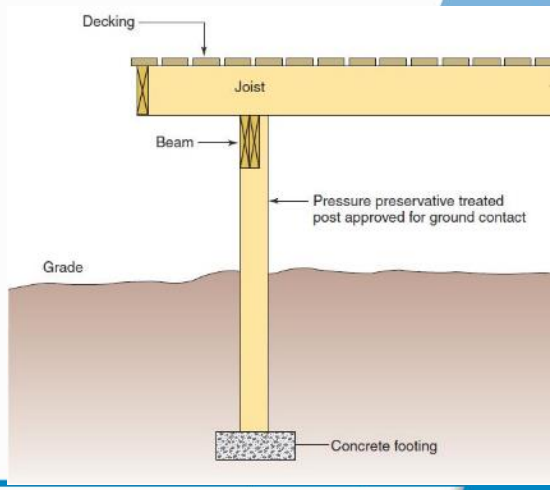
- Revised and reorganized for clarification
- Item 1: Rearranged. Columns in crawl spaces. Moisture barrier governed by crawl space provisions in R408.
- Item 2: Adds columns to other wood framing members (columns in R317.1.4 deleted).
- Item 8: Comes from deleted R317.1.3 (Geographical areas), which seemed to only apply if a need was demonstrated.
- Item 9: Reduced clearance for columns above basement floor slabs deleted from R317.1.4 Exception 1.

(Continued)



R317.1 Protection of Wood against Decay (Continued)

- R317.1.3: Deleted. Text revised and moved to the new Item 8 of R317.1.
- R317.1.4: Deleted because it was confusing and contained errors
  - Exception 1: Deleted: seemed to exempt all columns exposed to the weather. Conflict with IBC and Exception 2.
  - Exception 2: Clarified and moved to Item 1 of R317.1.
  - Exception 3: Deleted because it seemed to exempt any deck posts supported by piers or pedestals extending above concrete or earth.
- R317.1.5: Deleted: covered under scope of new Item 8 of R317.1.



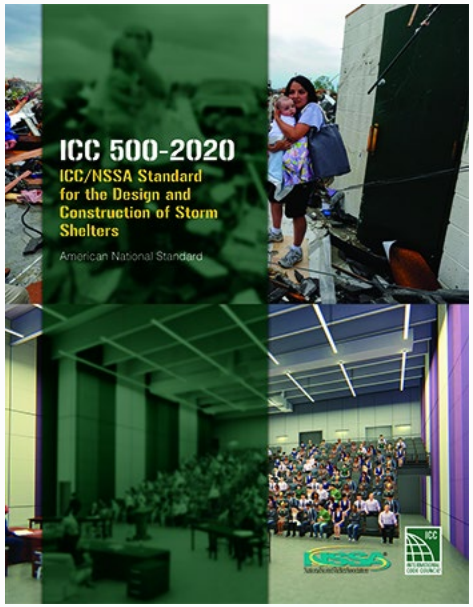
R320 Accessibility

- Clarifies accessibility provisions for live/work units and owner-occupied lodging houses (B&Bs)
  - Accessibility typically not required for IRC buildings

Live/work units

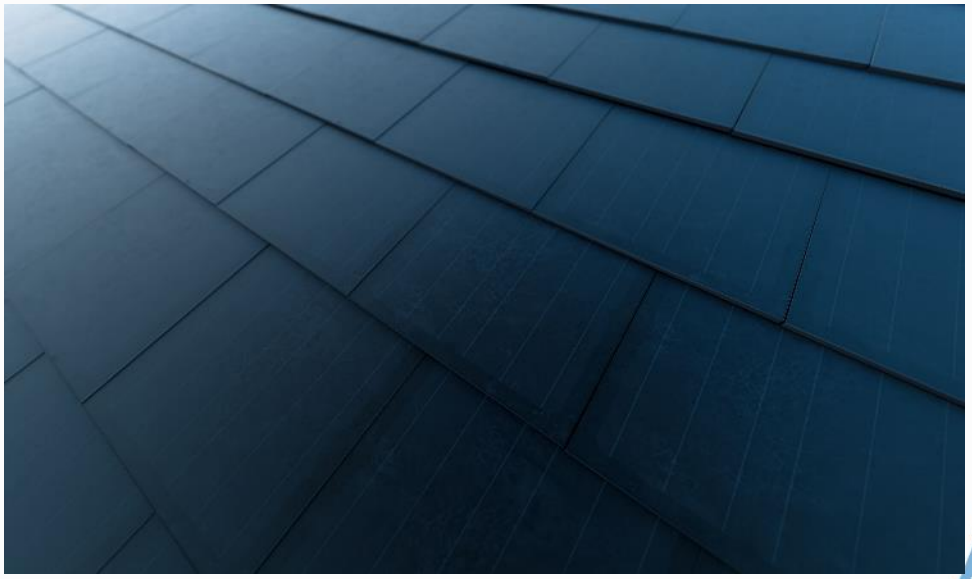
R323.1.1 Storm Shelters

- An engineered design is required for storm shelters.



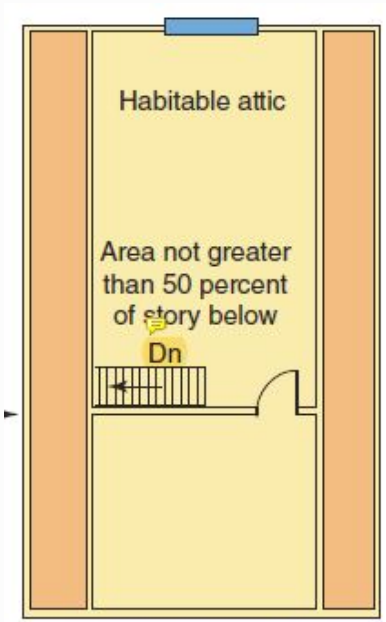
R324.6 Photovoltaic Systems

- Building-integrated photovoltaic (BIPV) systems meeting the specified criteria do not require firefighter access pathways and setbacks.

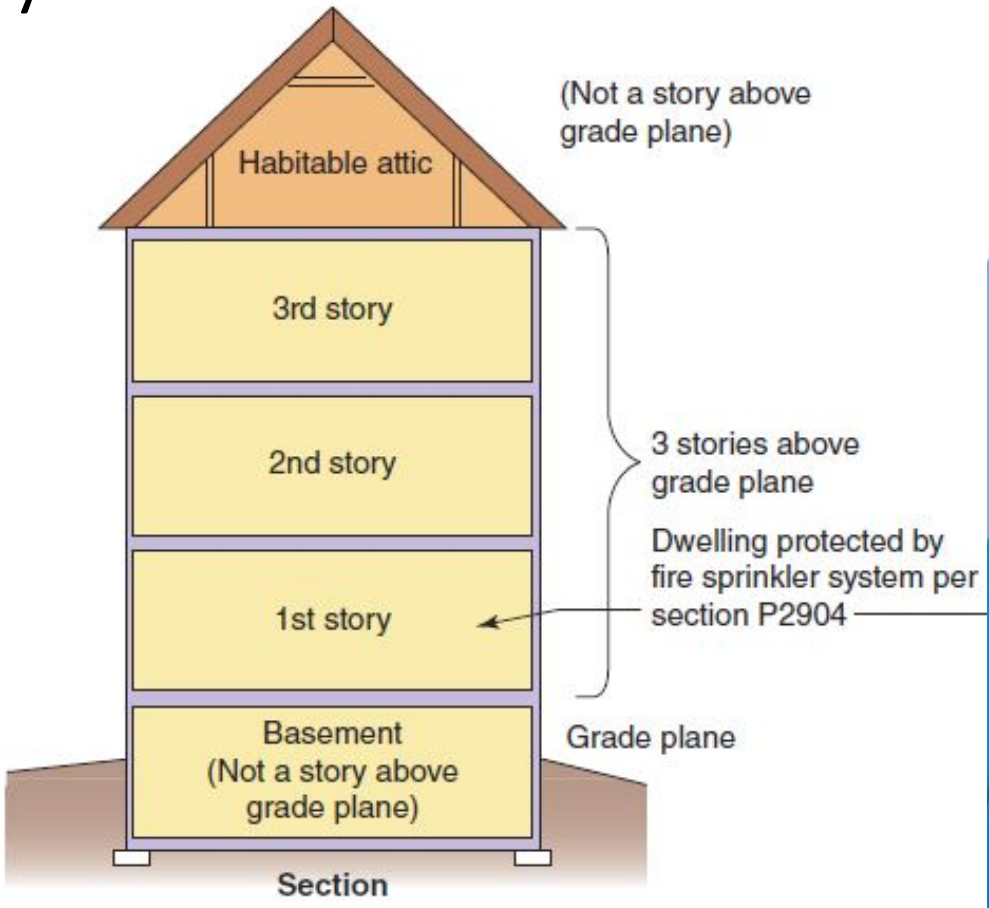


R326 Habitable Attics

- Habitable attic above 3rd story not a story if:
  - Sprinkler system
  - Area limited to one-half area of story below



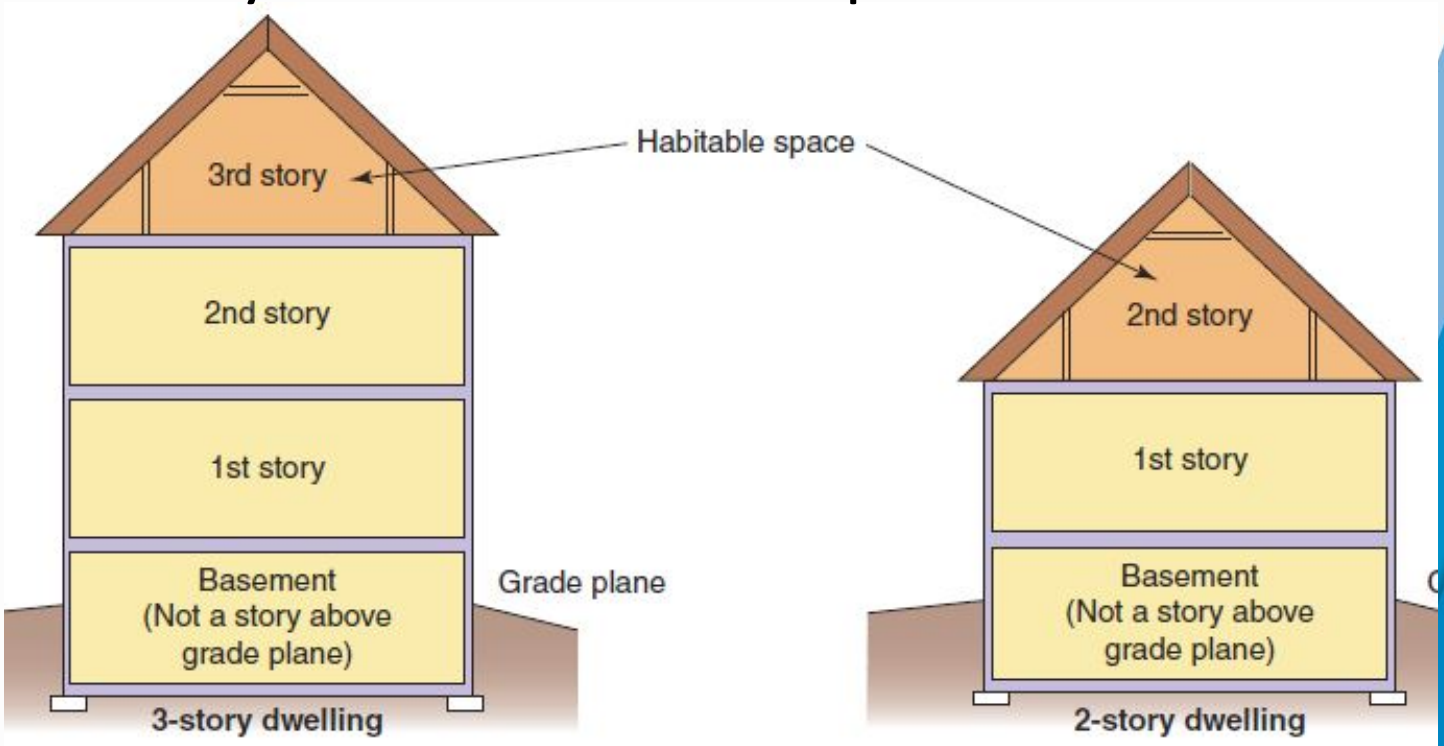
Floor plan of habitable attic



Section

R326 Habitable Attics (Continued)

- Habitable space above 2nd story or 1st story meets definition of story – no additional requirements



Chapter 4 - Foundations

Table R403.1(1) Footing Width and Thickness

- Minimum footing size tables are revised to more accurately reflect current practice.
- A 20 psf roof live load or 25 psf ground snow load form the lowest load assumed for the footing.

Table R403.1(1) Footing Width and Thickness excerpt

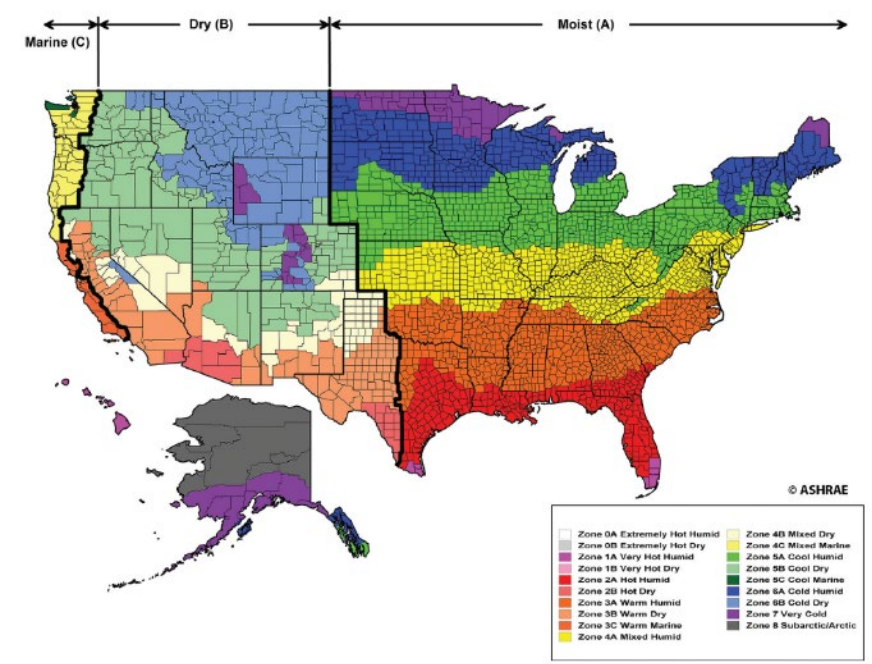
Ground Snow Load or Roof Live Load	Story and Type of Structure with Light Frame	Load Bearing Value of Soil (psf)					
		1500	2000	2500	3000	3500	4000
20 psf Roof Live Load or 25 psf Ground Snow Load	1 story - slab on grade	12x6	12x6	12x6	12x6	12x6	12x6
	1 story - with crawl space	12x6	12x6	12x6	12x6	12x6	12x6
	1 story - plus basement	16x6 ~~18x6~~	12x6 ~~14x6~~	12x6	12x6	12x6	12x6
	2 story - slab on grade	13x6 ~~12x6~~	12x6	12x6	12x6	12x6	12x6
	2 story - with crawl space	15x6 ~~16x6~~	12x6	12x6	12x6	12x6	12x6
	2 story - plus basement	19x6 ~~22x6~~	14x6 ~~16x6~~	12x6 ~~13x6~~	12x6	12x6	12x6
30 psf	1 story - slab on grade	12x6	12x6	12x6	12x6	12x6	12x6
	1 story - with crawl space	13x6	12x6	12x6	12x6	12x6	12x6
	1 story - plus basement	16x6 ~~19x6~~	12x6 ~~14x6~~	12x6	12x6	12x6	12x6
	2 story - slab on grade	13x6 ~~12x6~~	12x6	12x6	12x6	12x6	12x6
	2 story - with crawl space	16x6 ~~17x6~~	12x6 ~~13x6~~	12x6	12x6	12x6	12x6
	2 story - plus basement	19x6 ~~23x6~~	14x6 ~~17x6~~	12x6 ~~14x6~~	12x6	12x6	12x6

R406.2 Foundation Waterproofing

- Six-mil polyvinyl chloride and polyethylene fabrics are removed from the list of approved waterproofing materials.

R408.8 Under-floor Vapor Retarder

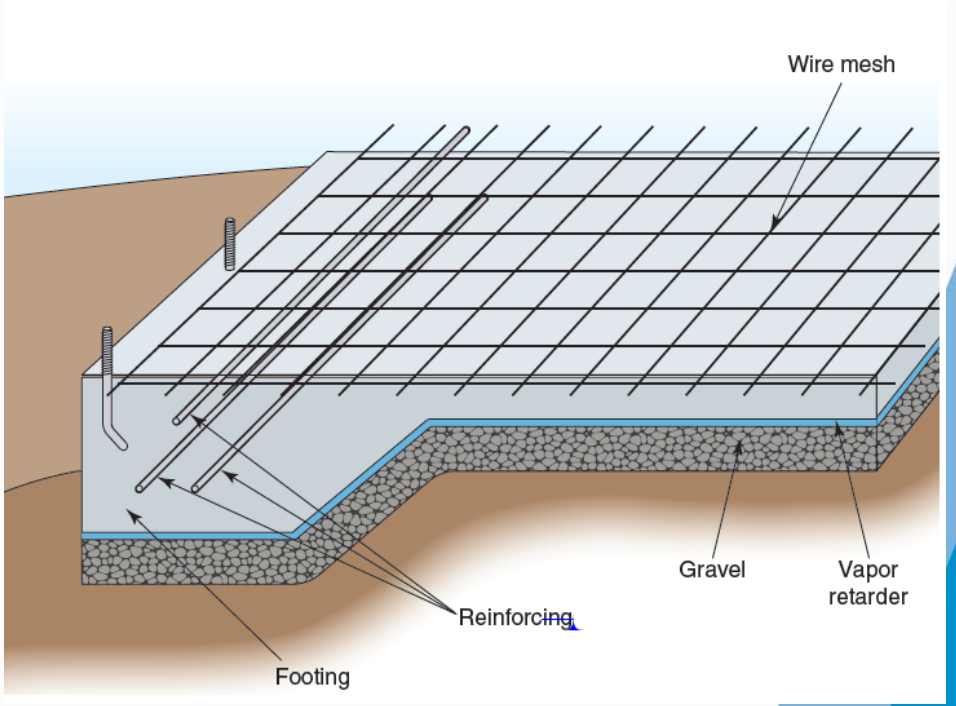
- A Class I or II vapor retarder is required on exposed air permeable insulation between floor joists in Climate Zones 1A, 2A and 3A.



Chapter 5 - Floors

R506.2.3 Vapor Retarder

- Thicker vapor retarders are now required below slabs on grade.
- Minimum 10 mil (0.01 inch) thick



R507.1 Deck Loads

- Deck designs are now based on live or snow loads.

R507.3 Deck Footings

- Footings for freestanding decks on or near the ground have been clarified.

Table R507.3.1 Minimum Footing Size for Decks

LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (sq. ft.)	SOIL BEARING CAPACITY		
		1500 psf		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)
40	5	7	8	6
	20	10	12	6
	40	14	16	6
50	5	7	8	6
	20	11	13	6
	40	15	17	6
60	5	7	8	6
	20	12	14	6
70	5	7	8	6
	20	12	14	6

R507.4 Deck Posts

- The deck post height table is expanded by adding the tributary area supported by a post and the wood species for determination of maximum post height.

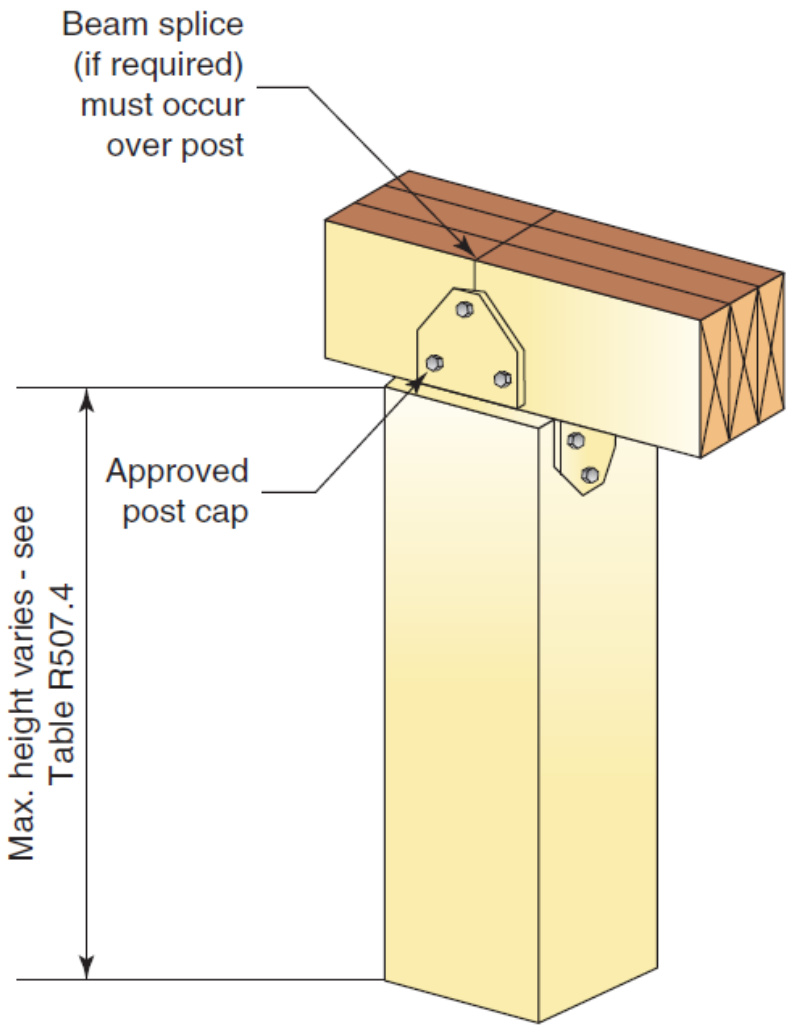
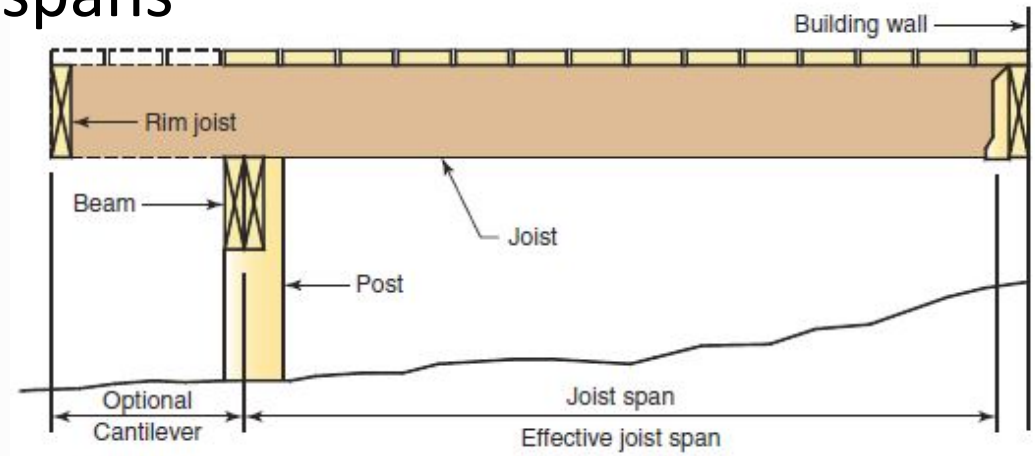


Table R507.4 Deck Post Height

Loads (psf)	Post Species	Post Size	Tributary Area (ft^2)							
			20	40	60	80	100	120	140	160
			Maximum Deck Post Height (feet-inches)							
50 Ground Snow Load	Southern Pine	4 x 4	14-0	12-2	9-10	8-5	7-5	6-7	5-11	5-4
		4 x 6	14-0	14-0	12-6	10-9	9-6	8-7	7-10	7-3
		6 x 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	13-4
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Douglas Fir, Hem-fir, SPF	4 x 4	14-0	12-1	9-8	8-2	7-1	6-2	5-3	4-2
		4 x 6	14-0	14-0	12-4	10-7	9-4	8-4	7-7	6-11
		6 x 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	12-10
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood, W. Cedars, Pond. Pine, Red Pine	4 x 4	14-0	11-8	9-0	6-10	3-7	NP	NP	NP
		4 x 6	14-0	14-0	12-0	10-0	8-6	7-0	5-3	NP
		6 x 6	14-0	14-0	14-0	14-0	14-0	14-0	10-8	2-4
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0

R507.5 Deck Beams

- The deck beam span table is split into multiple tables providing spans for given deck live or snow loads. Single and multi-ply spans as well as options for cantilevered deck joists are listed.



Deck beam span

Table R507.5(2) Max. Deck Beam Span – 50 psf Ground Snow Load

Beam Species	Beam Size	Effective Deck Joist Span Length (feet)						
		6	8	10	12	14	16	18
		Maximum Beam Span (feet-inches)						
Southern Pine	1-2x6	4-6	3-11	3-6	3-2	2-11	2-9	2-7
	1-2x8	5-9	4-11	4-5	4-0	3-9	3-6	3-3
	1-2x10	6-9	5-10	5-3	4-9	4-5	4-2	3-11
	1-2x12	8-0	6-11	6-2	5-8	5-3	4-11	4-7
	2-2x6	6-8	5-9	5-2	4-9	4-4	4-1	3-10
	2-2x8	8-6	7-4	6-7	6-0	5-7	5-2	4-11
	2-2x10	10-1	8-9	7-10	7-1	6-7	6-2	5-10
	2-2x12	11-11	10-3	9-2	8-5	7-9	7-3	6-10
	3-2x6	7-11	7-2	6-6	5-11	5-6	5-1	4-10
	3-2x8	10-5	9-3	8-3	7-6	6-11	6-6	6-2
	3-2x10	12-8	10-11	9-9	8-11	8-3	7-9	7-3
	3-2x12	14-11	12-11	11-6	10-6	9-9	9-1	8-7

Table R507.5 Deck Beam Span

- Table R507.5(5) - Joist Span Factors For Calculating Effective Deck Joist Span

C/J	Joist Span Factor
0 (no cantilever)	0.66
1/12 (0.87)	0.72
1/10 (0.10)	0.80
1/8 (0.125)	0.84
1/6 (0.167)	0.90
1/4 (0.250)	1.00

J = actual joist span length (feet)

C = actual joist cantilever length (feet)

Cantilever Example

- A deck with a ground snow load of 50 psf is designed using two plies of Southern Pine 2x10.
- **Joist span** is 12 feet.
  - Table R507.5(2) limits the beam to a maximum span of 7′-1″.
- **Joist span** is 12 feet and there is no cantilever.
  - C = 0 feet (cantilever)
  - J = 12 feet (joist)
  - Applying the adjustment factor from footnote j in Table R507.5(2):
    - C /J= 0 and the joist span factor is 0.66
  - An effective **joist span** can be calculated as 0.66 x 12′ = 8′. Look at the maximum beam length for an 8 ft joist span.
- The maximum **beam span** is 8′-9″ per Table R507.5(2) because there is no cantilever.

R507.6 Deck Joists

- Deck joist options are added for decks with large ground snow loads. Cantilever spans are now specifically based on maximum joist spans.

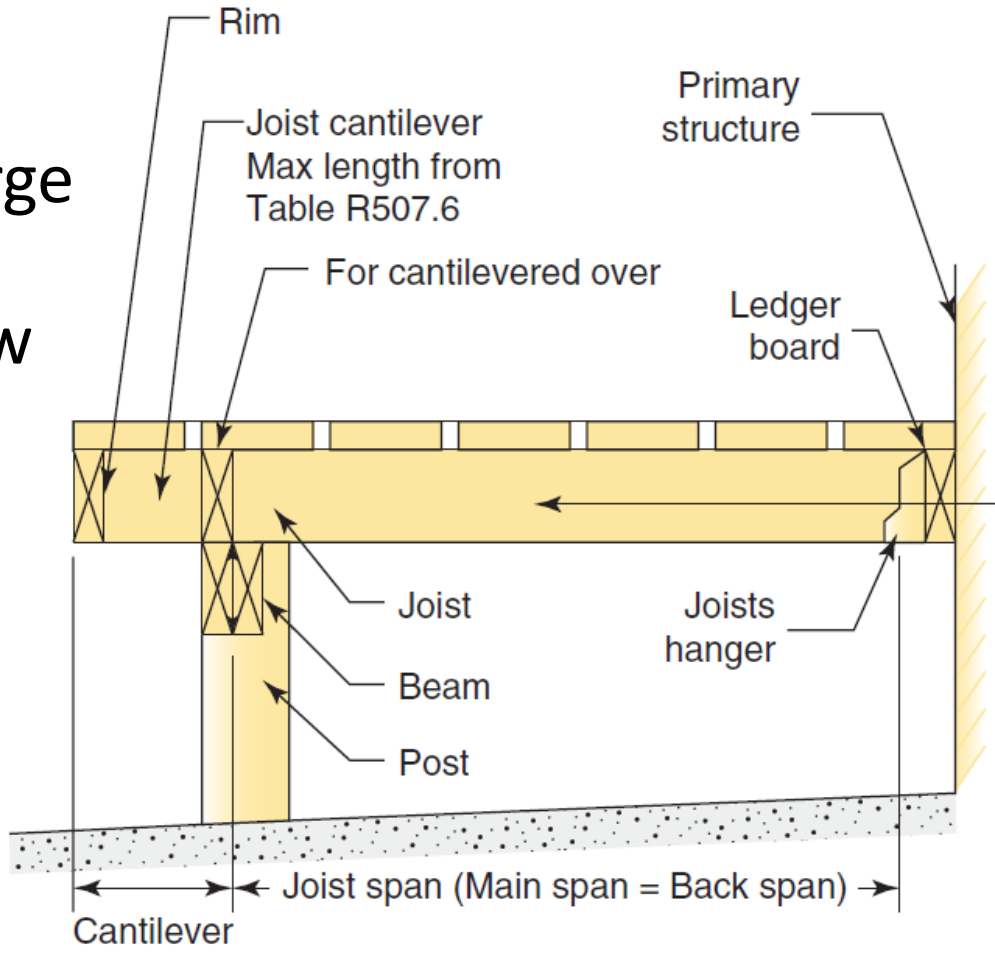
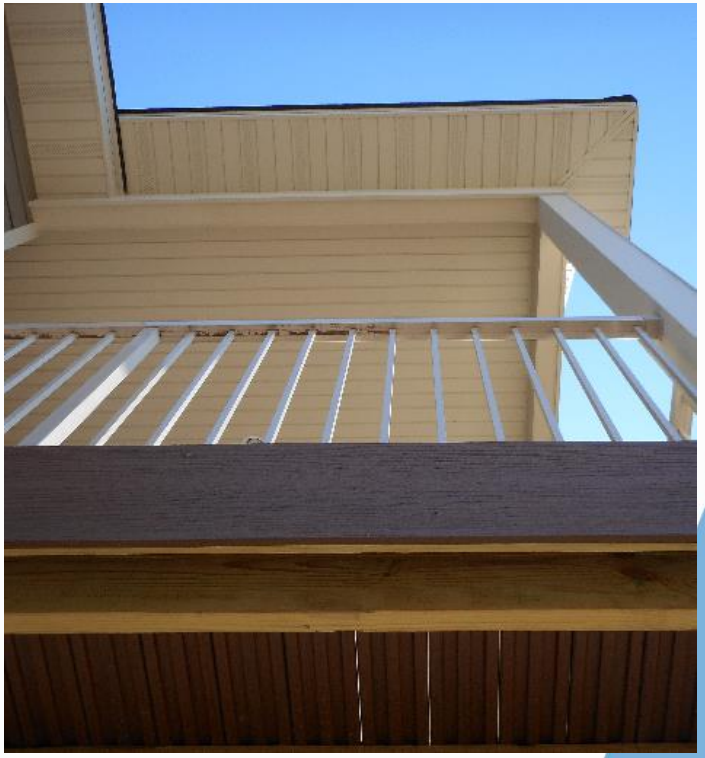


Table R507.6 Max. Deck Joist Spans

Load[a] (psf)	Joist Species[b]	Joist Size	Allowable Joist Span (feet-inches)			Maximum Cantilever (feet-inches)							
			Joist Spacing (inches)			Joist Back Span (feet)							
			12	16	24	4	6	8	10	12	14	16	18
40 Live Load	Southern Pine	2x6	9-11	9-0	7-7	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2x8	13-1	11-10	9-8	1-0	1-6	2-0	2-6	2-3	NP	NP	NP
		2x10	16-2	14-0	11-5	1-0	1-6	2-0	2-6	3-0	3-4	3-4	NP
		2x12	18-0	16-6	13-6	1-0	1-6	2-0	2-6	3-0	3-6	4-0	4-1
	Douglas Fir, Hem-fir, Spruce-Pine-Fir	2x6	9-6	8-4	6-10	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2x8	12-6	11-1	9-1	1-0	1-6	2-0	2-3	2-0	NP	NP	NP
		2x10	15-8	13-7	11-1	1-0	1-6	2-0	2-6	3-0	3-3	NP	NP
		2x12	18-0	15-9	12-10	1-0	1-6	2-0	2-6	3-0	3-6	3-11	3-11
	Redwood, W. Cedars, Pond. Pine, Red Pine	2x6	8-10	8-0	6-10	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2x8	11-8	10-7	8-8	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2x10	14-11	13-0	10-7	1-0	1-6	2-0	2-6	3-0	2-9	NP	NP
		2x12	17-5	15-1	12-4	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP

R507.10 Exterior Guards

- Requirements for deck guardrails are added.
- Provisions mirror requirements for interior stairway ramp guards.
- Two methods to connect guards – to side or top of deck framing.



Chapter 6 - Walls

Table R602.3(1) – Fasteners

Item	Description of Building Elements	Number and Type of Fastener	Spacing and Location
	Roof		
1	Blocking between ceiling joists or rafters or trusses to top plate or other framing below	4-8d box (2½"x 0.113") nails 3-8d common (2½" × 0.131") nails 3-10d box (3" × 0.128") nails 3-(3" × 0.131") nails	Toenail
	Blocking between rafters or truss not at the wall top plate, to rafter or truss	2-8d common (2½" × 0.131") nails 2-(3" × 0.131") nails	Each end, toenail
		2-16d common (3½" × 0.162") nails 3-(3" × 0.131") nails	End nail
	Flat blocking to truss and web filler	16d common (3½" × 0.162") nails 3-(3" × 0.131") nails	6"o.c. face nail
	Wall		
12	Adjacent full-height stud to end of header	3-16d common (3½" × 0.162") nails 4-16d box (3 ½"x 0.135") nails 4-10d box (3" × 0.128") nails 4-(3" × 0.131") nails	End nail

Table R602.3(1) – Fasteners

Item	Thickness	Number and Type of Fastener	Spacing of Fasteners	
			Edges (inches)	Interm. supports (inches)
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing				
~~30~~ 31	⅜" – ½"	6d common or deformed (2" × 0.113" x 0.266" head) ~~(subfloor, wall)[l];~~ ~~8d common (2½" × 0.131") nail (subfloor, wall); or~~ 2 ⅜" × 0.113" x 0.266" head nail (subfloor, wall)	6[f]	~~12~~ 6[f]
		8d common (2½" × 0.131") (roof) RSRS-01 (2⅜" × 0.113") nail (roof)	6[f]	~~12~~ 6[f]
~~31~~ 32	$^{19}/_{32}$"– ~~1"~~ ¾"	8d common (2½" × 0.131") (subfloor, wall) Deformed $2^{3}/_{8}$" × 0.113" x 0.266" head (wall or subfloor)	6	12
		8d common (2½" × 0.131") nail (roof) RSRS-01 (2⅜" × 0.113") nail (roof)	6[f]	~~12~~6[f]
~~32~~ 33	~~1⅛"~~⅞" – 1¼"	10d common (3" × 0.148") nail ~~8d~~ (2½" × 0.131" x 0.281" head) deformed nail	6	12

f. For wood structural panel roof sheathing attached to gable end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at ~~6~~ 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C.

Table R602.3(2) Alternate Attachments

Nominal Material Thickness (inches)	Description of Fastener and Length (inches)	Spacing of Fasteners	
		Edges (inches)	Interm. supports (inches)
Wood structural panels subfloor, roof[g] and wall sheathing to framing and particleboard wall sheathing to framing			

g. Alternate fastening is only permitted for roof sheathing where the ultimate design wind speed is less than or equal to 110 mph, and where fasteners are installed 3 inches on center at all supports.

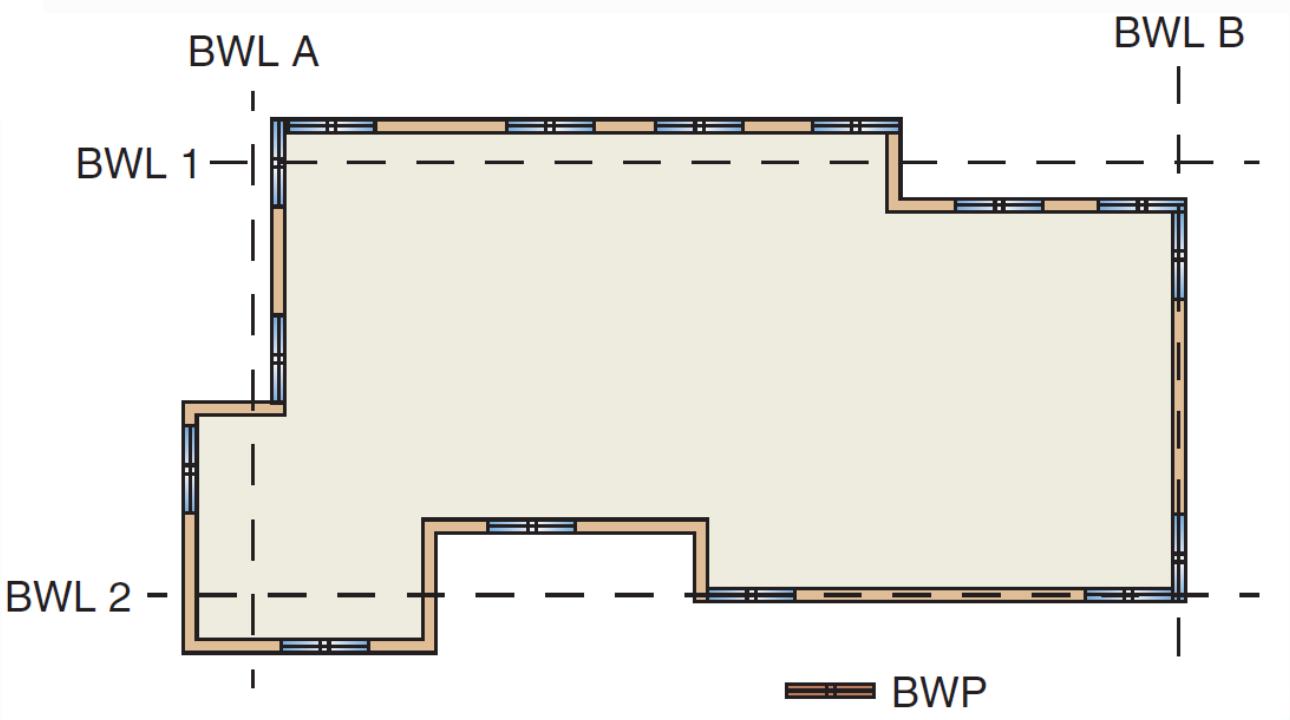
R602.9 Cripple Walls

- Cripple wall requirements apply **only** to exterior cripple walls.

R602.10.1.2 Location of Braced Wall Lines

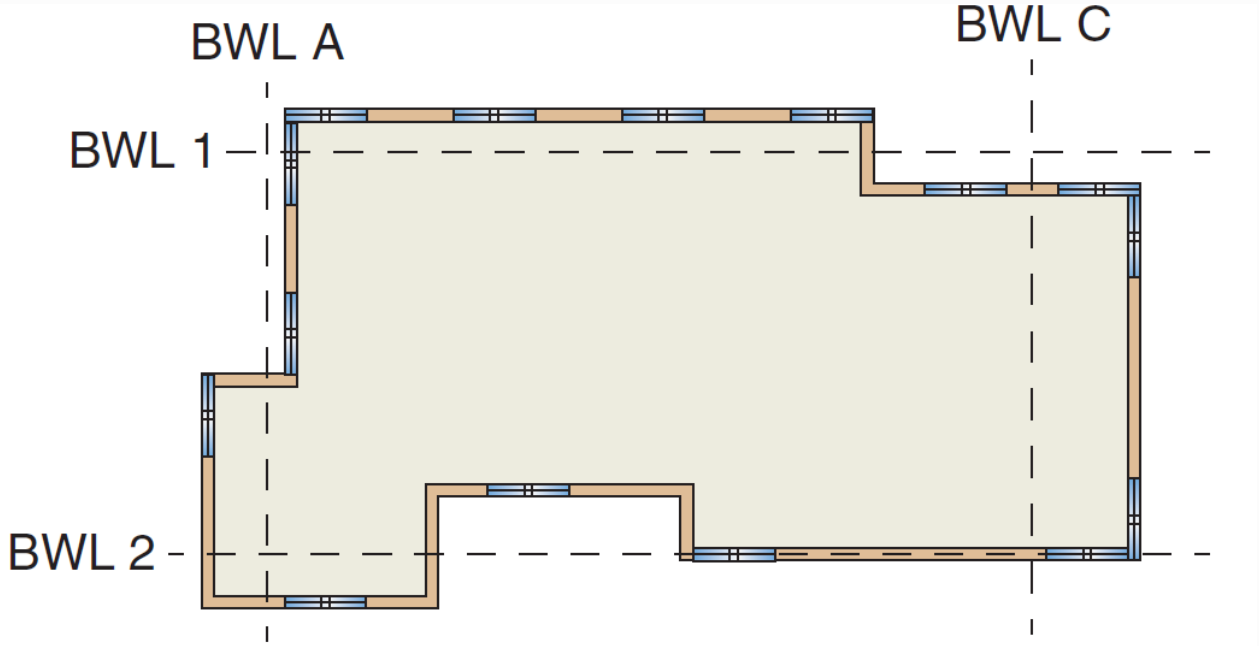
- Braced wall lines must be placed on a physical wall or placed between multiple walls.

Example 1:



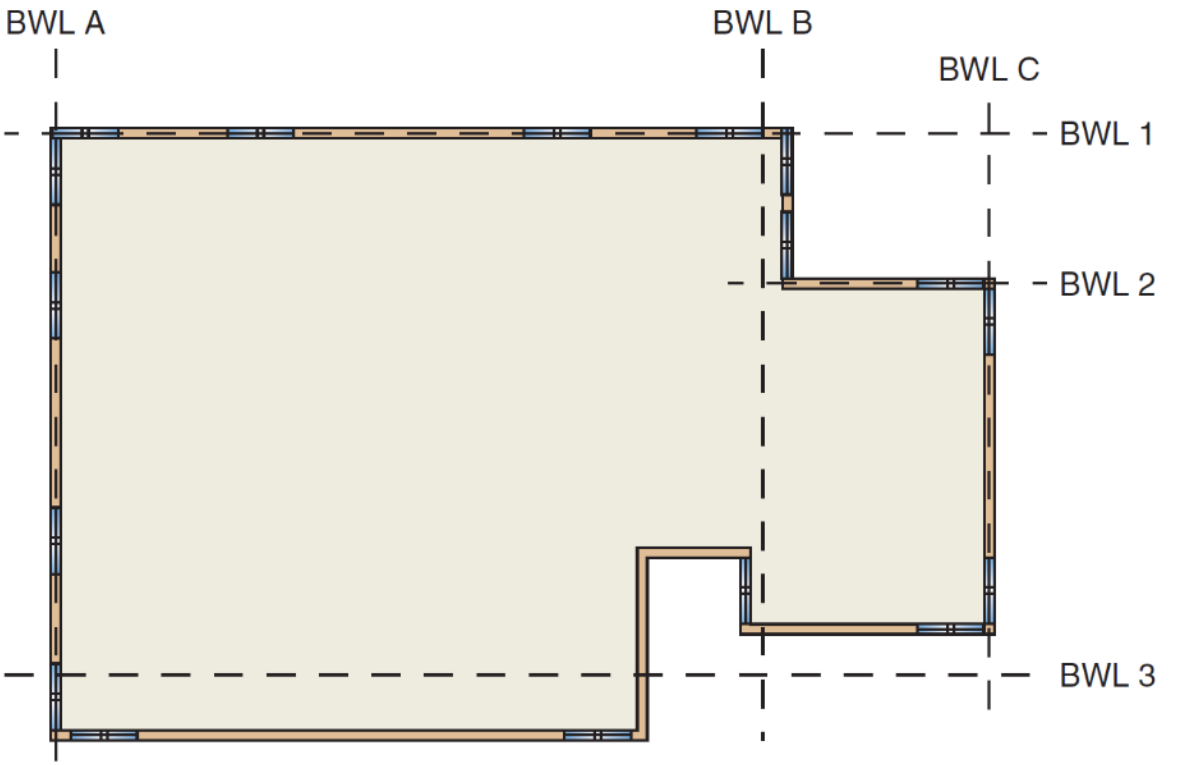
R602.10.1.2 Location of Braced Wall Lines (Continued)

Example 2:

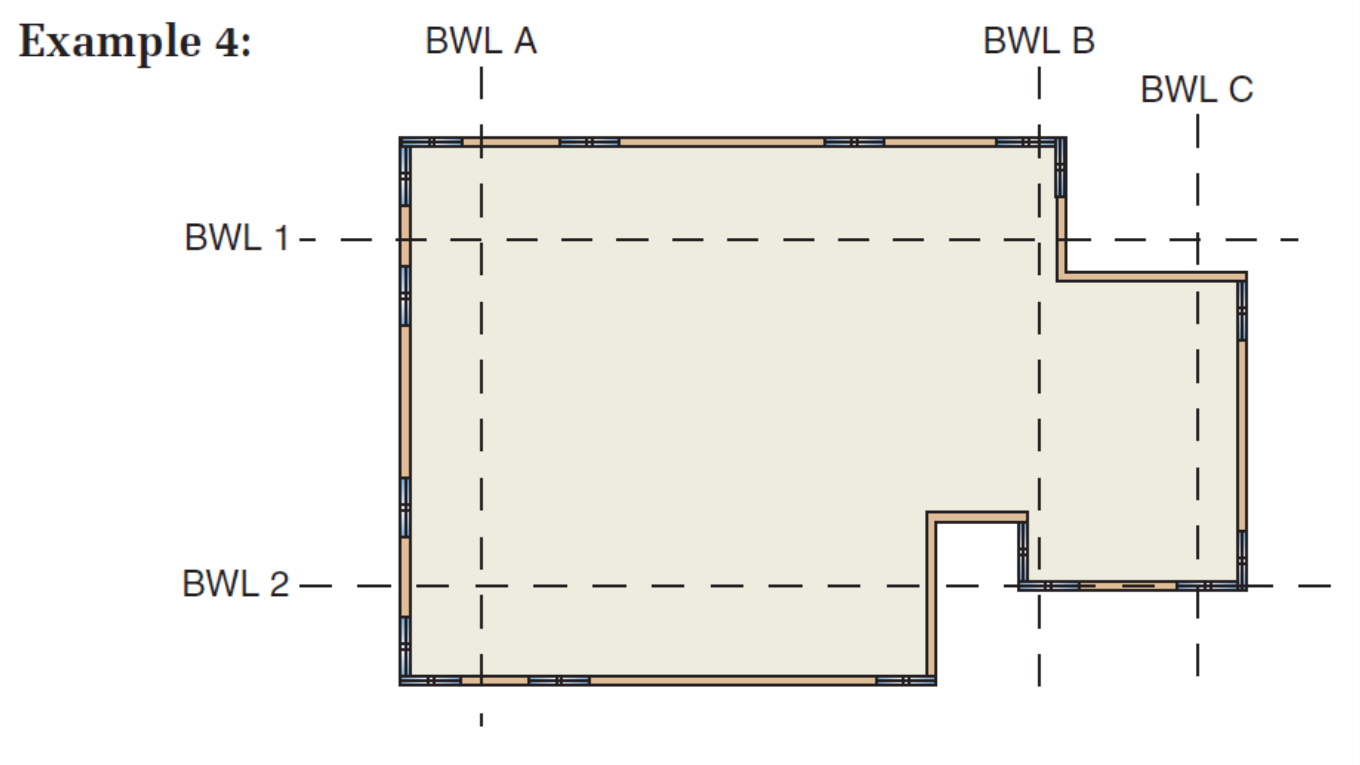


R602.10.1.2 Location of Braced Wall Lines (Continued)

Example 3:



R602.10.1.2 Location of Braced Wall Lines (Continued)



R602.10.2.2 Location of Braced Wall Panels

- Section R602.10.2.2 is clarified for the starting point of the first braced wall panel when not placed at the corner of the structure.

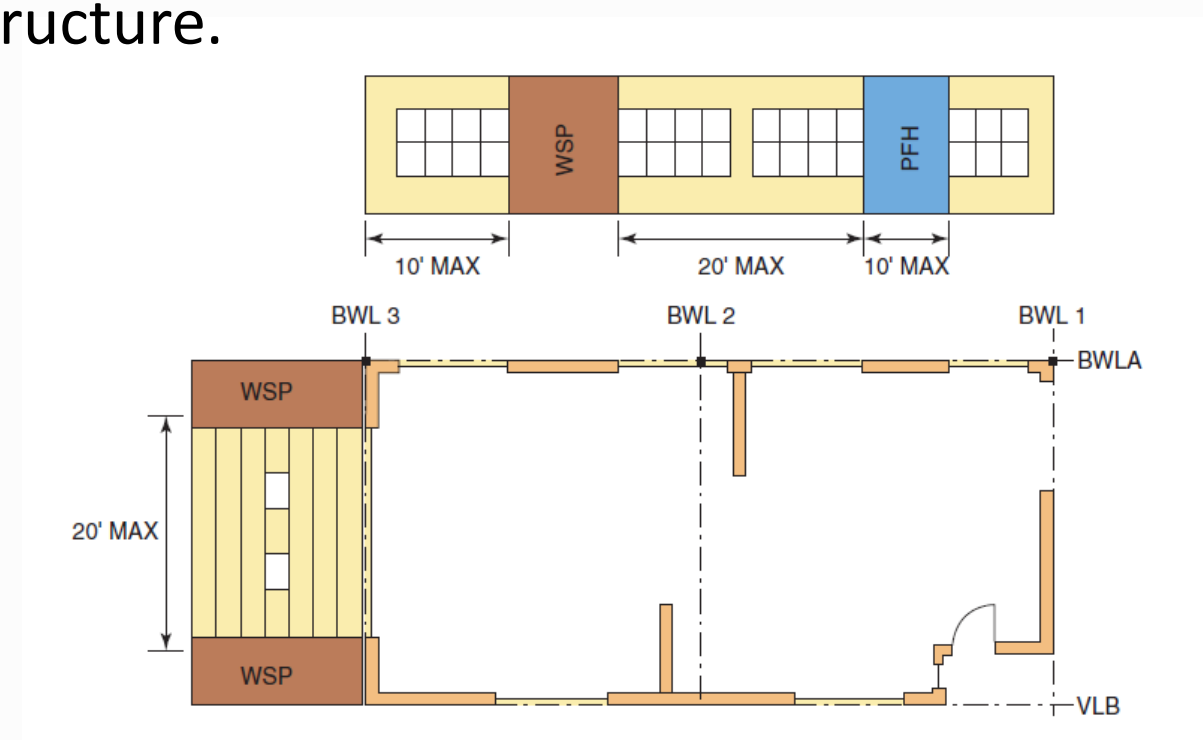
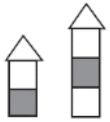


Table R602.10.3(1) Bracing based on Wind Speed

[Assumptions]			Minimum Total Length (feet) of Braced Wall Panels Required Along Each Braced Wall Line[a]		
Ultimate Design Wind Speed (mph)	Story Location	Braced Wall Line[c]	Method GB	Methods WSP, BV- WSP, ABW, PFH, PFG	Methods CS- WSP, CS- G, CS-PF
< 95 mph		10	2.5	1.5	1.5
		20	4.5	2.5	2.5
		30	6.5	4.0	3.5
		40	8.5	5.0	4.0
		50	10.5	6.0	5.0
		60	12.5	7.0	6.0
		10	5.0	3.0	2.5
		20	8.5	5.0	4.5
		30	12.5	7.0	6.0
		40	16.0	9.5	8.0
		50	20.0	11.5	10.0
		60	23.5	13.5	11.5

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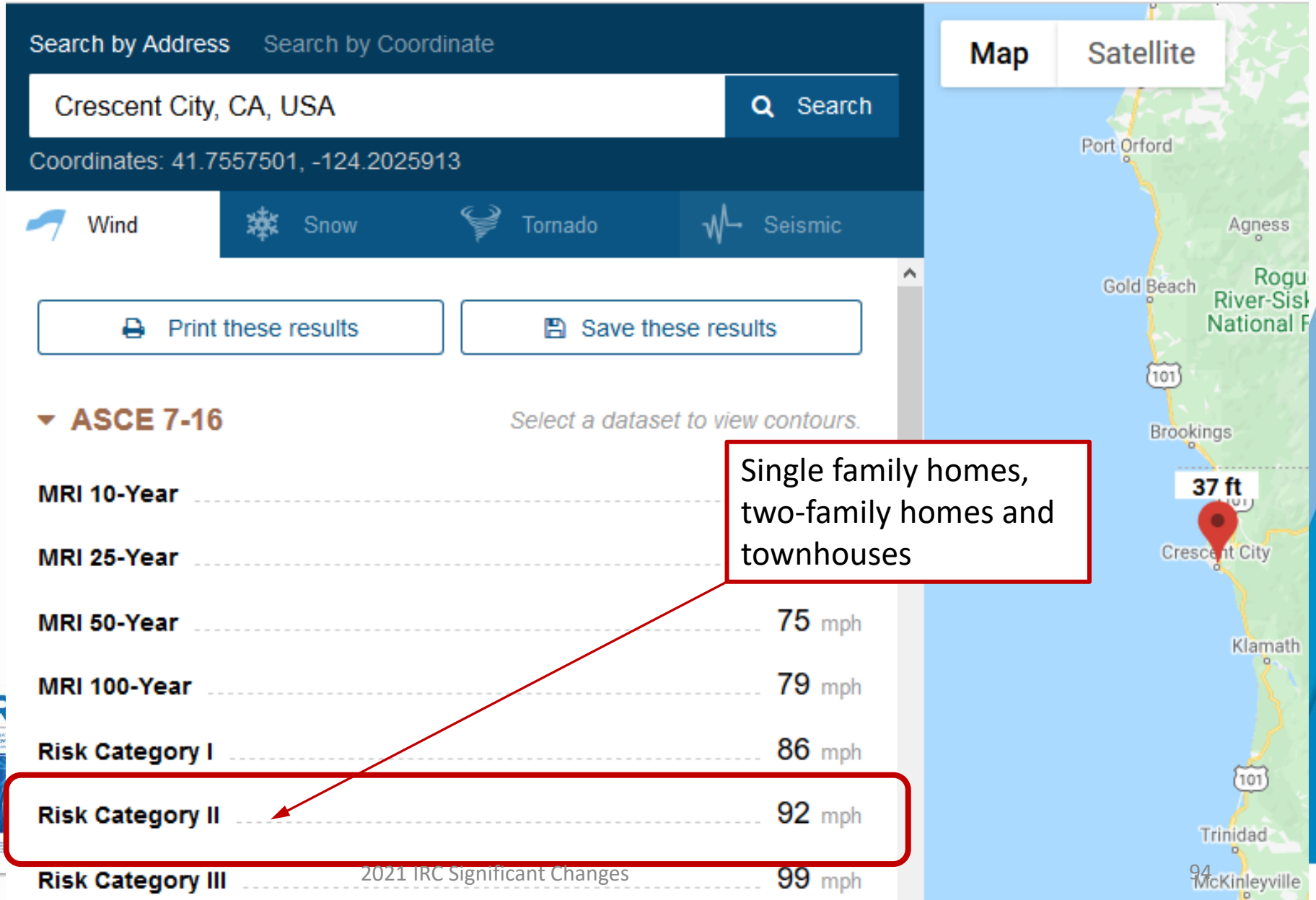


Single family homes, two-family homes and townhouses

Table R602.10.3(3) Bracing Based On Seismic Design Category, footnote f

f. Methods PFH, PFG and ABW are only permitted on a single story or a first of two stories.

Table R602.10.3(4) Seismic Adjustment Factors

Item Number	Adjustment Based On	Story[g]	Condition	Adjustment Factor[a, b]	Applicable Methods
7	Walls with stone or masonry veneer, detached one- or two-family dwellings in SDC D_0-D_2[d,f]	Any Story	See Section R602.10.6.5.5 ~~Table R602.10.6.5~~		BV-WSP
8	Walls with stone or masonry veneer, detached one- or two-family dwellings in SDC D_0-D_2[d,f]	First and second story of two-story dwelling	Limited Brick Veneer on Second Story. See Section R602.10.6.5.3. ~~Table R602.10.6.5~~	1.2	WSP, CS-WSP
10	Horizontal blocking	Any story	Horizontal blocking omitted	2.0	WSP, PBS, CS-WSP

R602.10.6.5 Wall Bracing with Veneer in SDC D

- Veneer applications in high seismic areas are broken into first story and veneer above the first story applications.

IRC Section	Maximum Veneer Height	Extent Allowed	Bracing Methods Allowed
R602.10.6.5.1	Veneer in first story only	Throughout 1st story	Any
R602.10.6.5.2	Veneer throughout second story	Throughout 1st and 2nd story	Method BV-WSP
R602.10.6.5.3	Veneer in gable or into portion of second story	Throughout 1st story, limited area in 2nd story	Method WSP, Method CS-WSP, Method BV-WSP

R602.10.6.5.1 Veneer on 1st story only

- Wall bracing shall be in accordance with Table R602.10.3(3)

BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

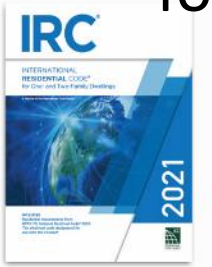
- SOIL CLASS D[b]
- WALL HEIGHT = 10 FEET
- 10 PSF FLOOR DEAD LOAD
- 15 PSF ROOF/CEILING DEAD LOAD
- BRACED WALL LINE SPACING ≤ 25 FEET

Seismic Design Category	Story Location	Braced Wall Line Length (feet)[a]	MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[c,f]				
			Method LIB[d]	Method GB	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB[e]	Method WSP	Methods CS-WSP, CS-G, CS-PF
D_1		10	NP	3.0	3.0	2.0	1.7
		20	NP	6.0	6.0	4.0	3.4
		30	NP	9.0	9.0	6.0	5.1
		40	NP	12.0	12.0	8.0	6.8
		50	NP	15.0	15.0	10.0	8.5
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
		10	NP	8.5	8.5	6.0	5.1
		20	NP	17.0	17.0	12.0	10.2
		30	NP	25.5	25.5	18.0	15.3
		40	NP	34.0	34.0	24.0	20.4
		50	NP	42.5	42.5	30.0	25.5
D_2		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6
		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4
		10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP
	Cripple wall below one- or two-story dwelling	10	NP	NP	NP	7.5	6.4
		20	NP	NP	NP	15.0	12.8
		30	NP	NP	NP	22.5	19.1
		40	NP	NP	NP	30.0	25.5
		50	NP	NP	NP	37.5	31.9

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

R602.10.6.5.2 Veneer Exceeding 1st story

- Wall bracing on interior and exterior braced wall lines shall be constructed using Method BV-WSP.
- Cripple walls shall not be permitted.
- Required interior braced wall lines shall be supported on continuous foundations.



R602.10.6.5.3 Limited Veneer Exceeding 1st story

- Wall bracing using Method WSP or CS-WSP is allowed if the bracing length required in Table R602.10.3(3) is multiplied by 1.2 for each braced wall line.
- See section for limits.

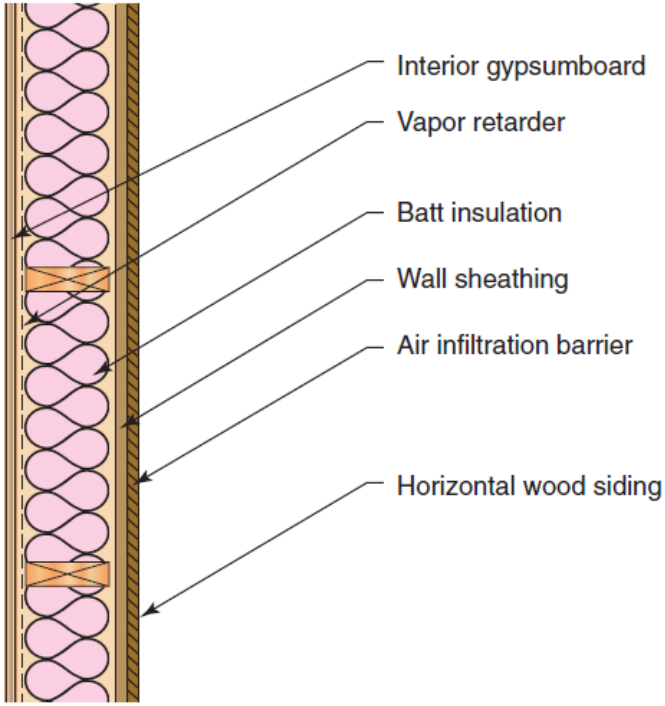
R609.4.1 Garage Door Labelling

- Garage doors shall be labeled with a permanent label provided by the garage door manufacturer.
- The label shall identify the garage door:
  - manufacturer
  - model/series number
  - positive and negative design wind pressure rating
  - installation instruction drawing reference number
  - applicable test standard

Chapter 7 – Wall Covering

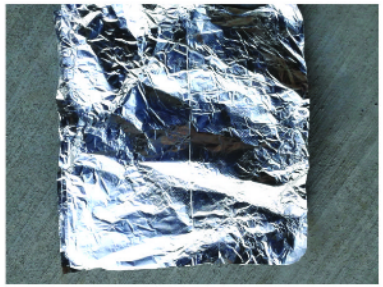
R702.7 Vapor Retarders

- The vapor retarder section is reorganized for clarity and ease of use.
- Materials are listed as Class I, II or III.
- Tables offer appropriate climate zones for each class.
- Class II and III vapor retarders may be used with continuous insulation.



Vapor Retarders

Class I



VR < 0.1 perm

Impermeable

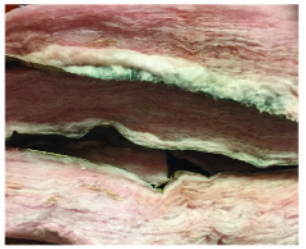
Foil and Polyethylene sheets

Class II

0.1 perm < VR < 1 perm

Semi-impermeable

Extruded polystyrene and
Kraft fiberglass batts



Class III

1 perm < VR

Semi-impermeable

Latex paint, 30# felt and Plywood

R703.2, R703.7.3 Water-resistive Barriers

- WRB material options include:
  - No. 15 felt complying with ASTM D226, Type 1
  - ASTM E2556, Type I or II
  - ASTM E331
  - Other approved materials
- WRB requirements for dry climates versus wet climates are defined for stucco.

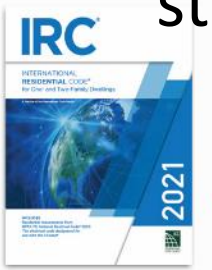


Table R703.8.4(1) Tie Attachment and Airspace

- Larger air gaps are allowed behind veneer to accommodate thicker continuous insulation. (Note: table illustration is not showing the min. Tie and Tie fastener columns)

Backing and Tie	Airspace[b]	
Wood stud backing with corrugated sheet metal	Nominal 1 in. between sheathing and veneer	
Wood stud backing with adjustable metal strand wire	Minimum nominal 1in. between sheathing and veneer	Maximum 4⅝ in. between backing and veneer
Wood stud backing with adjustable metal strand wire	Greater than 4⅝ in. between backing and veneer	Maximum 6⅝ in. between backing and veneer
Cold-formed steel stud backing with adjustable metal strand wire	Minimum nominal 1 in. between sheathing and veneer	Maximum 4⅝ in. between backing and veneer
Cold-formed steel stud backing with adjustable metal strand wire	Greater than 4⅝ in. between backing and veneer	Maximum 6⅝ in. between backing and veneer

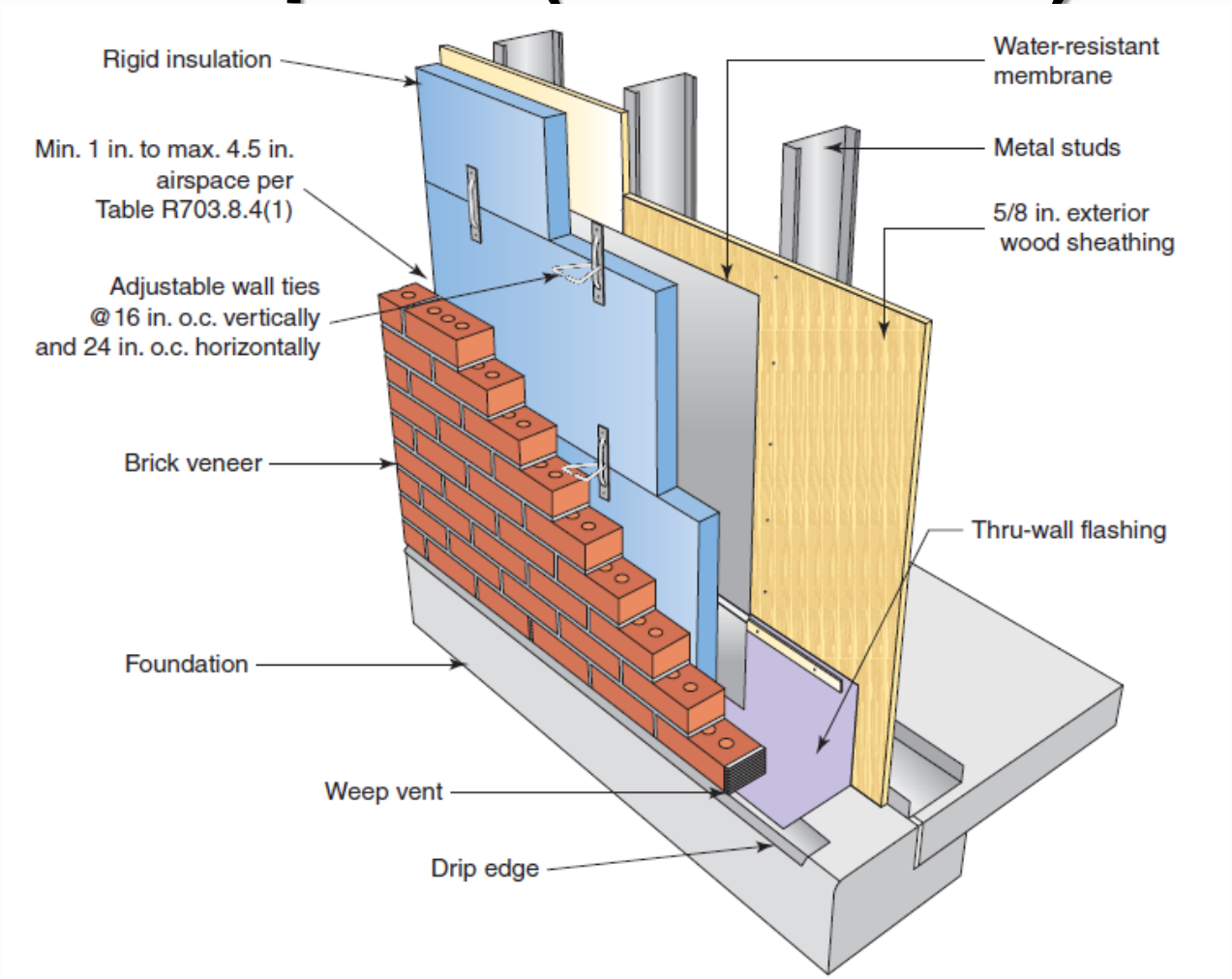
Table R703.8.4(1) Tie Attachment and Airspace Footnotes d-f

d. Adjustable tie pintle shall include a minimum of 1 pintle leg of wire size W2.8 with a maximum offset of 1-1/4 in.

e. Adjustable tie pintle shall include a minimum of 2 pintle legs with a maximum offset of 1¼ in. Distance between inside face of brick and end of pintle shall be a maximum of 2 in.

f. Adjustable tie backing attachment components shall consist of one of the following: eyes with minimum wire W2.8, barrel with minimum ¼ in. outside dia., or plate with minimum thickness of 0.074 in. and minimum width of 1¼ in.

Table R703.8.4(1) Tie Attachment and Airspace (Continued)



R703.11.2 Vinyl Siding over Continuous Insulation

- Wind pressure ratings for vinyl siding have dropped.

Table R703.11.2 Required Minimum Wind Load Design Pressure Rating

ULTIMATE DESIGN WIND SPEED (MPH)	ADJUSTED MINIMUM DESIGN WIND PRESSURE (ASD) (PSF)[a, b]					
	Case 1: With interior gypsum wallboard[c]			Case 2: Without interior gypsum wallboard[c]		
	Exposure			Exposure		
	B	C	D	B	C	D
≤95	-30.0	-33.2	-39.4	-33.9	-47.4	-56.2
100	-30.0	-36.8	-43.6	-37.2	-52.5	-62.2
105	-30.0	-40.5	-48.1	-41.4	-57.9	-68.6
110	~~-44.0~~ -31.8	~~-61.6~~ -44.5	~~-73.1~~ -52.8	~~-62.9~~ -45.4	~~-88.1~~ -63.5	~~-104.4~~ -75.3
115	~~-49.2~~ 35.5	~~-68.9~~ -49.7	~~-81.7~~ -59.0	~~-70.3~~ -50.7	~~-98.4~~ -71.0	~~-116.7~~ -84.2
120	~~-51.8~~ -37.4	~~-72.5~~ -52.4	~~-86.0~~ -62.1	~~-74.0~~ -53.4	~~-103.6~~ -74.8	~~-122.8~~ -88.6
130	~~-62.2~~ -44.9	~~-87.0~~ -62.8	~~-103.2~~ -74.5	~~-88.8~~ -64.1	~~124.3~~ -89.7	~~-147.4~~ -106
>130	See Footnote d ~~Not Allowed[d]~~					

R704 Soffits

- Requirements for soffit material and installation are expanded in a new section.

R704 Soffits

- R704.1 General wind limitations
- R704.2 Soffit installation where the design wind pressure is 30 psf or less
- R704.2.1 Vinyl soffit panels
- R704.2.2 Fiber-cement soffit panels
- R704.2.3 Hardboard soffit panels
- R704.2.4 Wood structural panel soffit
- R704.3 Soffit installation where the design wind pressure exceeds 30 psf
- R704.3.1 Vinyl soffit panels
- R704.3.2 Fiber-cement soffit panels
- R704.3.3 Hardboard soffit panels
- R704.3.4 Wood structural panel soffit

Figure R704.2.1(1) Single Span Vinyl Soffit Panel Support

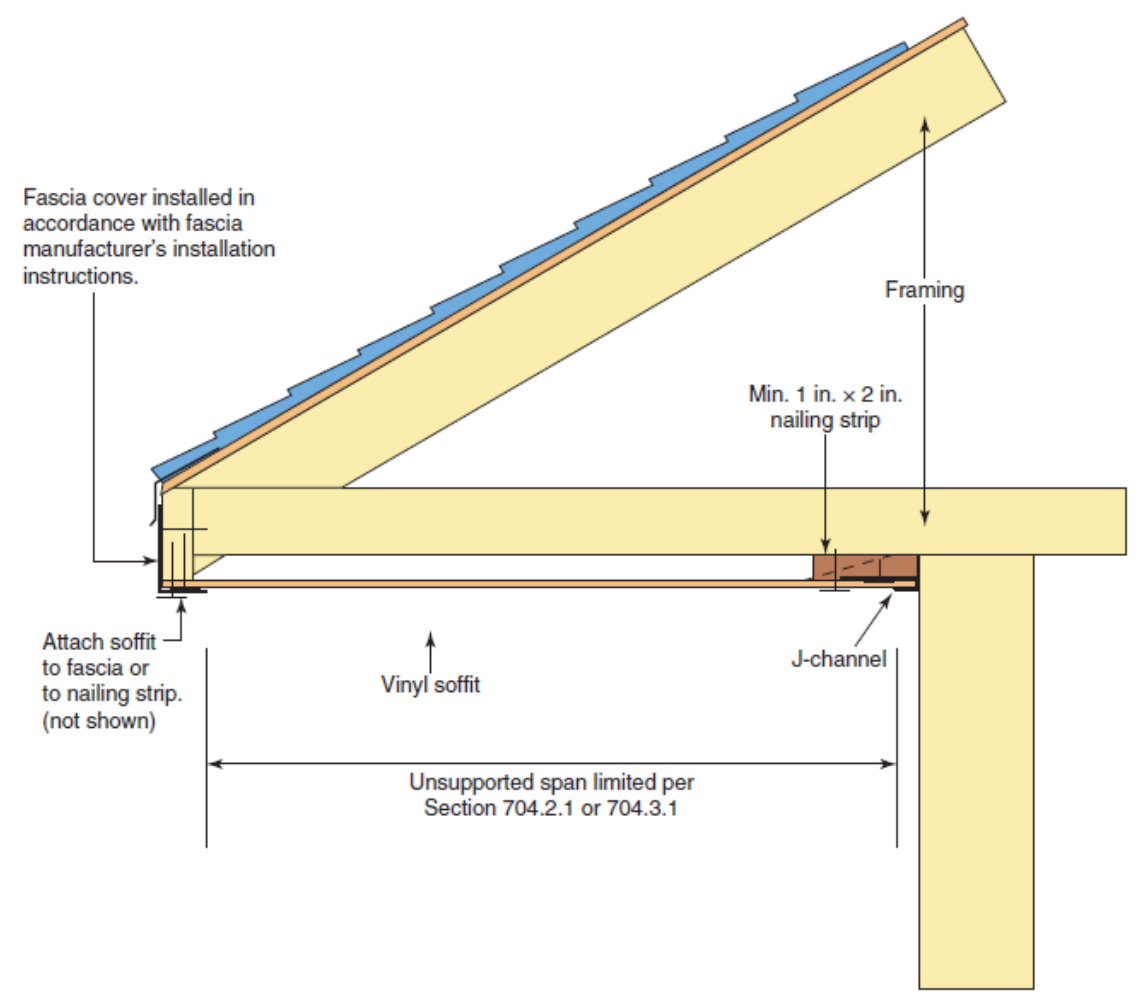


Table R704.3.4 Prescriptive Alternative Nailing for a WSP Soffit

Maximum Design Pressure (+ or - psf)	Minimum Panel Span Rating	Minimum Panel Performance Category	Nail Type and Size	Fastener[a] Spacing Along Edges and Intermediate Supports	
				Galvanized Steel	Stainless Steel
30	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	6[f]	4
40	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	6	4
50	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	4	4
			8d common (2½ x 0.131 x 0.281 head diameter)	6	6
60	24/0	3/8	6d box (2 x 0.099 x 0.266 head diameter)	4	3
			8d common (2½ x 0.131 x 0.281 head diameter)	6	4
70	24/16	7/16	8d common (2½ x 0.131 x 0.281 head diameter)	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
80	24/16	7/16	8d common (2½ x 0.131 x 0.281 head diameter)	4	4
			10d box (3 x 0.128 x 0.312 head diameter)	6	4
90	32/16	15/32	8d common (2½ x 0.131 x 0.281 head diameter)	4	3
			10d box (3 x 0.128 x 0.312 head diameter)	6	4

Chapter 8 – Roof
Chapter 9 – Roof Covering

ICC LEARNING center

R802 Wood Roof Framing

- Revised provisions clarify ridge beam and ceiling joist requirements.

Table R802.5.2(1) Heel Joint Connections

- The heel joint connection table is updated for roof spans of 24 and 36 feet and a 19.2-inch rafter spacing.

Table R802.5.2(1) Rafter/Ceiling Joist Heel Joint Connections

RAFTER SLOPE	RAFTER SPACING (inches)	GROUND SNOW LOAD (psf)											
		20[e]			30			50			70		
		Roof span (feet)											
		12	24	36	12	24	36	12	24	36	12	24	36
		Required number of 16d common nails per heel joint splice[a,b,c,d,f]											
3:12	12	3	5	8	3	6	9	5	9	13	6	12	17
	16	4	7	10	4	8	12	6	12	17	8	15	23
	19.2	4	8	12	5	10	14	7	14	21	9	18	27
	24	5	10	15	6	12	18	9	17	26	12	23	34
4:12	12	3	4	6	3	5	7	4	7	10	5	9	13
	16	3	5	8	3	6	9	5	9	13	6	12	17
	19.2	3	6	9	4	7	11	6	11	16	7	14	21
	24	4	8	11	5	9	13	7	13	19	9	17	26
5:12	12	3	3	5	3	4	6	3	6	8	4	7	11
	16	3	4	6	3	5	7	4	7	11	5	9	14
	19.2	3	5	7	3	6	9	5	9	13	6	11	17
	24	3	6	9	4	7	11	6	11	16	7	14	21
⋮													
12:12	12	3	3	3	3	3	3	3	3	4	3	3	5
	16	3	3	3	3	3	3	3	3	5	3	4	6
	19.2	3	3	3	3	3	4	3	4	6	3	5	7
	24	3	3	4	3	3	5	3	5	7	3	6	9

Table R802.5.2(1) Rafter/Ceiling Joist Heel Joint Connections Footnote a

a. 10d common (3″ × 0.148″) nails shall be permitted to be substituted for 16d common (3½″x 0.162″) nails where the required number of nails is taken as 1.2 times the required number of 16d common nails, rounded up to the next full nail.

R802.6 Rafter and Ceiling Joist Bearing

Where:

1. Roof pitch is ≥ 3:12 (25% slope)
2. Ceiling joists or rafter ties are connected to rafters to provide a continuous tension tie

Vertical bearing of the top of the rafter against the ridge board shall satisfy the bearing requirement.

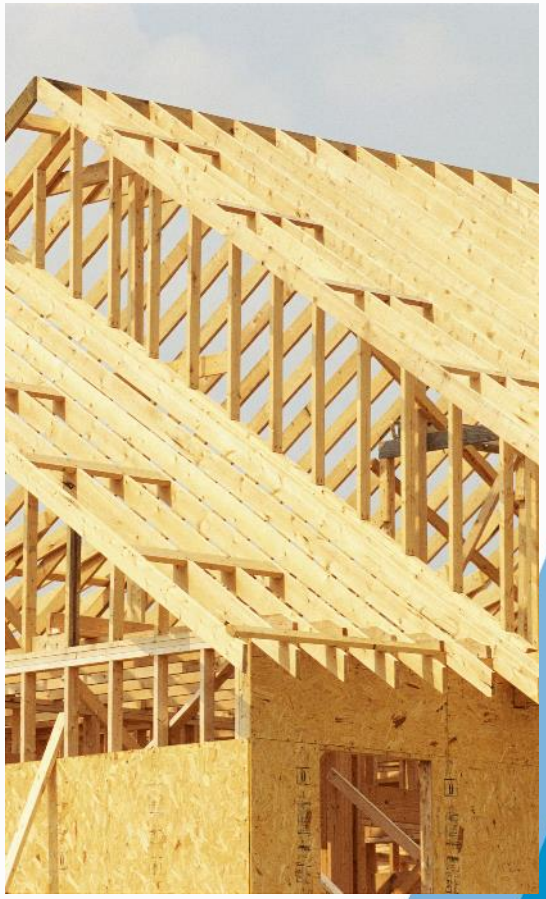


Table R804.3 CFS Roof Framing Fasteners

- Connections for CFS roof framing members are updated and clarified.

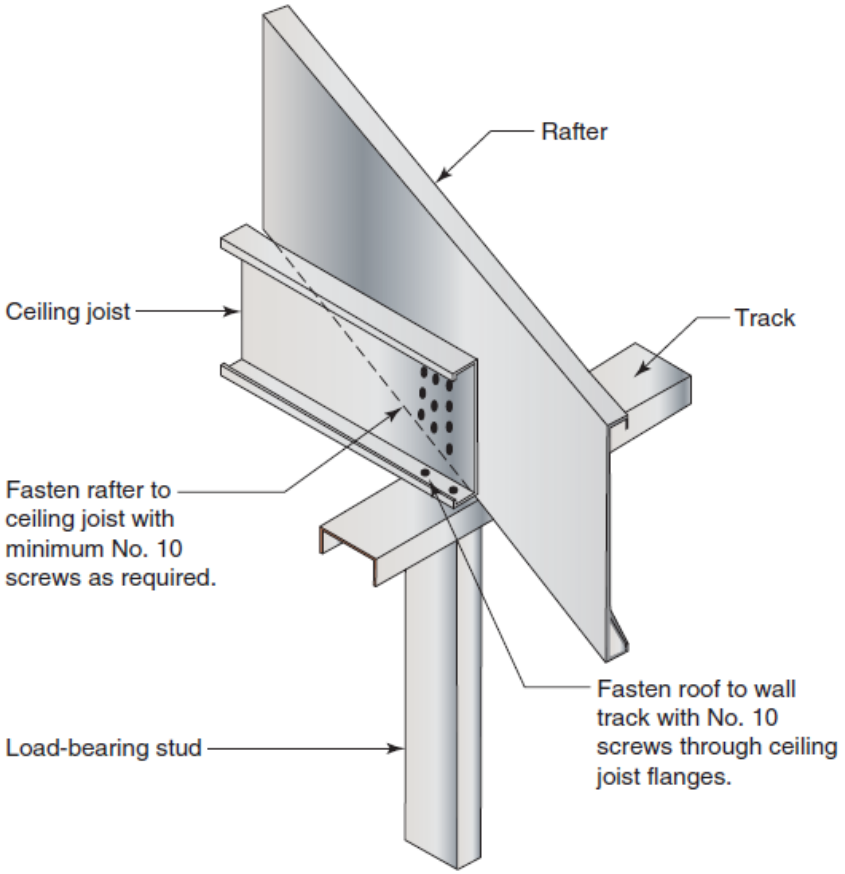


Table R804.3 Roof Framing Fastening Schedule

DESCRIPTION OF BUILDING ELEMENTS			NUMBER AND SIZE OF FASTENERS[a]				SPACING OF FASTENERS
Roof sheathing (oriented strand board or plywood) to rafter			No. 8 screws				6″ o.c. on edges and 12″ o.c. at interior supports. 6″ o.c. at gable end truss
Gypsum board to ceiling joists			No. 6 screws				12" o.c.
Gable end truss to endwall top track			No. 10 screws				12″ o.c.
Rafter to ceiling joist and to ridge member			Minimum No. 10 screws, in accordance with Table R804.3.1.1(3)				Evenly spaced, not less than 1/2″ from all edges.
Ceiling joist or roof truss to top track of bearing wall[b]	Ceiling Joist or Truss Spacing (in.)	Roof Span (ft)	Ultimate Design Wind Speed (mph) and Exposure Category				Each ceiling joist or roof truss
			130B 115C	<139B 120C	130C	<139C	
	…						

Table R804.3.2.1(2) Wind Speed Equivalent to Snow Load Conversion

Ultimate Wind Speed and Exposure		Equivalent Ground Snow Load (psf)									
		Roof slope									
Exposure	Wind speed (mph)	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12
B	115	20	20	20	20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~50~~ 20
	120	20	20	20	20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~50~~ 20
	130	20	20	20	20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~50~~ 20	~~50~~ 20	~~50~~ 20
	<140	20	20	20	20	~~30~~ 20	~~50~~ 20	~~50~~ 20	~~50~~ 30	~~50~~ 30	~~50~~ 30
C	115	20	20	20	20	~~30~~ 20	~~30~~ 20	~~30~~ 20	~~50~~ 20	~~50~~ 30	~~50~~ 30
	120	20	20	20	20	~~30~~ 20	~~30~~ 20	~~50~~ 20	~~50~~ 30	~~50~~ 30	50
	130	20	20	~~20~~ 30	30	30	~~50~~ 30	~~50~~ 30	~~50~~ 30	50	~~70~~ 50
	<140	30	30	~~30~~ 50	50	~~50~~ 30	~~50~~ 30	~~70~~ 50	~~70~~ 50	~~70~~ 50	— 50

R905.4.4.1 Metal Roof Shingle Wind Resistance

- Requirements for metal shingle wind resistance are added to Section R905.4.

Table R905.4.4.1 Classification of Steep Slope Metal Roof Shingles Tested per ASTM D3161

MAXIMUM ULTIMATE DESIGN WIND SPEED, V_{ULT} FROM FIGURE R301.2(2) (mph)	MAXIMUM BASIC WIND SPEED, V_{ASD} FROM TABLE R301.2.1.3 (mph)	ASTM D3161 SHINGLE CLASSIFICATION
110	85	A, D or F
116	90	A, D or F
129	100	A, D or F
142	110	F
155	120	F
168	130	F
181	140	F
194	150	F

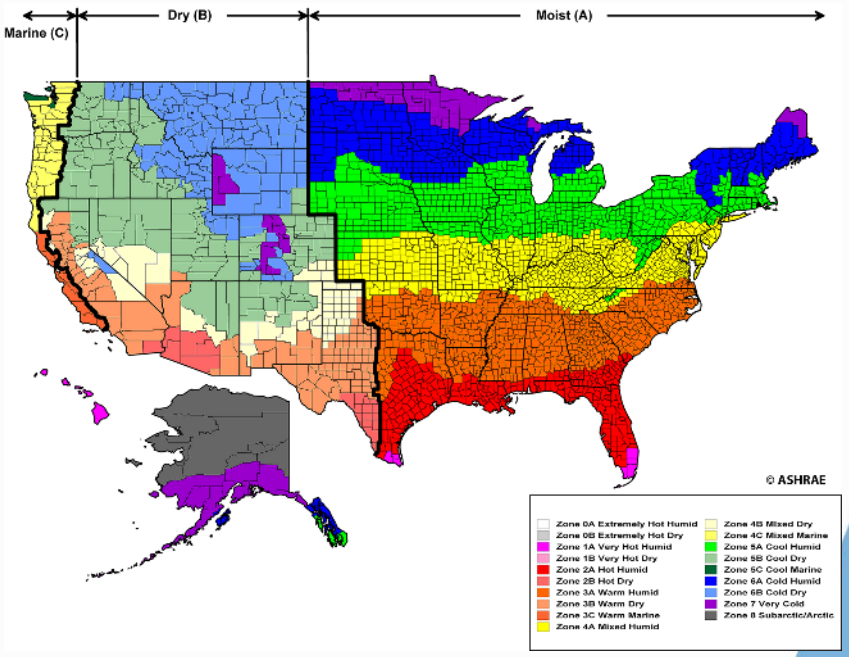
Chapter 11 - Energy

N1101.6 Definition of High-Efficacy Light Sources

- High-efficacy lighting:
  - lamps ≥ 65 lumens/W
  - luminaires ≥ 45 lumens/W
  - reflects current technology and federal standards

N1101.7 Climate Zones

- Comprehensively updated
- New Climate Zone 0
- Approximately 10% of US counties assigned new climate zone.



N1101.13 Compliance Options

- The compliance path options are revised.
- The prescriptive and mandatory labels in section titles are removed.

N1101.13 Compliance Options (Continued)

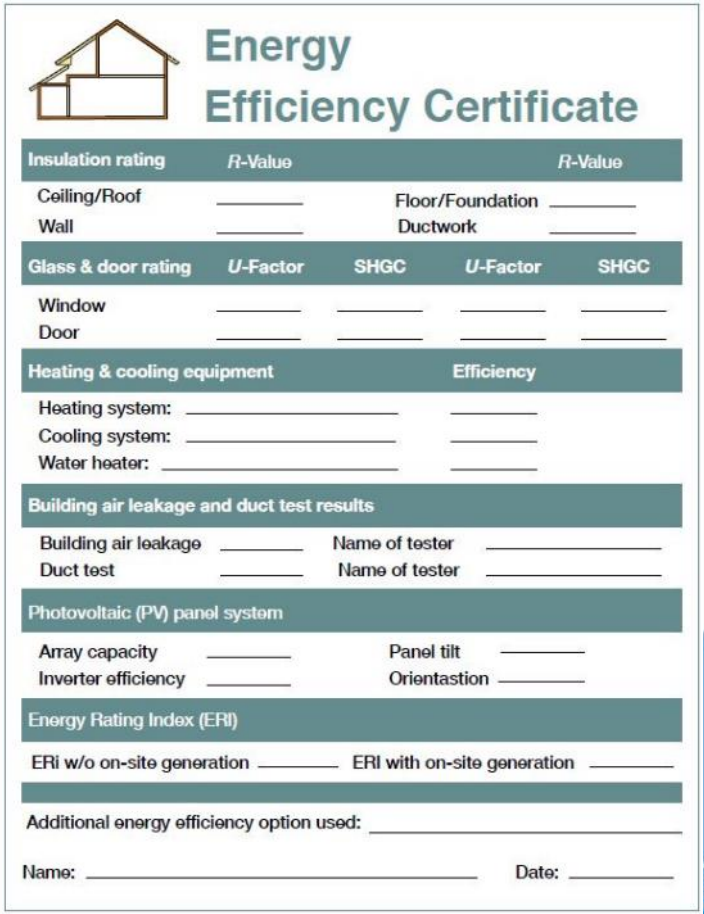
- Prescriptive Compliance Option
- Total Building Performance Option
- Energy Rating Index Option
- Tropical Climate Region Option

N1101.13.5 Additional Energy Efficiency Requirements

- Additional energy efficiency measures are required in addition to the compliance path requirements.

N1101.14 Permanent Energy Certificate

- Additional information:
  - Building thermal envelope
  - Solar energy
  - Energy Rating Index (ERI)
  - Code edition



Energy Efficiency Certificate

Insulation rating	*R*-Value		*R*-Value
Ceiling/Roof	_____	Floor/Foundation	_____
Wall	_____	Ductwork	_____

Glass & door rating	*U*-Factor	SHGC	*U*-Factor	SHGC
Window	_____	_____	_____	_____
Door	_____	_____	_____	_____

Heating & cooling equipment	Efficiency
Heating system: _____	_____
Cooling system: _____	_____
Water heater: _____	_____

Building air leakage and duct test results

Building air leakage _____ Name of tester _____
Duct test _____ Name of tester _____

Photovoltaic (PV) panel system

Array capacity _____ Panel tilt _____
Inverter efficiency _____ Orientastion _____

Energy Rating Index (ERI)

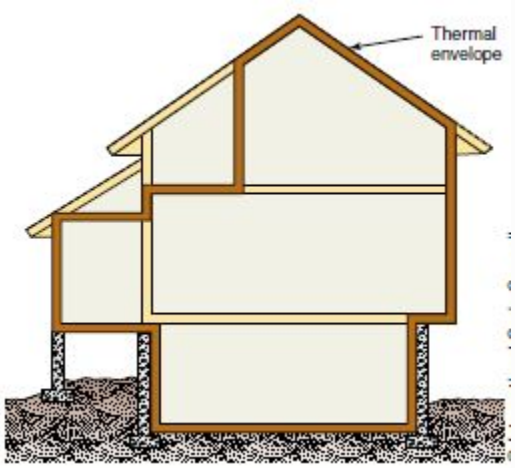
ERI w/o on-site generation _____ ERI with on-site generation _____

Additional energy efficiency option used: _____

Name: _____ Date: _____

N1102.1 Building Thermal Envelope

- The assembly *U*-Factor is established as the primary insulation metric.
- The *R*-Value approach is now an alternative method.



Tables N1102.1.2 and N1102.1.3 Insulation and Fenestration Requirements

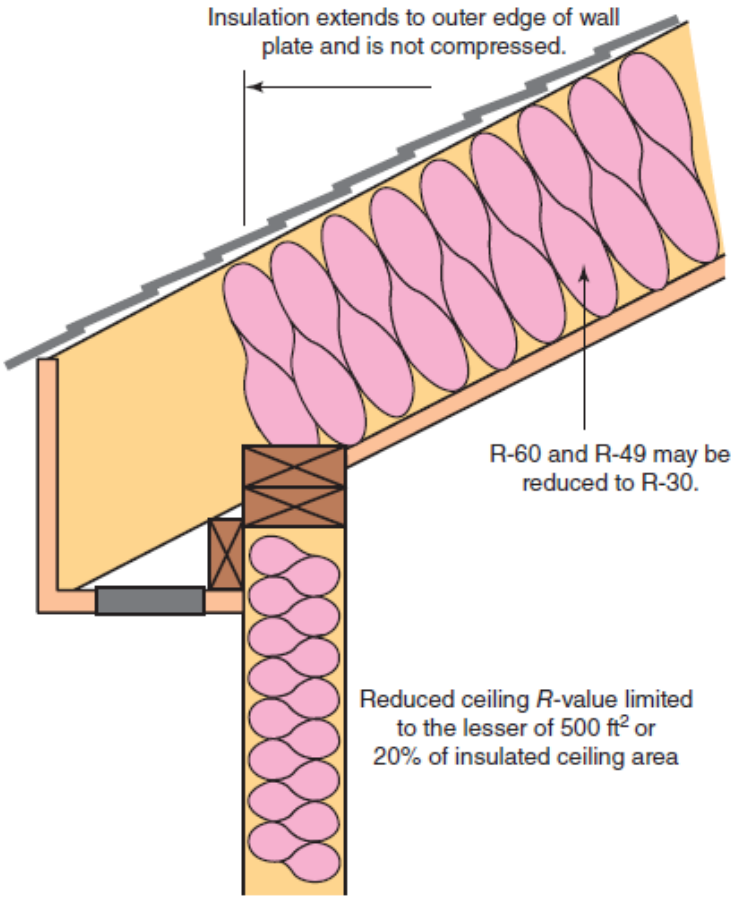
- Lowered *U*-factors and increased *R*-values in the prescriptive tables

Table N1102.1.3 Insulation and Fenestration Requirements

Climate Zone	Fenestration *U*-Factor	Ceiling *R*-Value	Slab *R*-value & Depth
2	0.40	~~38~~ 49	0
3	~~0.32~~ 0.30	~~38~~ 49	~~0~~ 10ci, 2 ft
4 except Marine	~~0.32~~ 0.30	~~49~~ 60	10ci, ~~2~~ 4 ft
5 and Marine 4	0.30	~~49~~ 60	10ci, ~~2~~ 4 ft
6	0.30	~~49~~ 60	10ci, 4 ft
7 and 8	0.30	~~49~~ 60	10ci, 4 ft

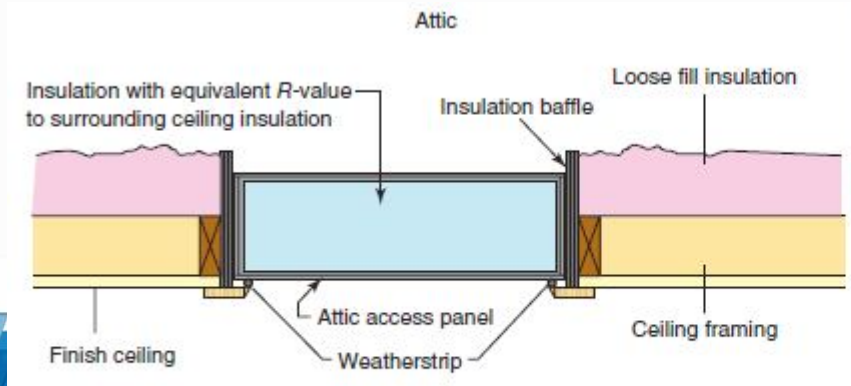
N1102.2 Ceiling Insulation

- The options for a reduction in *R*-values for both ceilings with attics and those without have been adjusted to recognize the increase in the prescriptive ceiling *R*-values in Table N1102.1.3.

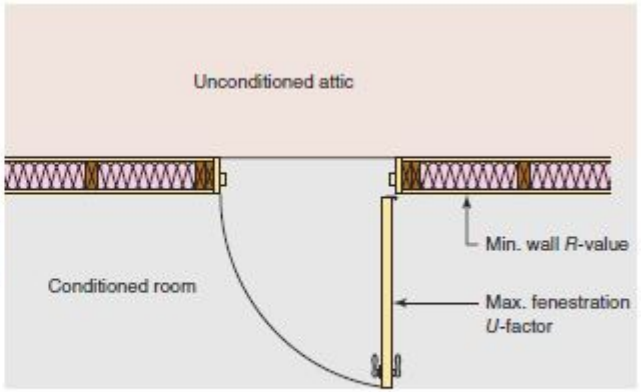


N1102.2.4 Access Hatches and Doors

- Prescriptive provisions for insulation levels and mandatory provisions for installation (weather-stripping and baffles) have been placed in separate sections.
- Provisions addressing pull-down stairs have been added.



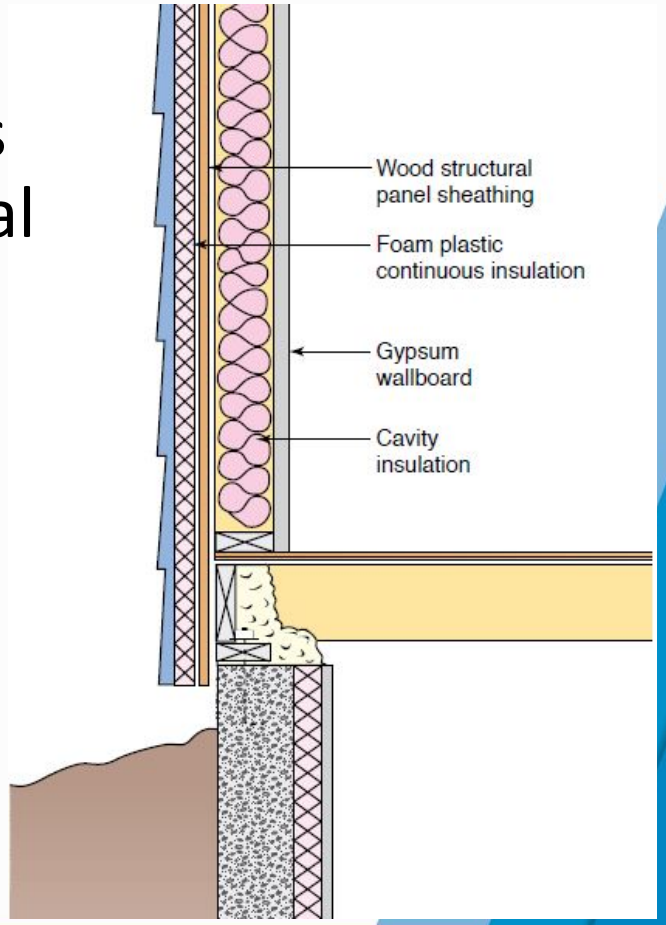
Horizontal attic access



Vertical attic access

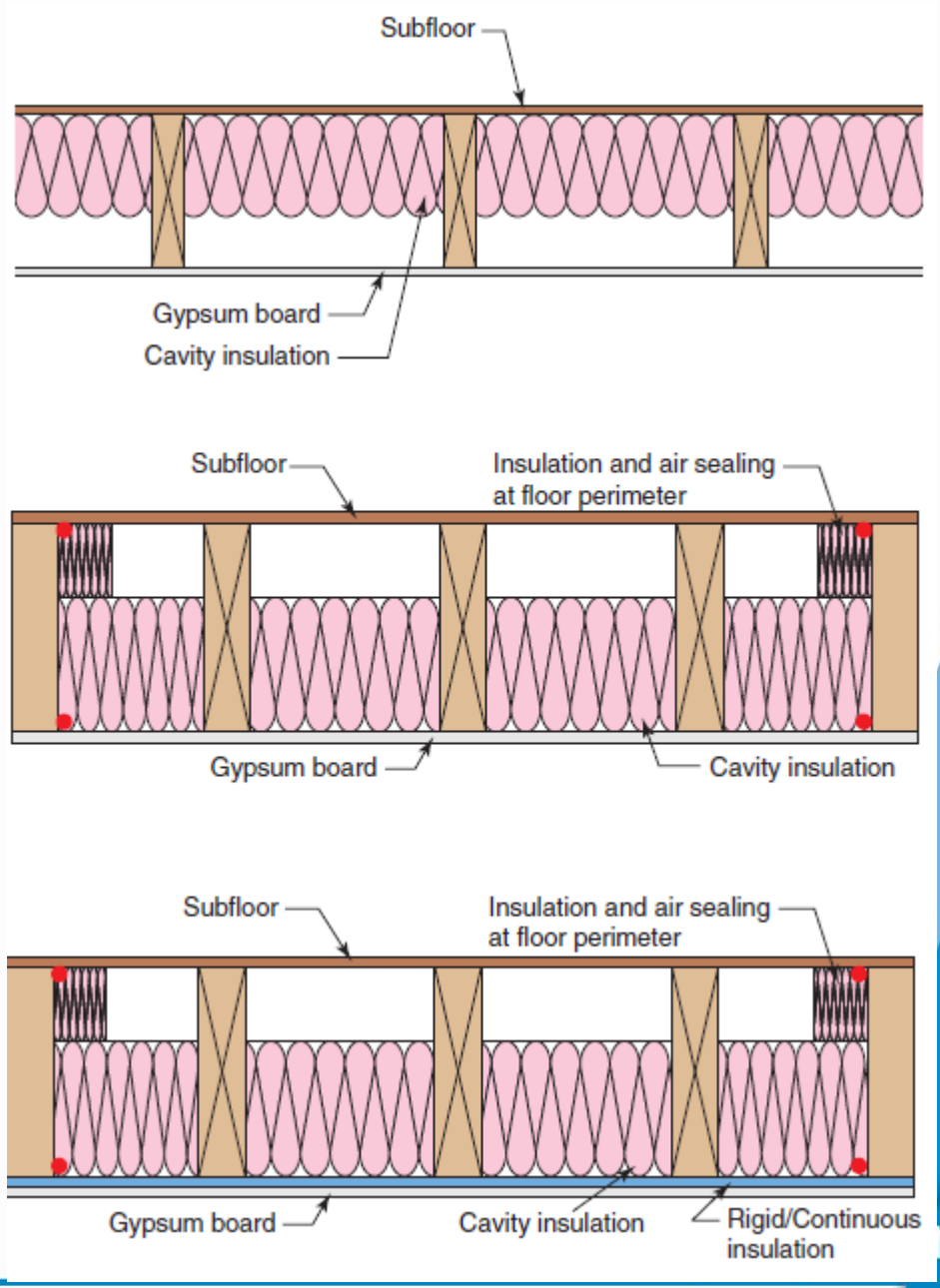
~~N1102.2.7 *R*-Value Reduction for Walls with Partial Structural Sheathing~~

- Deleted provision for reducing the *R*-value of the required continuous wall insulation at areas of structural wall sheathing.



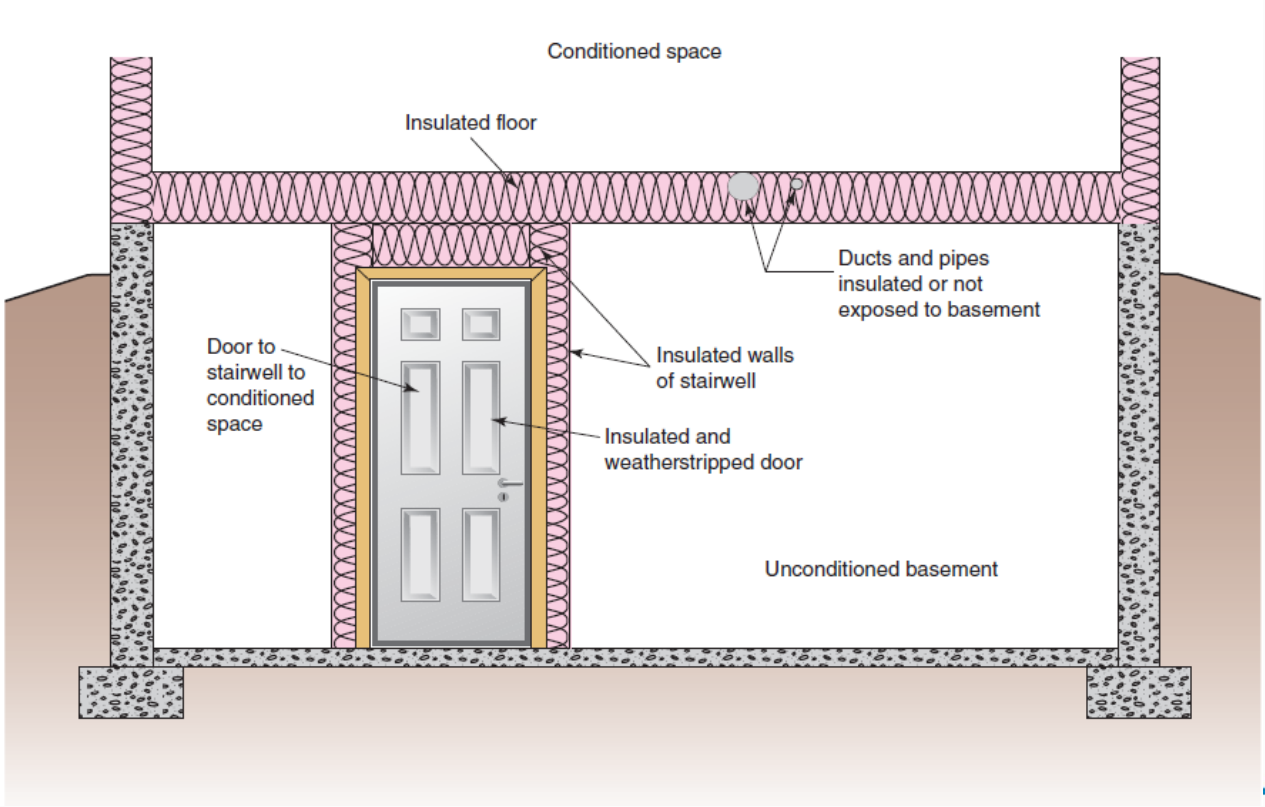
N1102.2.7 Floor Insulation

- Three separate methods of compliance:
  - Cavity insulation underside of subfloor
  - Cavity insulation top side of ceiling
  - Cavity and continuous insulation top side of ceiling



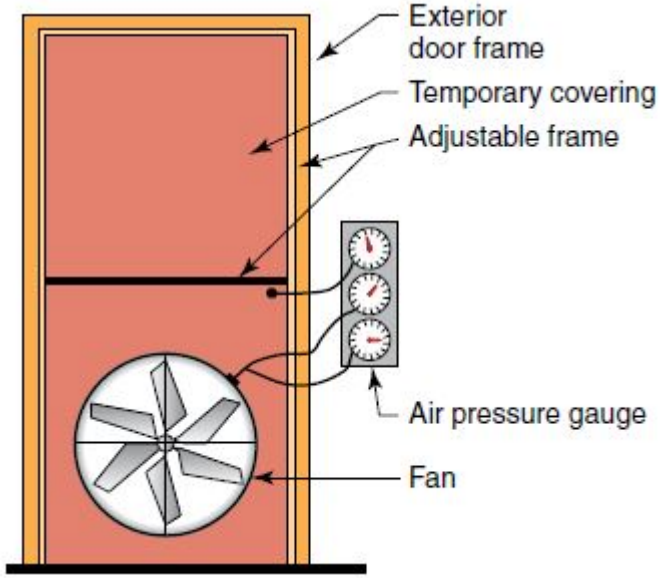
N1102.2.8 Unconditioned Basement

- A number of specific criteria must be met for a space to qualify as an unconditioned basement.

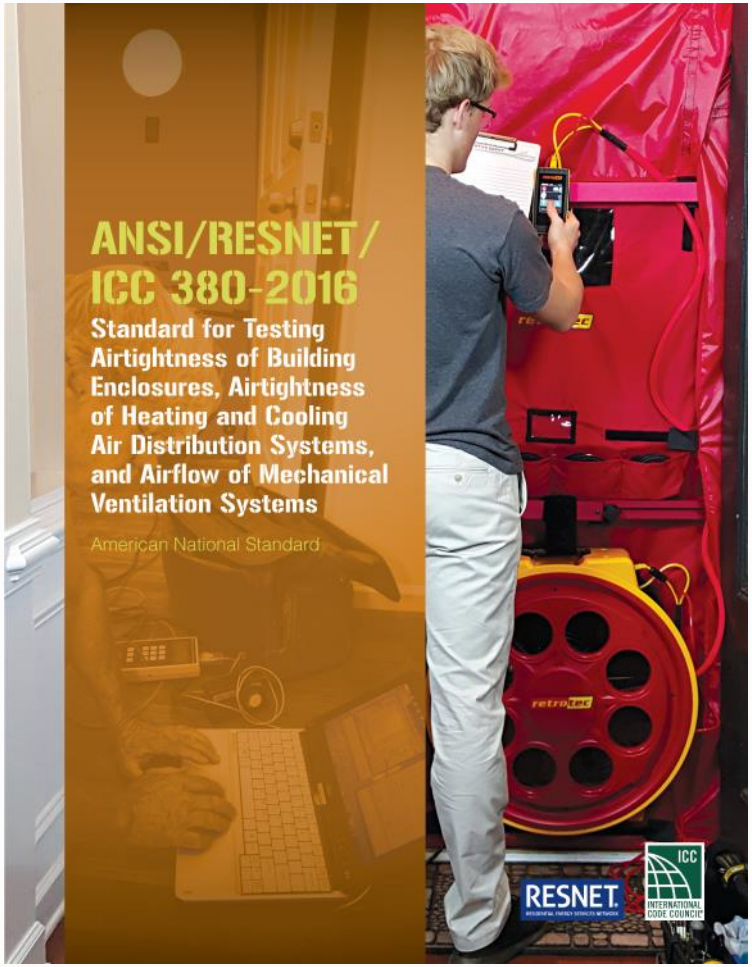


N1102.4 and Table N1102.4.1.1 Building Air Leakage and Testing

- 5 ACH for all compliance paths
- 3 ACH for prescriptive path in climate zones 3 through 8.
- Heated attached and detached garages are field verified for air barrier and insulation
- Exception to quantify air leakage in attached and small volume dwelling units
- Changes throughout Table N1102.4.1.1 Air Barrier, Air Sealing, and Insulation Installation.

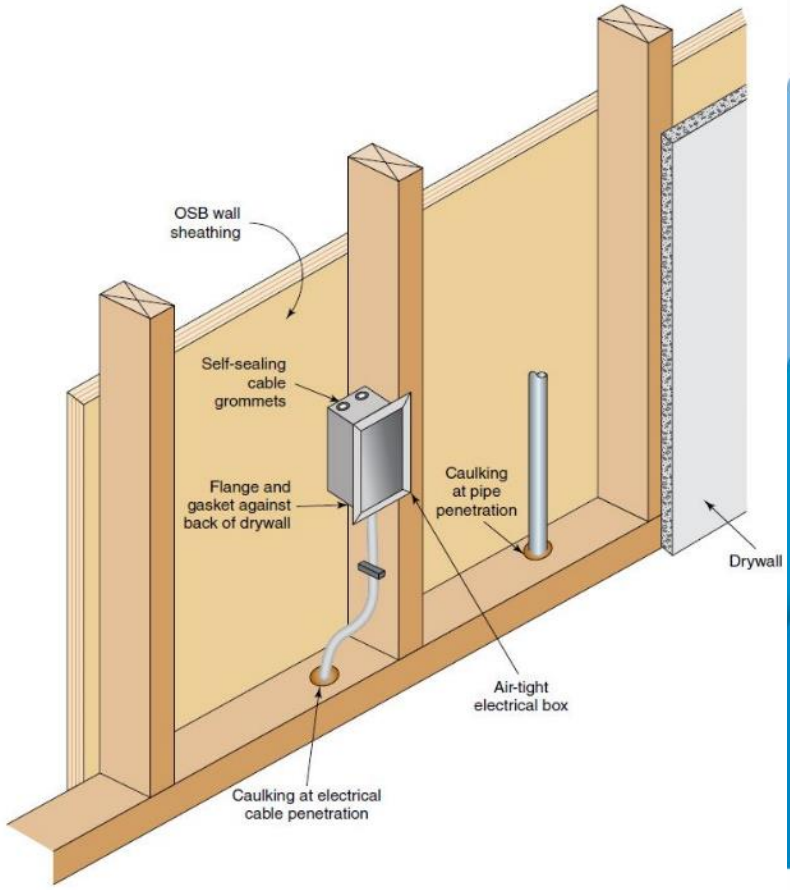


N1102.4 and Table N1102.4.1.1 Building Air Leakage and Testing



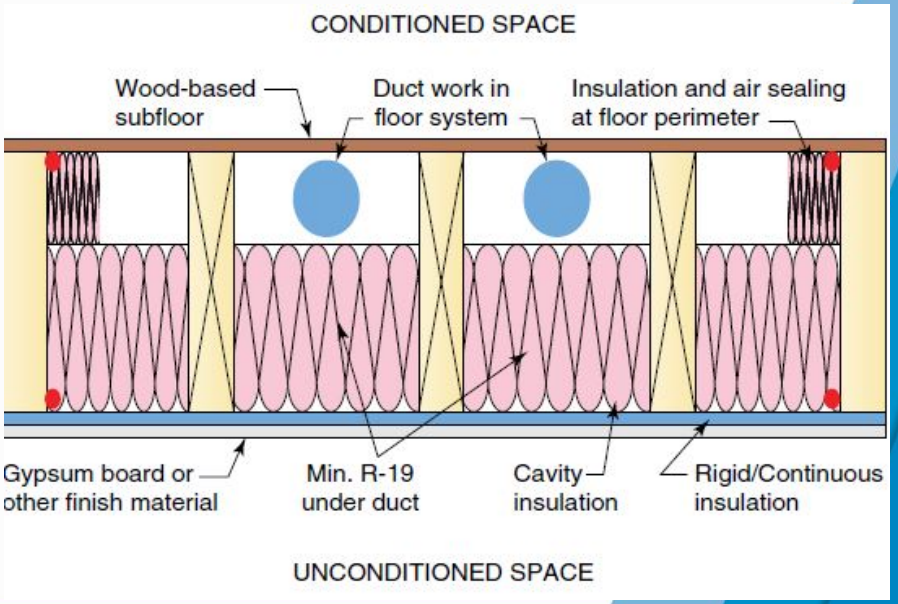
N1102.4.6 Air-Sealed Electrical Boxes

- Electrical and communication outlet boxes installed in the building thermal envelope:
  - Sealed
  - Tested NEMA OS 4
  - Marked "NEMA OS 4" or "OS 4"
  - Installed per manufacturer's instructions and NEMA OS 4



N1103.3 Duct Installation

- Clarifies four scenarios where ductwork qualifies as being in conditioned space:
  - Duct system completely within the continuous air barrier and building thermal envelope
  - Duct work in ventilated attic and buried within ceiling insulation
  - Duct work in floor cavities over unconditioned space
  - Duct work within exterior walls

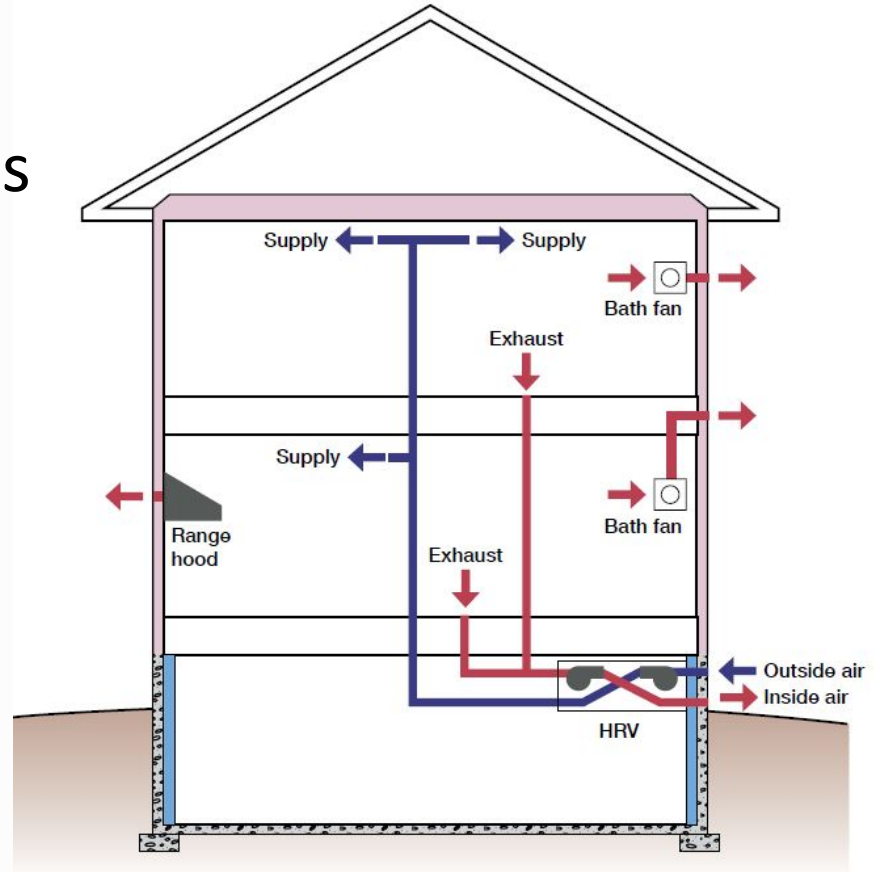


N1103.3.5 Duct Testing

- The exception for duct testing of ducts in conditioned spaces is deleted.

N1103.6 Mechanical Ventilation

- HRV or ERV system is required in climate zones 7 and 8.
- Mechanical ventilation systems now require testing.



N1104 Lighting Equipment

- High-efficacy lighting is now required in all permanent lighting fixtures.
- New provisions regulate lighting controls for interior and exterior lighting.

N1105 and Table N1105.2 Total Building Performance Analysis

- Section has been retitled and reorganized.
- New Table N1105.2 lists the related mandatory requirements that appear elsewhere in the code.

Table N1105.2 Requirements for Total Building Performance

Section	Title
N1101.13.5	Additional Energy Efficiency
N1101.14	Certificate
N1102.1.1	Vapor Retarder
N1102.2.3	Eave Baffles
N1102.2.4.1	Access hatches and doors
N1102.2.10.1	Crawl space wall insulation installations
N1102.4.1.1	Installation

Excerpt

N1106 and Table N1106.2 Energy Rating Index Analysis

- ERI values lowered to increase energy efficiency
- Additional 5% energy reduction is applied
- New Table N1106.2 lists all of the mandatory requirements for the ERI compliance path.

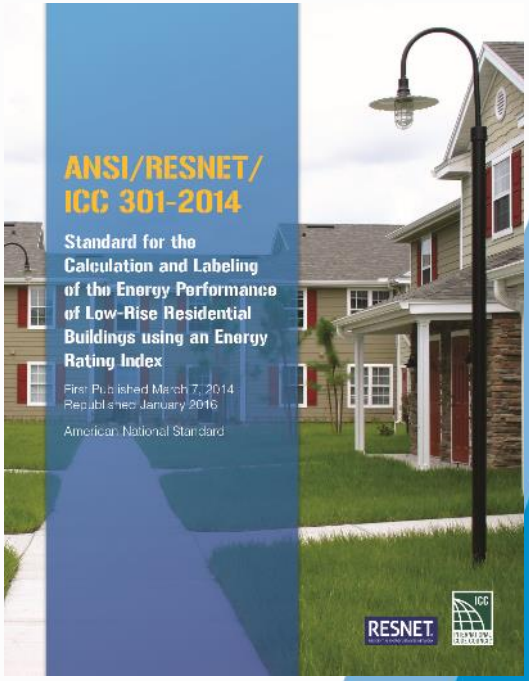


Table N1106.5 Maximum Energy Rating Index

Climate Zone	Energy Rating Index[a]
0-1	~~57~~ 52
2	~~57~~ 52
3	~~57~~ 51
4	~~62~~ 54
5	~~61~~ 55
6	~~61~~ 54
7	~~58~~ 53
8	~~58~~ 53

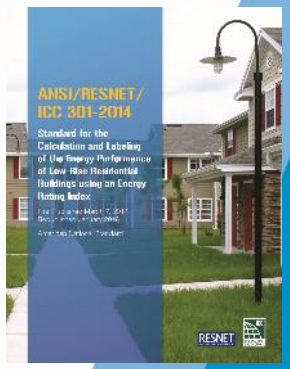
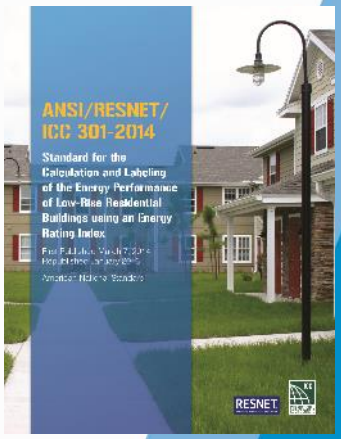


Table N1106.2 Requirements for Energy Rating Index

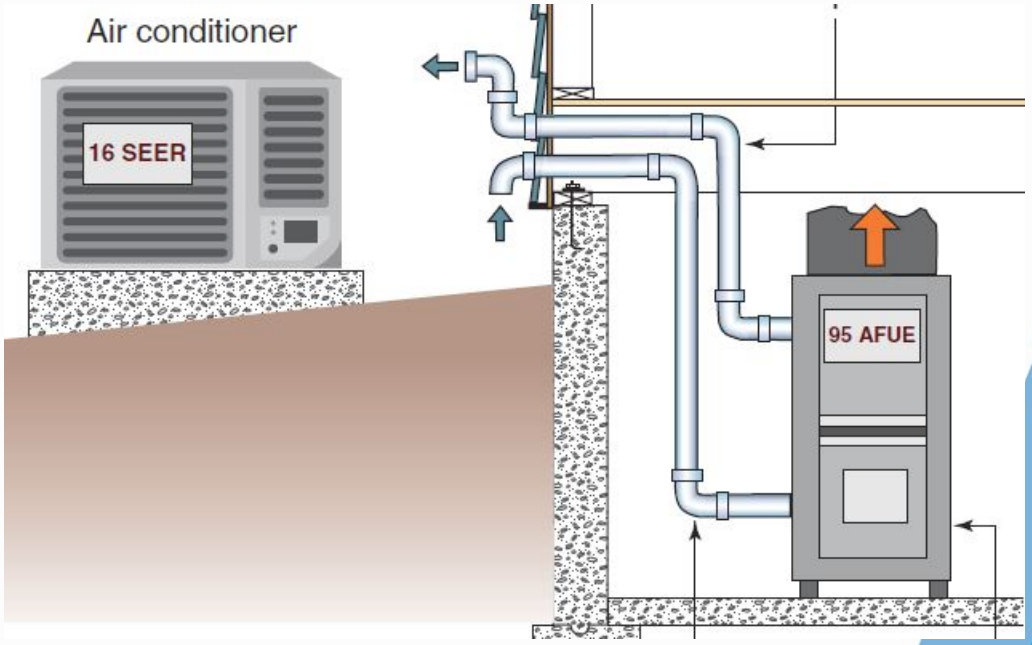
Section	Title
N1101.13.5	Additional Efficiency Packages
N1101.14	Certificate
N1102.1.1	Vapor Retarder
N1102.2.3	Eave Baffles
N1102.2.4.1	Access hatches and doors

Excerpt



N1108 Additional Efficiency Package Options

- Additional energy efficiency package option:
  - Prescriptive
  - Total Building Performance



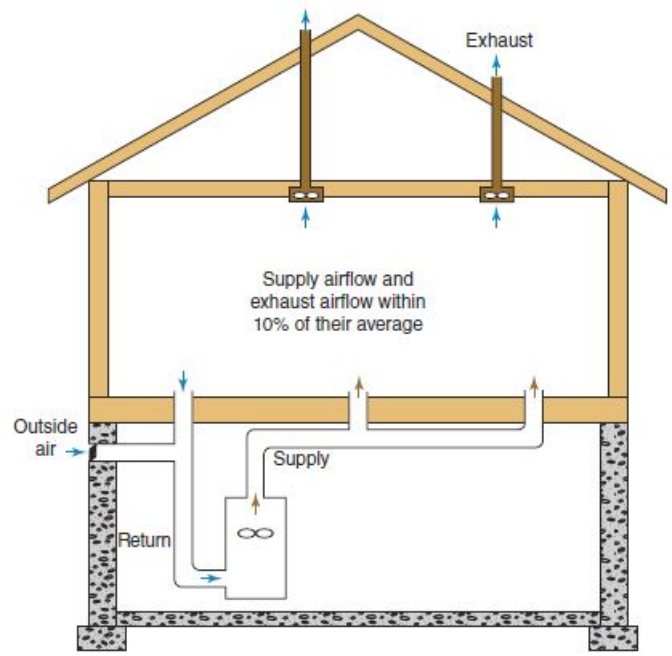
N1108.2.2 Item 1: More efficient HVAC equipment performance option.

Chapters 12-23 – Mechanical

ICC LEARNING center

M1505 Balanced Ventilation System Credit

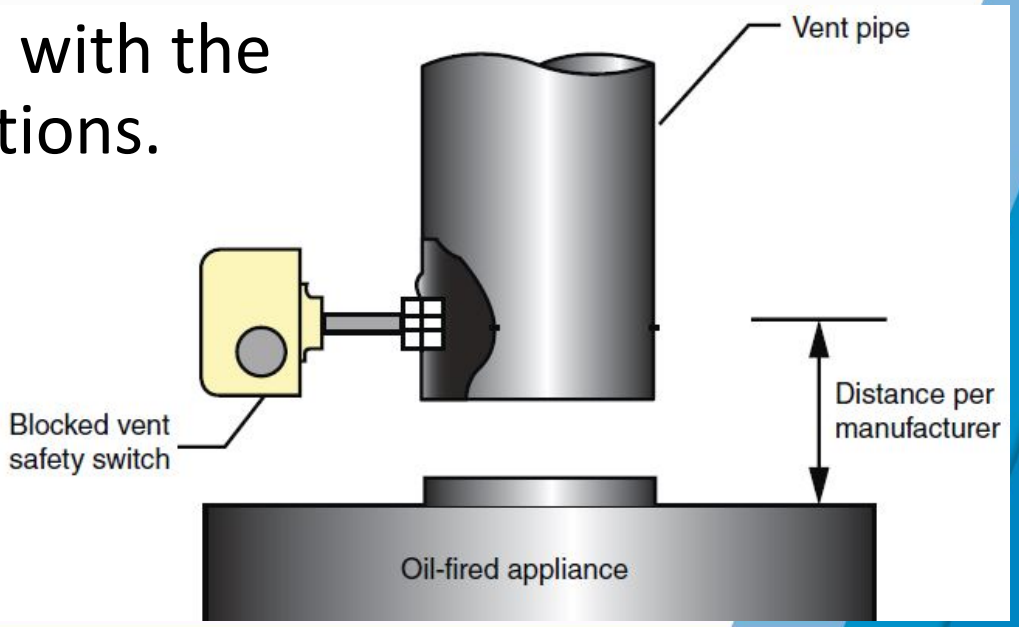
- A 30 percent reduction of airflow is permitted for balanced ventilation systems.



Balanced ventilation system

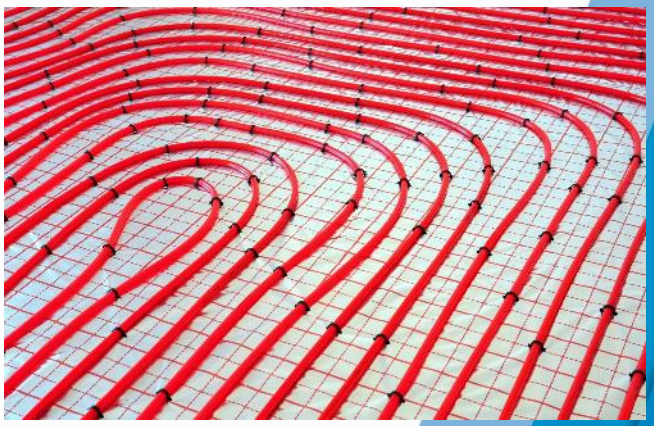
M1802.4 Blocked Vent Switch for Oil-fired Appliances

- Device will stop burner operation if venting system is obstructed.
- Requires a manual reset.
- Installed in accordance with the manufacturer's instructions.



M2101 Hydronic Piping Systems Installation

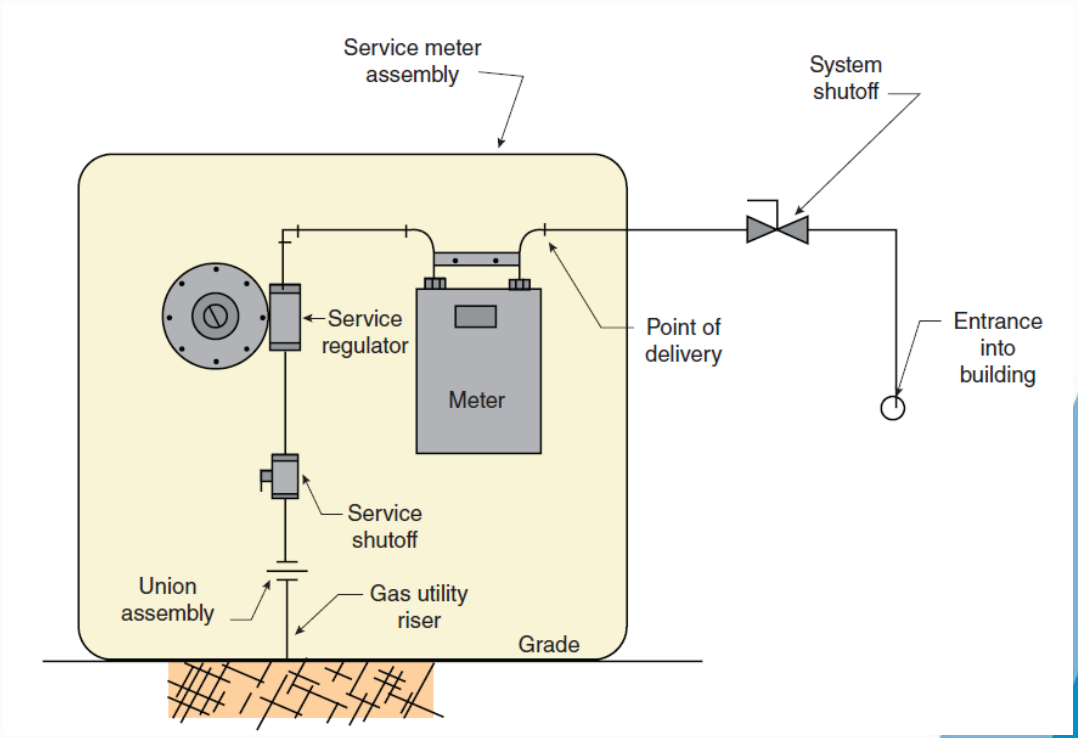
- Duplicates provisions from M2105 Ground-source Heat Pump Loop Piping systems
- Now applies to all hydronic piping systems
- M2103 Floor heating piping rating ~~100~~ 80 pounds psi at 180°F
- M2105 Ground-Source Piping: pipe ends per manufacturer



Chapter 24 – Fuel Gas

G2403 Point of Delivery and Service Meter Assembly Definitions

- Clarifies portions of piping system regulated by fuel gas provisions downstream of the point of delivery.



G2414.8.3 Threaded Joint Sealing

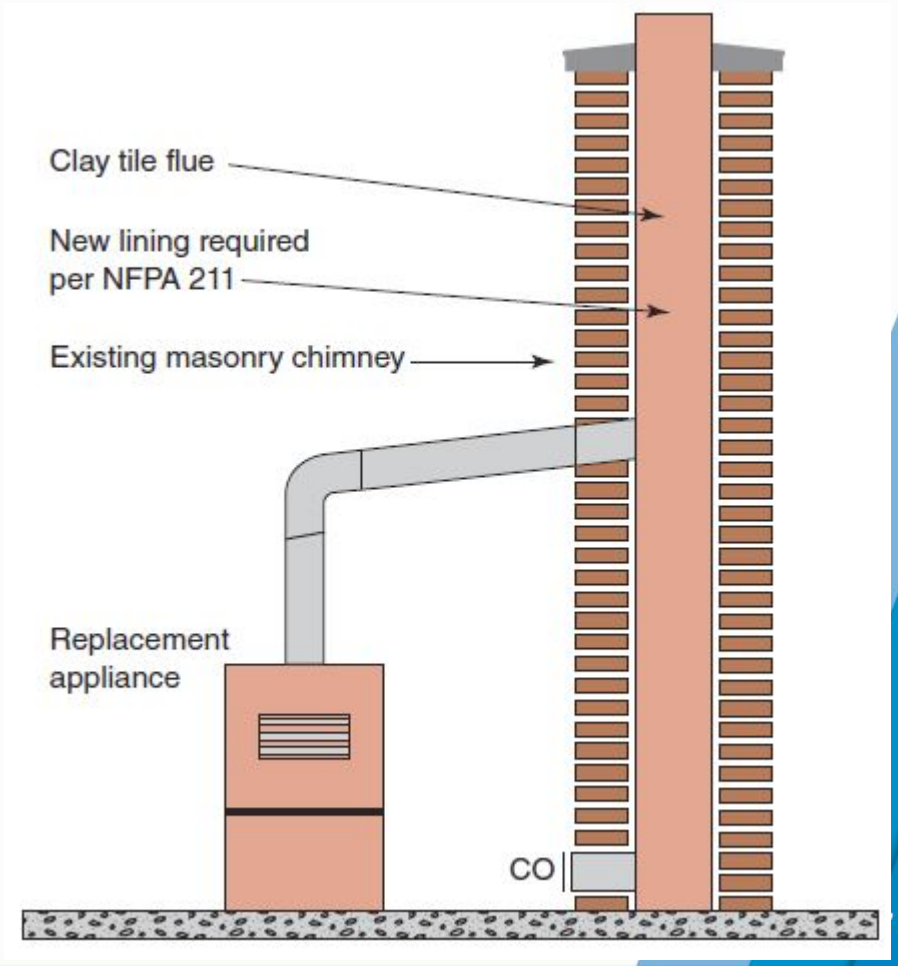
- Thread joint sealants are now required for assembling threaded joints in gas piping.

G2415.5 Fittings in Concealed Locations

- Plugs and caps have been added to the list of threaded fittings approved for concealed locations.

G2427.5.5.1 Chimney Lining

- The exception allowing an existing chimney to vent replacement appliances has been deleted.



G2427.8 Through-the-wall Vent Terminal Clearances

- Though-the-wall vent terminal clearance distances have been placed in a new table with a corresponding figure. (Fig.-G2427.8)

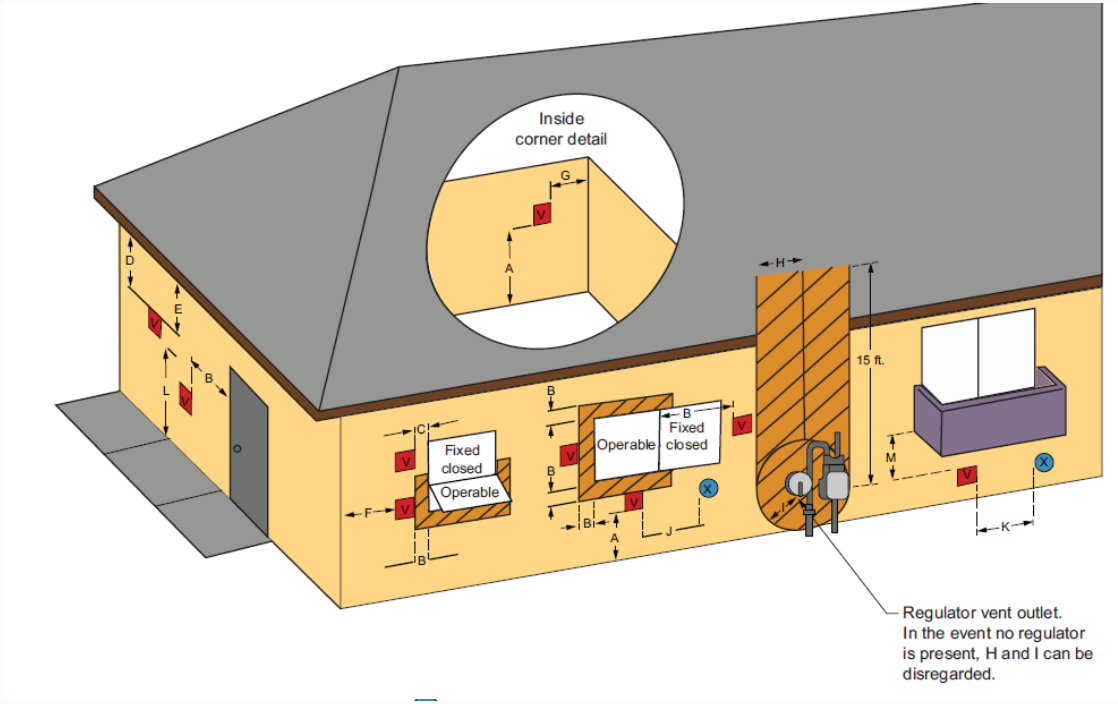


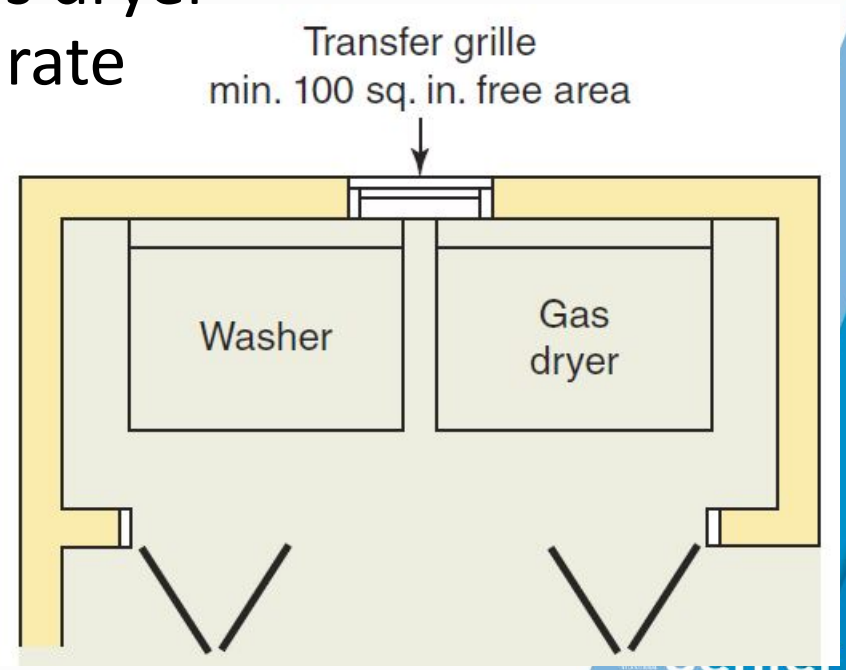
Table G2427.8 Through-the-wall Vent Terminal Clearances

Figure Clearance	Clearance Location	Minimum clearances for Direct- Vent Terminals	Minimum clearances for Non-Direct Vent Terminals
A	Clearance above finished grade level, veranda, porch, deck, or balcony	12 inches	
B	Clearance to window or door that is openable	6 inches: Appliances ≤ 10,000 Btu/hr 9 inches: Appliances > 10,000 Btu/hr ≤ 50,000 Btu/hr 12 inches: Appliances > 50,000 Btu/hr ≤ 150,000 Btu/hr Appliances > 150,000 Btu/hr, in accordance with the appliance manufacturer's instructions and not less than the clearances specified for nondirect-vent terminals in Row B	4 feet below or to side of opening or 1 foot above opening
C	Clearance to non-openable window	None unless otherwise specified by the appliance manufacturer	

Excerpt

G2439.5 Makeup Air for Dryer Installed in a Closet

- The requirement for a transfer opening for supplying makeup air to a closet designed for a gas dryer has been moved into a separate section.



G2447.2 Commercial Cooking Appliances Prohibited

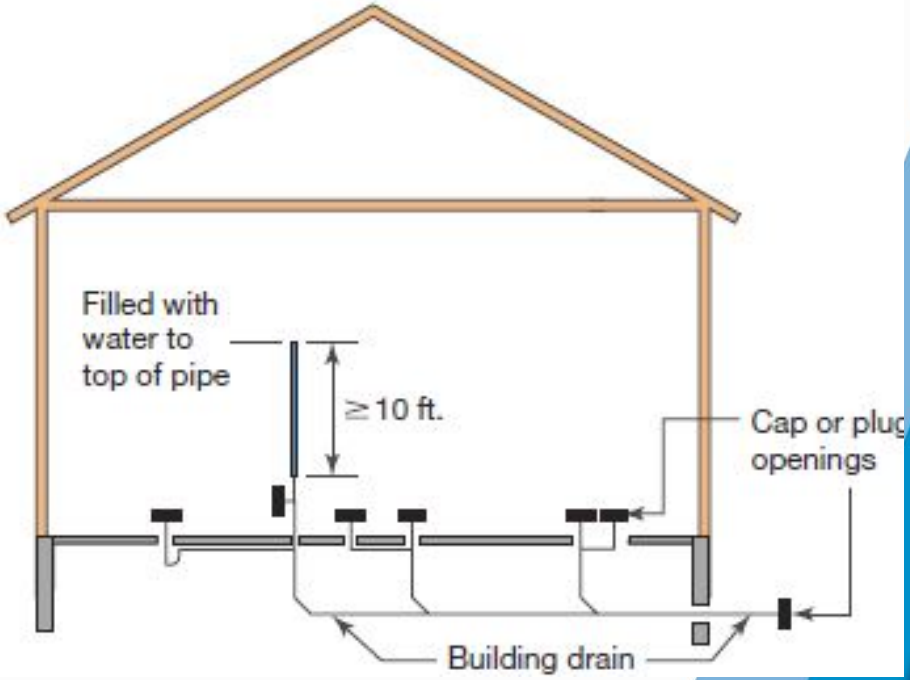
- Commercial gas cooking appliances are prohibited.

Chapters 25-33 – Plumbing

ICC LEARNING center

P2503.5.1 Drain, Waste and Vent Systems Testing

- The head pressure for a water test of DWV systems has increased to 10 feet.
  - Now matches the IPC.



P2503.5.1 Drain, Waste and Vent Systems Testing (continued)

- Air vacuum testing is now permitted for plastic piping DWV systems.

P2708.4, P2713.3 Shower and Bathtub Control Valves

- Addresses field adjustment and access to shower control valves.
- Lower flow shower heads need to be compatible with the shower control mixing valve.

P2904 Installation Practices for Residential Sprinklers

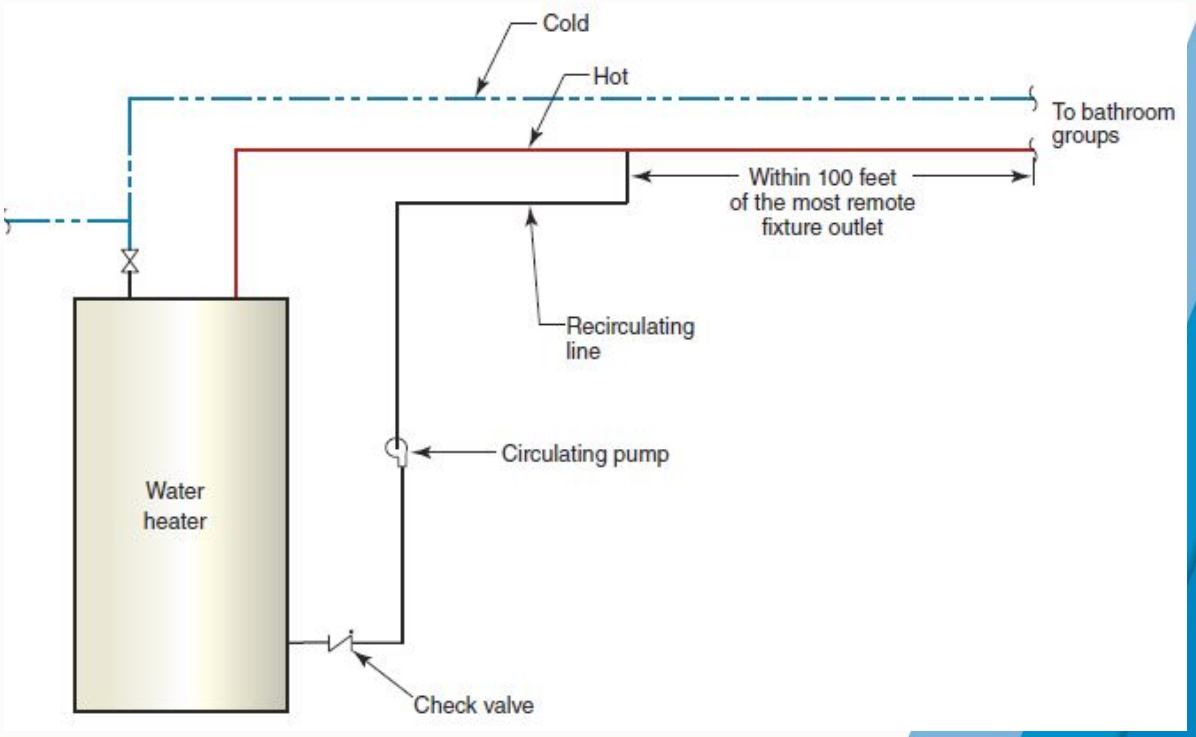
- Section P2904 for dwelling sprinklers is expanded to more closely align with NFPA 13D.
  - Permits intermediate temperature sprinklers
  - Allows a listed dry pipe residential sprinkler system for freeze protection

P2904 Installation Practices for Residential Sprinklers (continued)

- Permits a control valve on a standalone sprinkler system
- Protecting spaces with sloped or beamed ceilings per NFPA 13D
- Revises water meter table to correlate with NFPA 13D

P2905.3 Length of Hot Water Piping to Fixtures

- Limits the length of hot water piping serving fixtures to 100 ft. (IPC = 50 ft.)

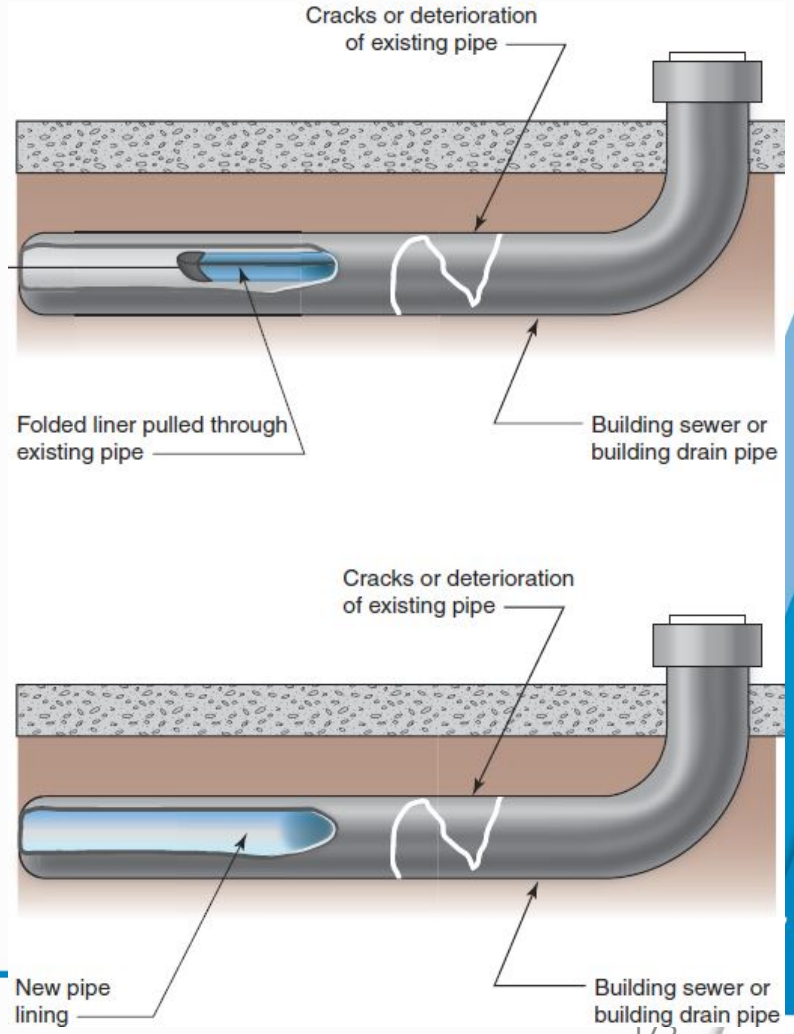


P3005.2.10.1 Removable Fixture Traps as Cleanouts

- Removable traps and removeable fixtures with integral traps are acceptable for use as cleanouts.

P3011 Relining of Building Sewers and Building Drains

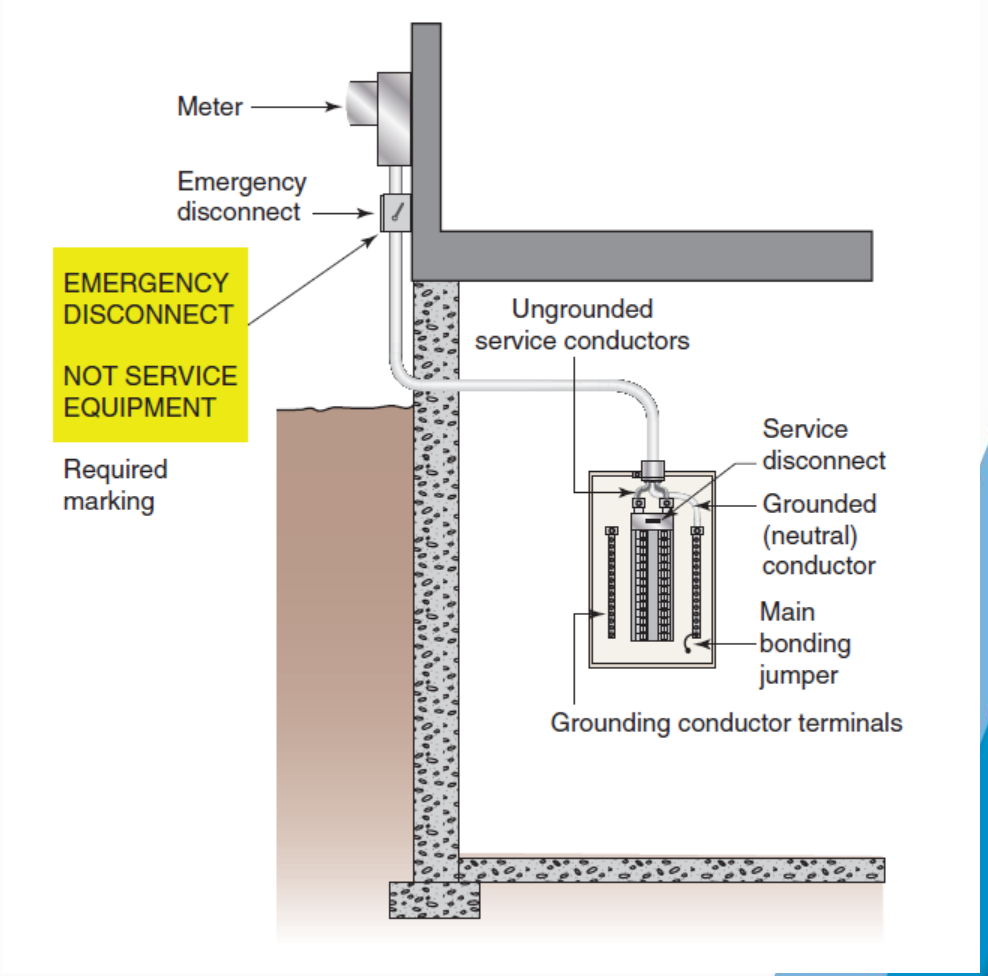
- Recognizes various available technologies for relining of existing building sewer and building drainage piping
- Clarifies inspection procedures



Chapters 34-43 – Electrical

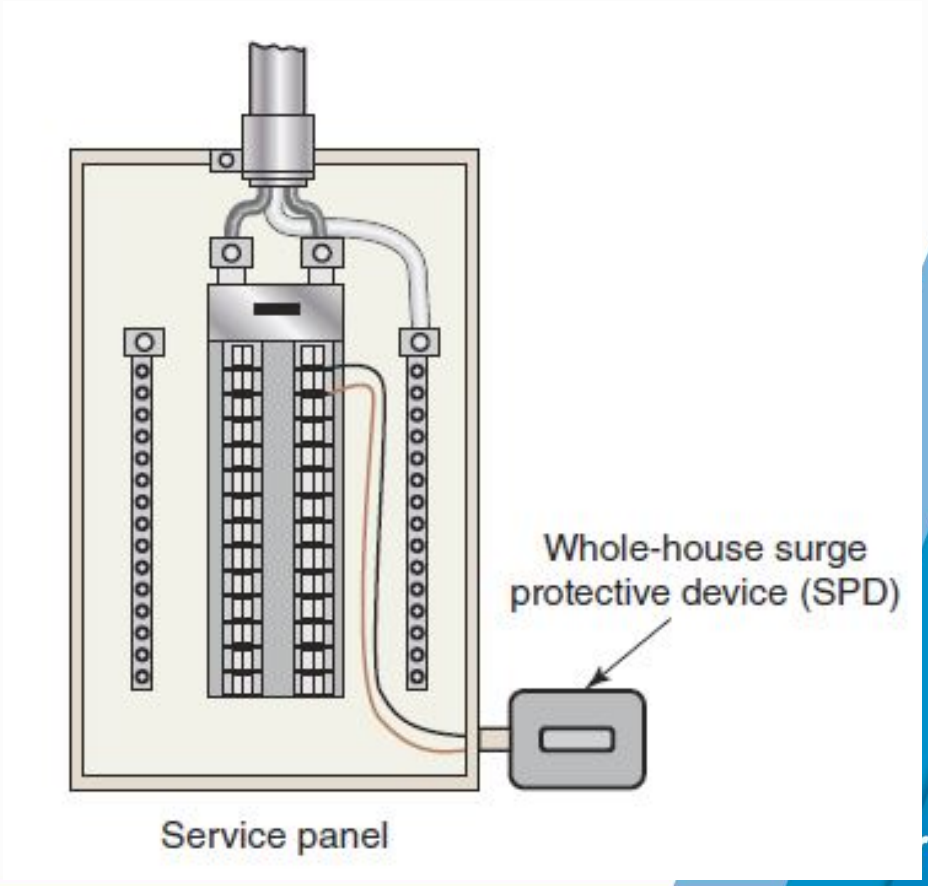
E3601.8 Emergency Service Disconnects

- An emergency service disconnect is required in a readily accessible outdoor location.



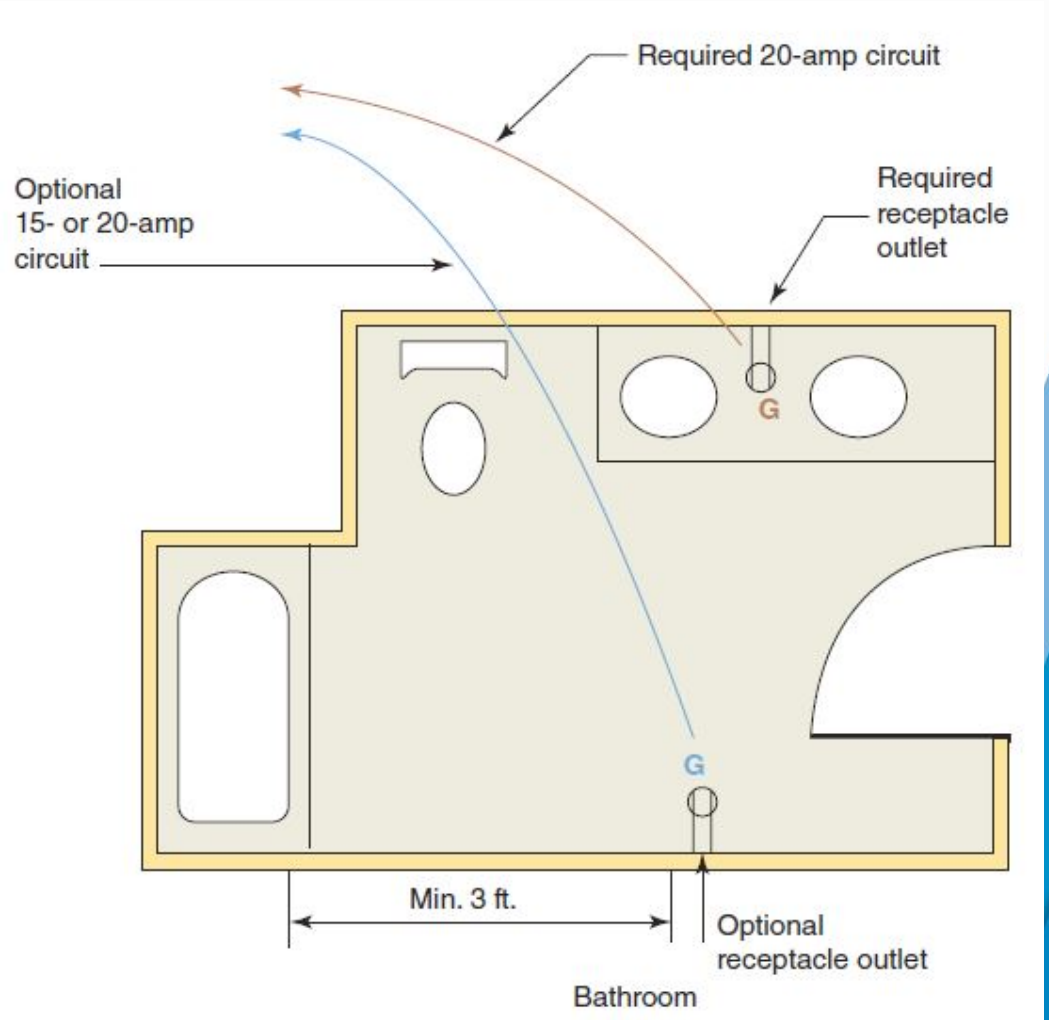
E3606.5 Service Surge-Protective Device

- A surge-protective device (SPD) is now required at the service panel.



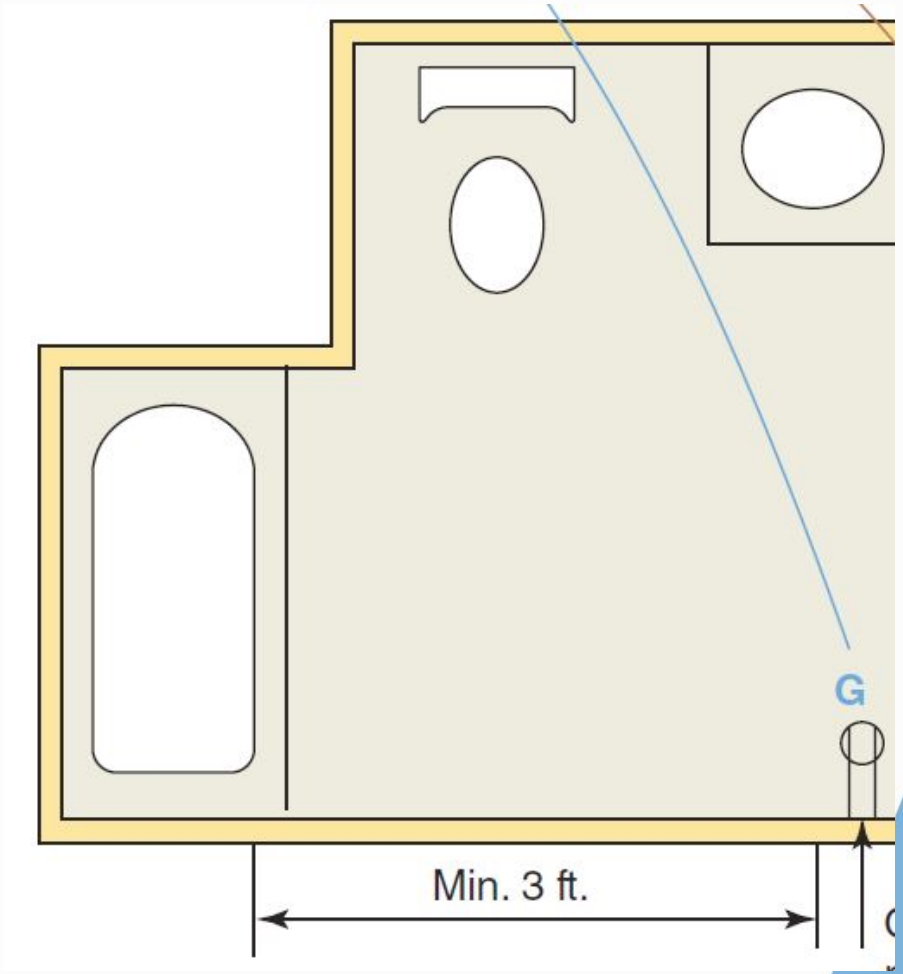
E3703.4 Bathroom Branch Circuits

- Only the required bathroom receptacle outlets or those serving a countertop need to be on the dedicated 20-amp bathroom circuit.



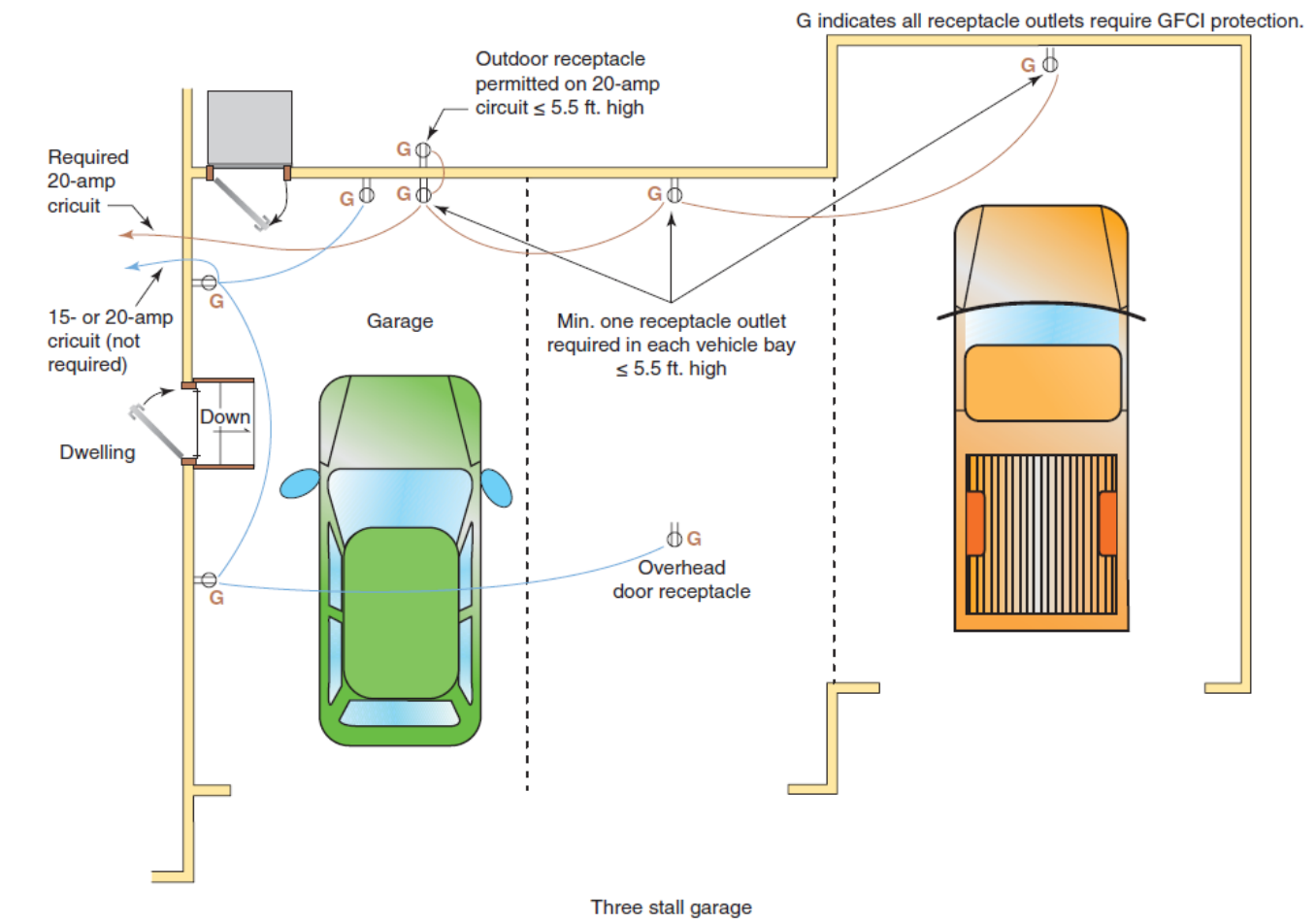
E3703.4 Bathroom Branch Circuits

- Note new provision in E4002.11 prohibits receptacle outlets within 3 feet horizontally from bathtub rim or shower stall threshold.



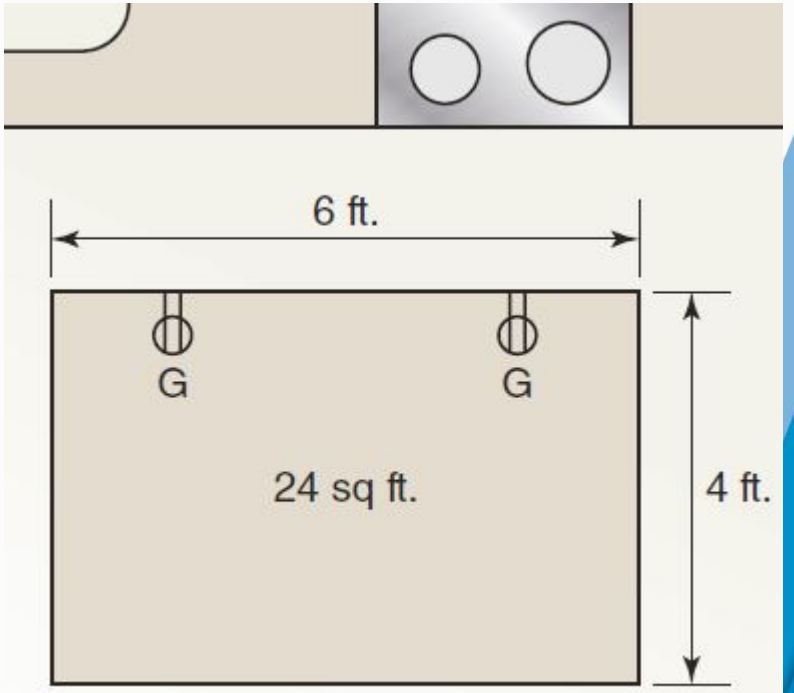
E3703.5 Garage Branch Circuits

- Only the required receptacle outlets must be on the 20-amp dedicated circuit for garages.



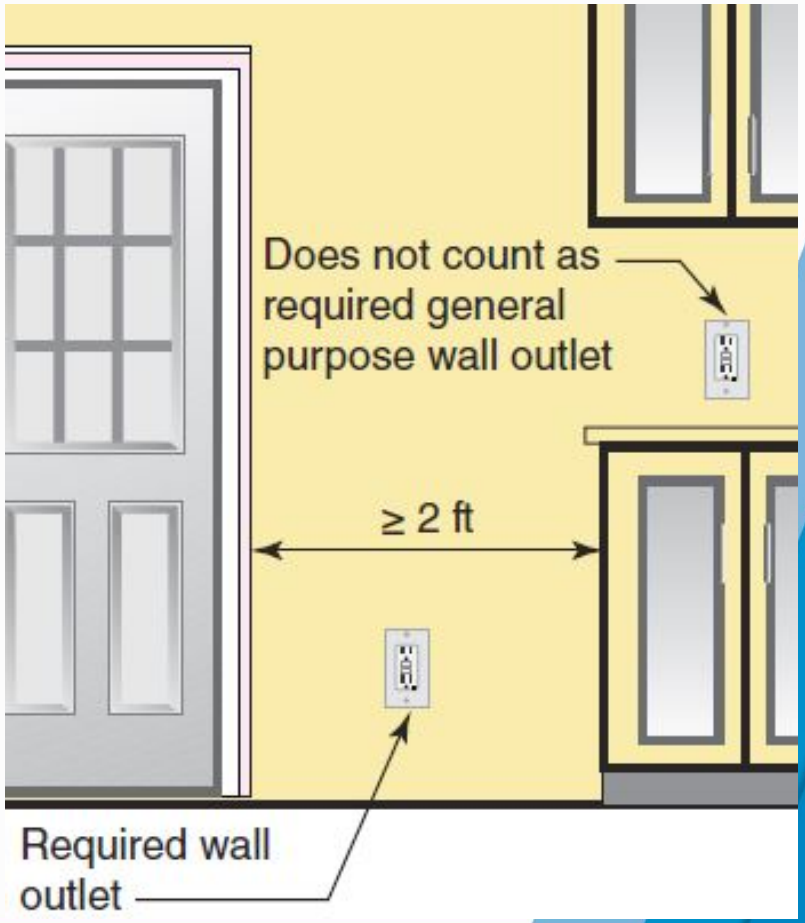
E3901.4.2 Kitchen Countertop and Work Surface Receptacles

- The number of receptacle outlets required for peninsular and island countertops in kitchens is determined by the area of the countertop surface.
  - One for the first 9 sq ft or fraction thereof
  - One for every additional 18 sq ft or fraction thereof



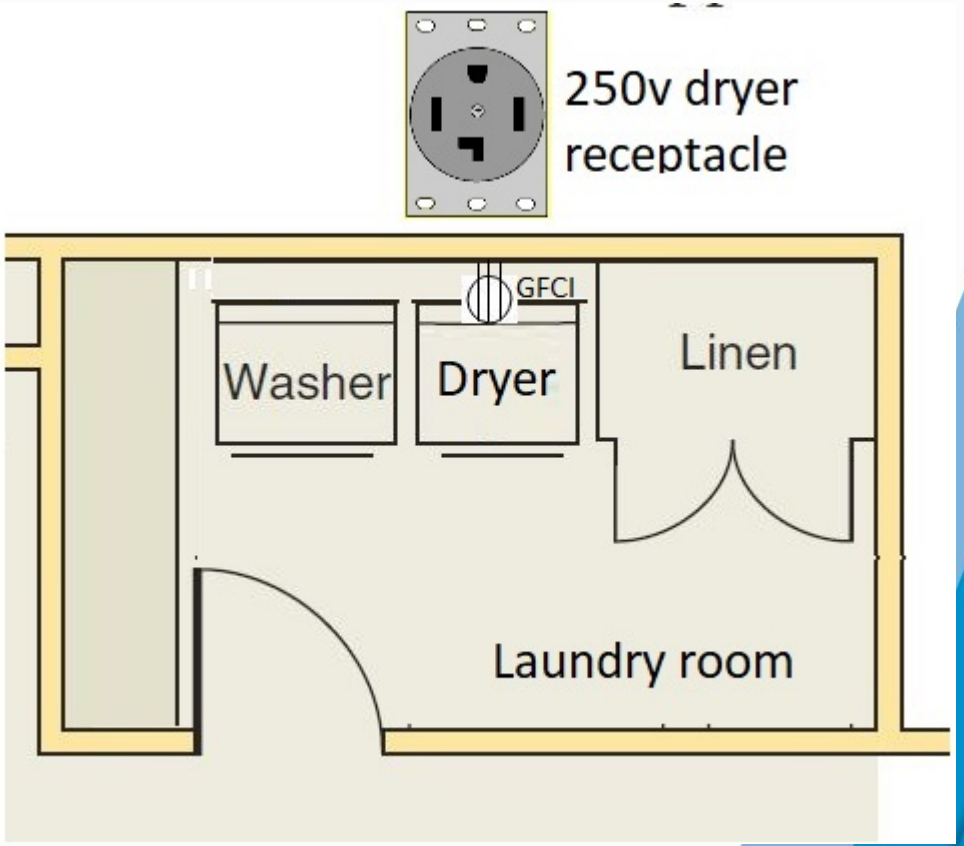
E3901.4 Kitchen Countertop and Work Surface Receptacles

- Countertop and work surface receptacles in kitchen areas cannot be counted as a required general-purpose wall space receptacle outlet.



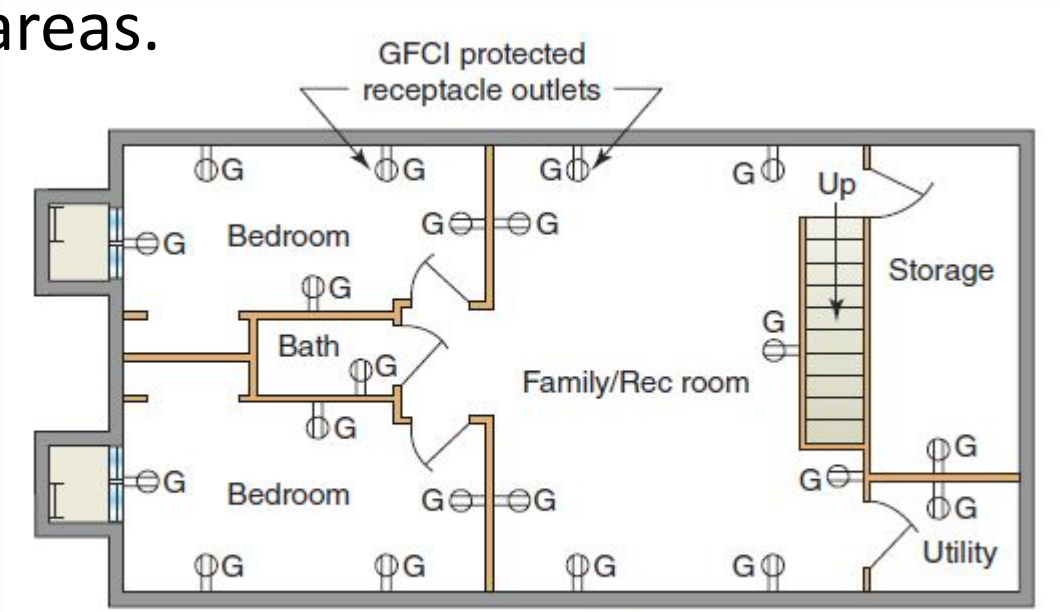
E3902 GFCI Protection for 250-Volt Receptacles

- GFCI protection is required for up to 250-volt receptacles in the identified areas.
- The 20-amp limitation has been removed.



E3902.5 GFCI Protection for Basement Receptacles

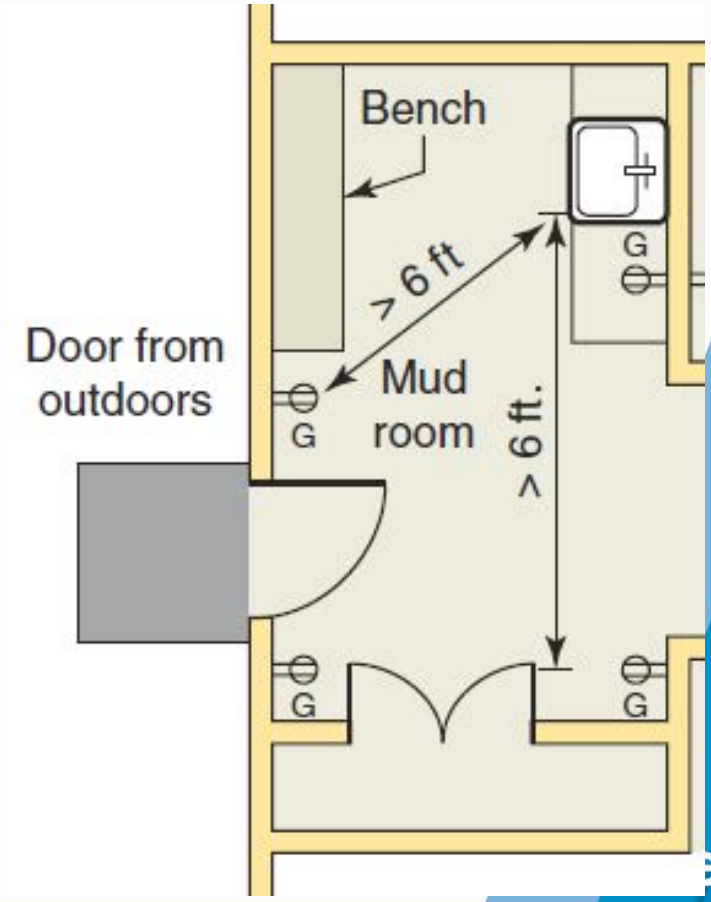
- The requirement for GFCI protection in unfinished basement areas has been expanded to include all basement areas.



Basement floor plan

E3902.10 GFCI Protection for Indoor Damp and Wet Locations

- GFCI protection is now required for damp and wet locations not included in the other 10 areas requiring GFCI protection.



Appendices

AF104 Radon Testing

- Procedures for Radon testing are added to Appendix F.

AF104 Testing

Where radon-resistant construction is required, radon testing shall be performed:

1. After the dwelling passes its air tightness test.
2. After the radon control system and HVAC installations are complete. The HVAC system shall be operating during the test. Where the radon system has an installed fan, the dwelling shall be tested with the radon fan operating.
3. At the lowest occupied floor level, whether or not that space is finished. Spaces that are physically separated and served by different HVAC systems shall be tested separately.

AF104 Testing

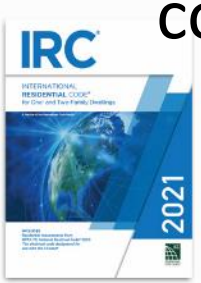
4. Not in a closet, hallway, stairway, laundry room, furnace room, bathroom or kitchen.
5. With a commercially available radon test kit or testing shall be performed by an approved third party with a continuous radon monitor. Testing with test kits shall include two tests, and the test results shall be averaged.
6. Windows and exterior doors closed at least 12 hours prior to the testing.
7. By the builder, a registered design professional, or an approved third party.

AF104 Testing

8. Over not less than 48 hours or not less that the period specified by the testing device manufacturer, whichever is longer.
9. Written radon test results shall be provided by the test lab or testing party. The final written test report with results less than 4 pCi/L shall be provided to the code official.
10. Where the radon test result is 4 pCi/L or greater, a fan for the radon vent pipe shall be installed.
11. Where the radon test result is 4 pCi/L or greater, the system shall be modified and retested.

Appendix U – Cob Construction

- A new section on cob construction is added which has requirements which differ slightly from light straw-clay and strawbale construction.
- Cob construction is also called monolithic adobe construction.



Appendix W – 3D Construction

- Appendix W adds requirements for 3D printed homes.

Photo Courtesy of ICON

Final Reflection

- What? What happened and what was observed in the training?
- So what? What did you learn? What difference did this training make?
- Now what? How will you do things differently back on the job as a result of this training?

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