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# **Significant changes in the 2021 Virginia Residential Code**

**HENRICO COUNTY**

Department of Building Construction and Inspections



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## Virginia Residential Code

- The Virginia Residential Code (VRC) combines the 2021 International Residential Code (IRC) and the 2021 Virginia state amendments into one document.
- These are the most significant changes we found in the 2021 VRC. If you see a change made in the 2021 VRC that we did not cover and is of importance, please let us know.



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## Chapter 3

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## Shipping Containers - R301.1.4



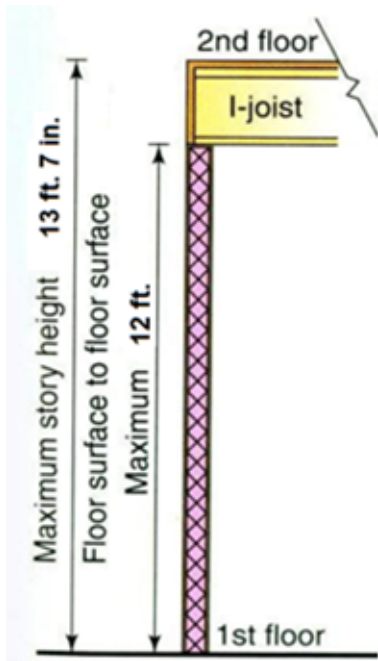
- Intermodal shipping containers repurposed for use as buildings or structures shall be designed in accordance with IBC section 3115.
- R-5 structures will be reviewed as a residential, single-family dwelling permit.



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## Story Height - R301.3 #1 Exception



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- Story height can now extend to a maximum of 13'-7" (in lieu of 11'-7") provided that:
  - A) the wall stud height does not exceed 12 feet;
  - B) No. 2 grade lumber or better is used. Stud side and spacing shall be per Table R602.3(6). The number of studs adjacent to openings shall be per Table R602.7.5.

OR

- C) an engineered design is provided for the wall framing members.

Wall bracing must also be in accordance with R602.10, and studs shall be laterally supported at the top and bottom plate in accordance with R602.3.



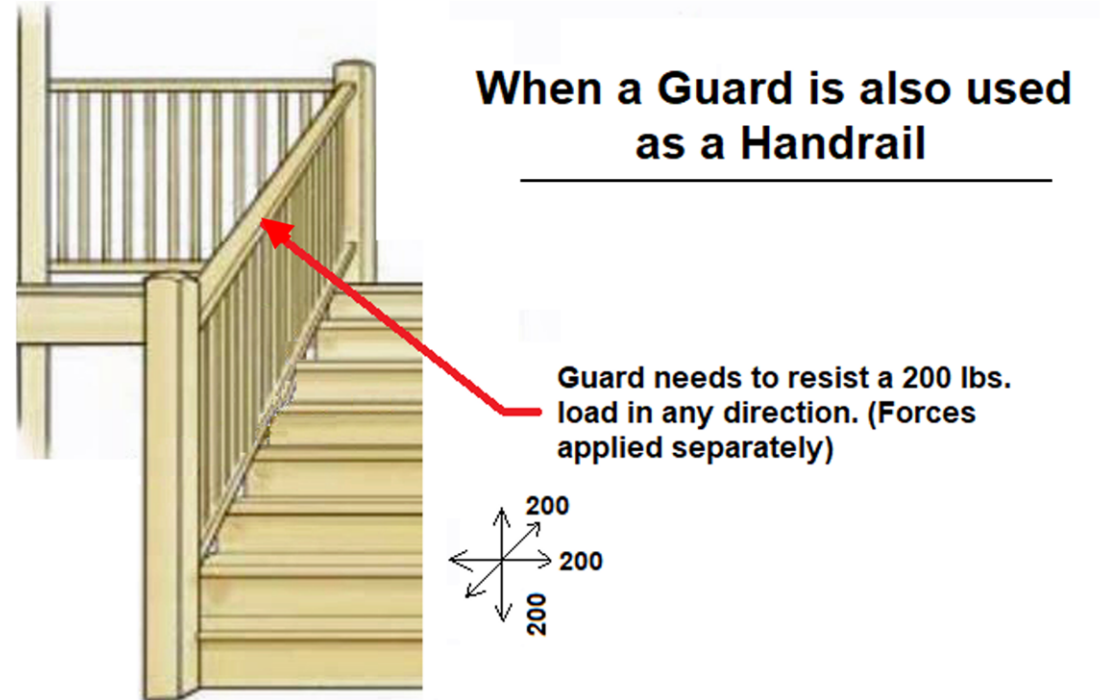
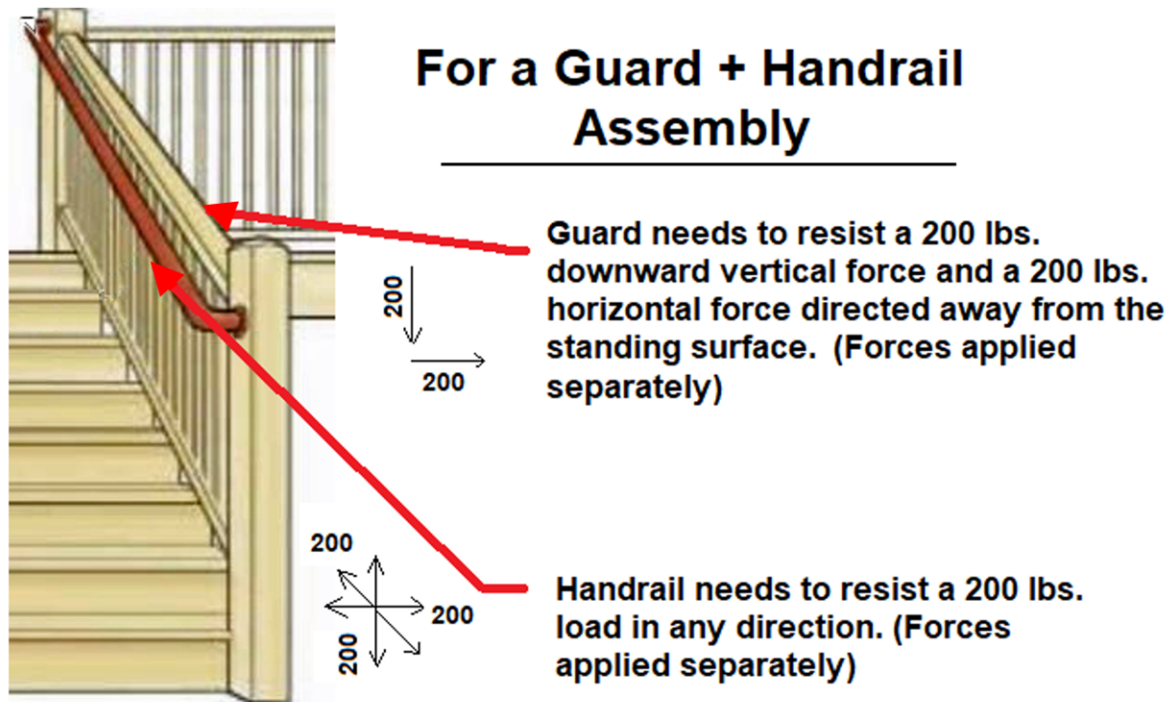


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## Handrail and guards - Table R301.5 footnotes “d” and “i”

- Table R301.5 footnotes “d” and “i” clarify when and where the 200 lbs. concentrated load needs to be applied to a handrail and/or guard.





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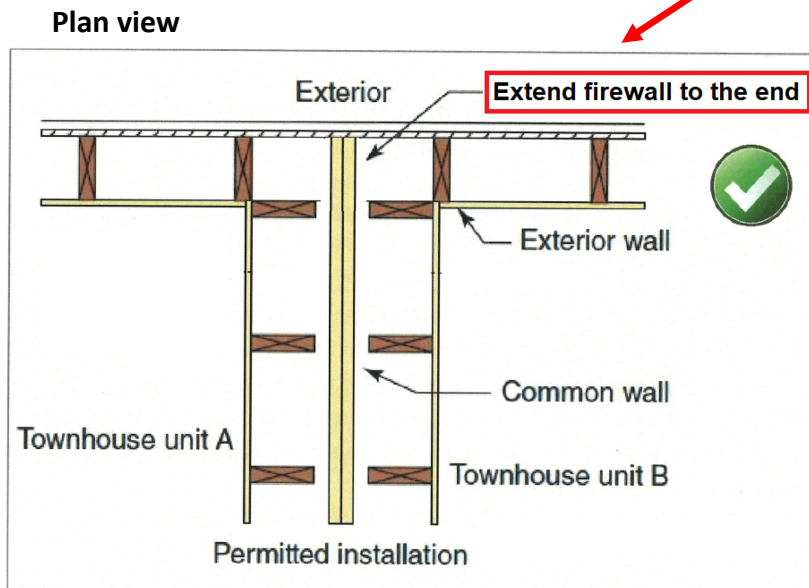
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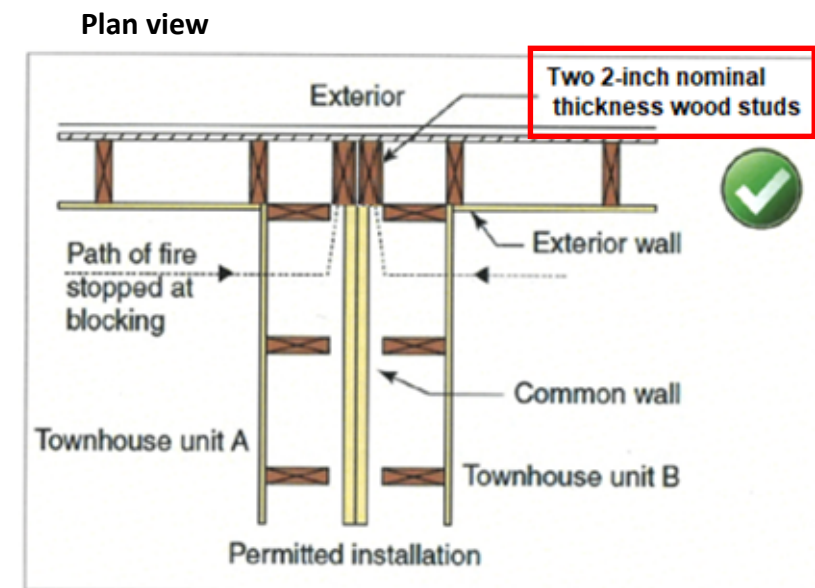
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## Fire-Rated Walls Separating Townhouse Units - R302.2.2

- The fire-rated walls required between townhouse units shall:
  - extend to and be tight against the exterior sheathing of the exterior walls OR extend to the inside face of the exterior walls without stud cavities (two, 2x material must be used to fill the cavities);
  - extend to the underside of the roof sheathing.



OR





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## Natural Ventilation – R303.1 Exception #1

- The 2018 code currently requires that individual rooms in dwellings to have glazing that opens to the exterior, with an opening area that is not less than 4% of the floor area being served.

- With the new 2021 code exception, you do not need openable windows provided the following conditions exist:
  - A) In habitable bedrooms when it's not a required EGRESS opening AND the whole-house ventilation makes at least 0.35 air changes per hour to the room served by the glazed opening.
  - B) In kitchens when the local exhaust system is installed per M1505 (which is the whole house ventilation requirement). The exhaust rate of the system shall be 100 cfm intermittent or 25 cfm continuous, per M1505.4.4.



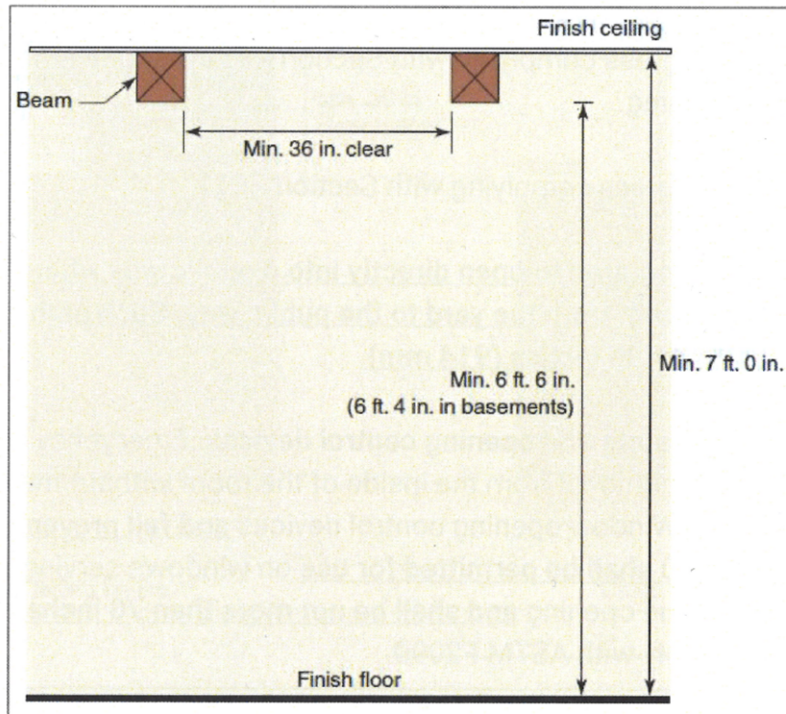
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## Minimum Ceiling Height – R305.1 Exception #4



- Beams and girders can now project a minimum of 6'-6" from the finished floor, provided there is not another beam or girder located within 36 inches horizontally.
- Ducts and duct chases are excluded from this exception. They may not encroach on the finished floor height. This is for structural projections only.
- Basement exceptions (R305.1 Exception #3) unchanged.



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## Minimum Ceiling Height – R305.1 Exception #4 (con't)

- There is a similar provision in this section that allows for beams, girders, and ducts to project not less 6'-4" from the finished floor area, but it was for *basements only*.

This is significant because this 6'-6" projection can be located *anywhere* in the dwelling.



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### **Broken Glass Retention Screens for Skylights and Other Sloped Glazing – R308.6.5 and R308.6.7**

- Broken glass retention screens are not required for skylights when laminated glass is used.
- When screens are required, they must be installed within 4” of the skylight glass.





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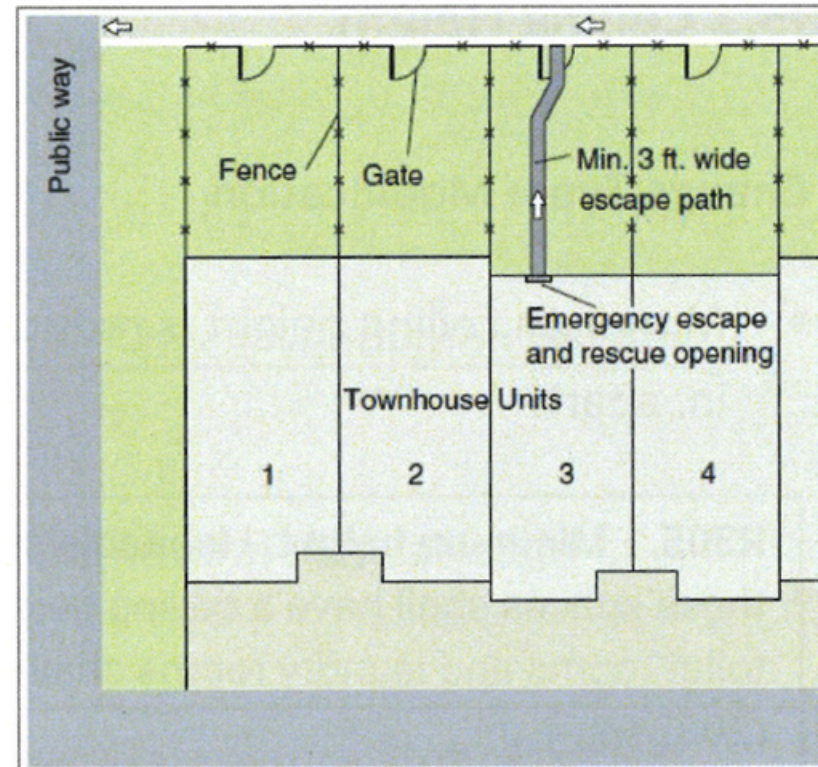
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## Emergency Escape and Rescue Openings (EGRESS) – R310.1

- EGRESS paths that open directly into a public way, yard, or court shall have a minimum width of 36 inches.





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## Emergency Escape and Rescue Openings (EGRESS) – R310.2.4



**R310.2.4 Emergency escape and rescue openings under decks, porches and cantilevers.** Emergency escape and rescue openings installed under decks, porches and cantilevers shall be fully openable and provide a path not less than 36 inches (914 mm) in height and 36 inches (914 mm) in width to a yard or court.

- The code change added “cantilevers” to the list AND added the new min. 36” width path requirement (the previous slide discussed this).





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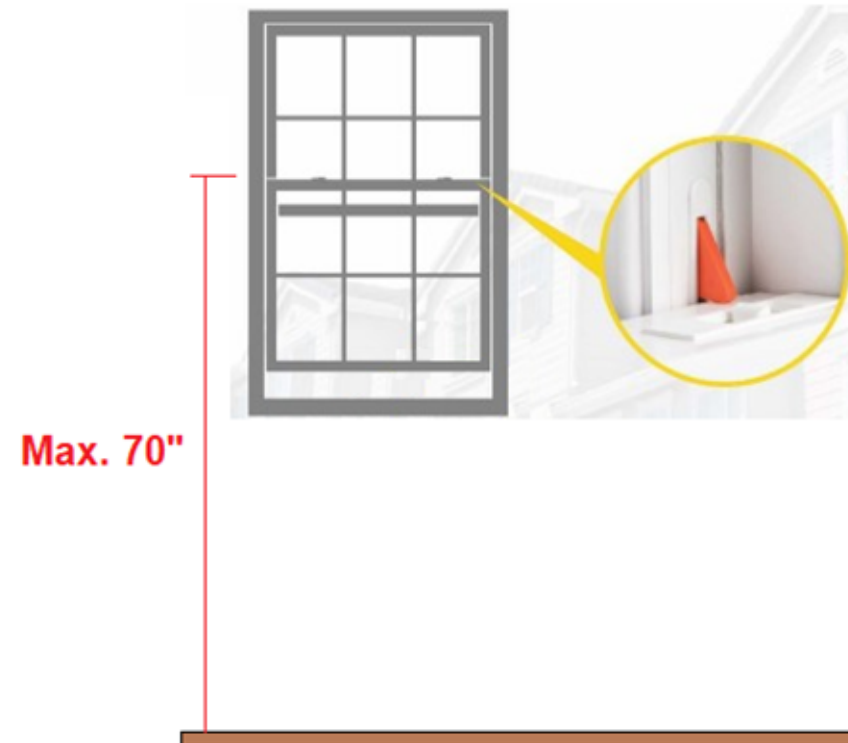
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## Operational constraints used on EGRESS window openings – R310.1.1

### Chapter 3

# Building Planning

- Window opening control devices and window fall prevention devices, if installed on a required EGRESS window, shall be located no more than 70” above the finished floor surface.





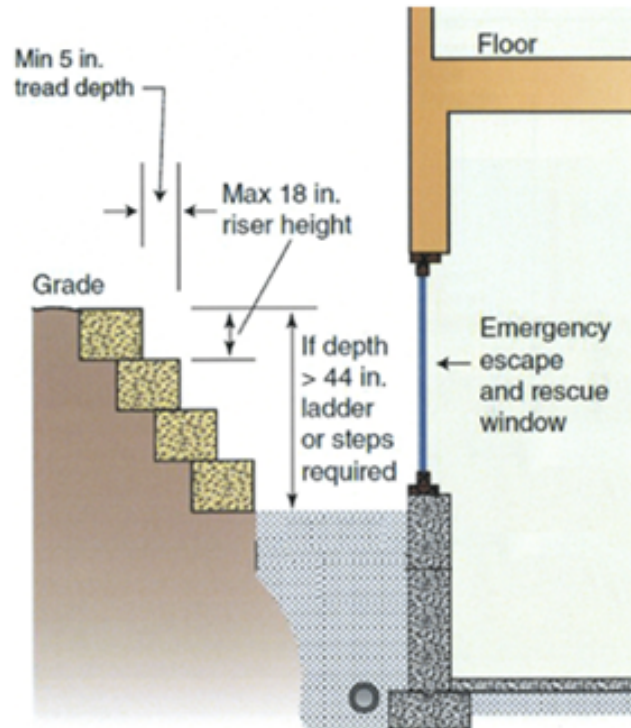
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## Stairways for Basement Area Well EGRESS – R310.4.2.2



- In lieu of a ladder, a stairway may be used for an area well. The stair requirements of R311.7 need not comply (such as handrail requirements).
- There are other requirements, however:
  - The min. width of the stairway needs to be 12 inches.
  - The min. tread depth needs to be 5 inches.
  - The max. tread height needs to be 18 inches.
- Note: The minimum 9 square foot floor area and minimum 36" opening clearance must still be maintained.



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## Required EGRESS Windows in Existing Basements – R310.7

**REMODELING ONLY**

- If you need to add an EGRESS window to an existing basement (i.e. due to renovations, adding new bedrooms, etc.) AND you have an existing or replacement window that is a min. 4 SF, min. 22” clear opening height, and min. 20” clear opening width, then the window may be used as an EGRESS window.

- The max. 44” sill height requirement still applies.

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## Stairways and Ramps - R311.7 and R311.8 Exceptions

- Stairways that:
  - 1) do not serve a building, porch, or deck;
  - 2) lead to a non-habitable attic; or
  - 3) lead to a crawlspace

do not need to comply with the stairway provisions of R311.7 (ie. riser/tread depth, handrails, etc.).

- Ramps that do not serve a building, porch, or deck do not need to comply with the ramp provisions of R311.9 (ie. max. slope, handrails, etc.).





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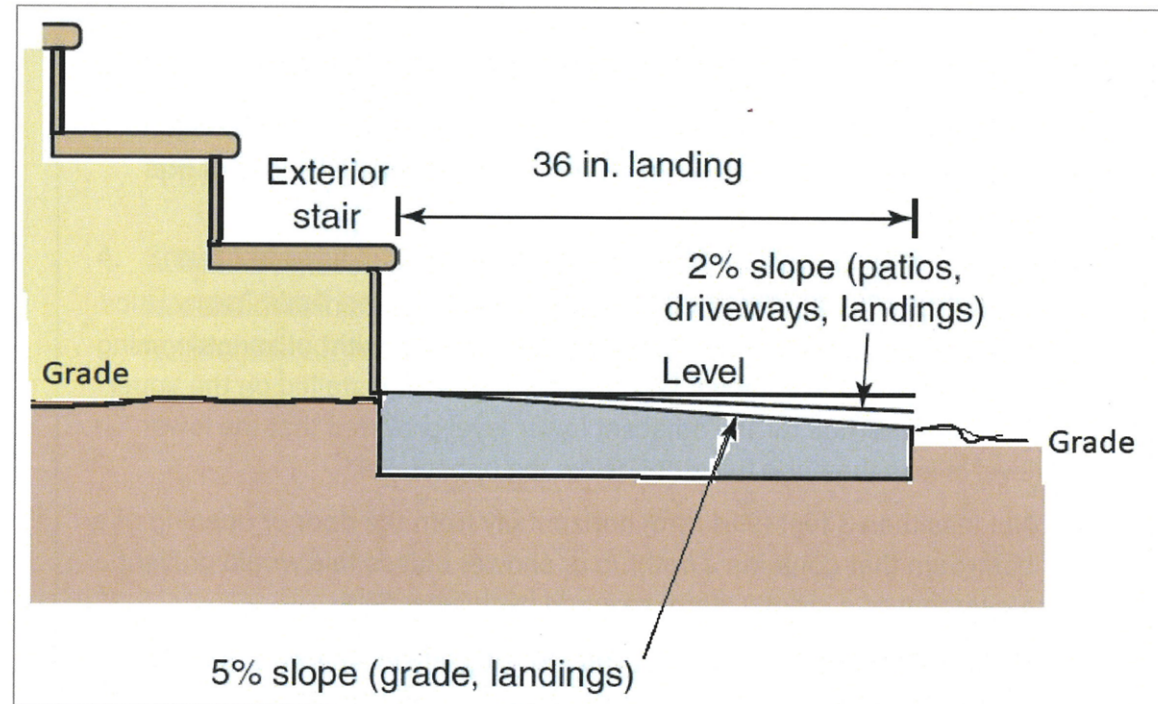
## Chapter 3

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## Stairway Landings – R311.7.7 Exception

- Stairway landings that are required to drain surface water may be sloped no steeper than 1:20 in the direction of travel, in lieu of the code-required 1:48.







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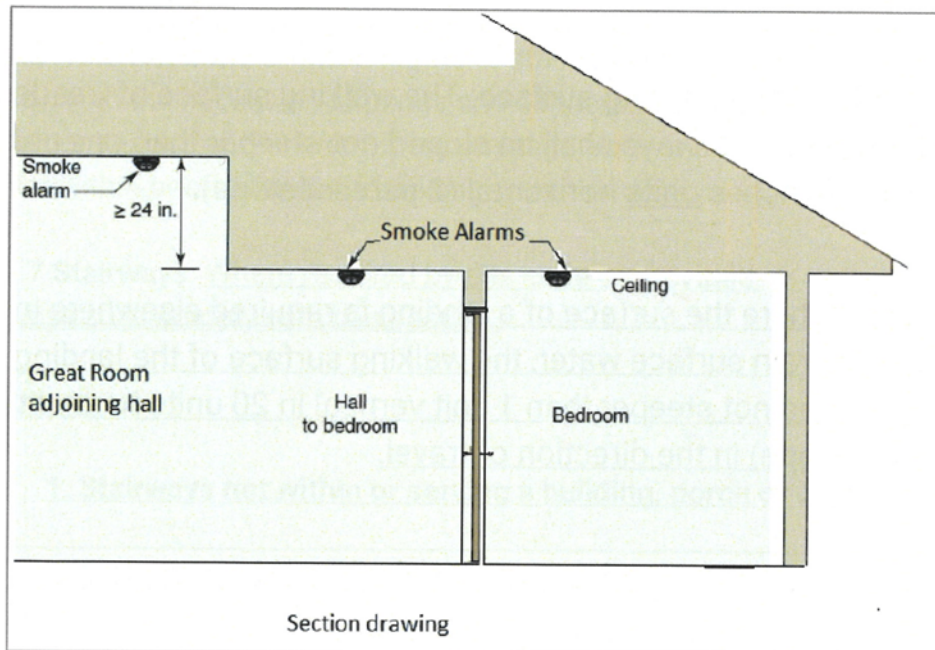
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## Smoke Alarm Locations – R314.3 #5

- Smoke alarms shall be located in the hallway and in the room open to the hallway in dwelling units where the ceiling height of a room open to a hallway serving the bedrooms exceeds that of the hallway by 24 inches.





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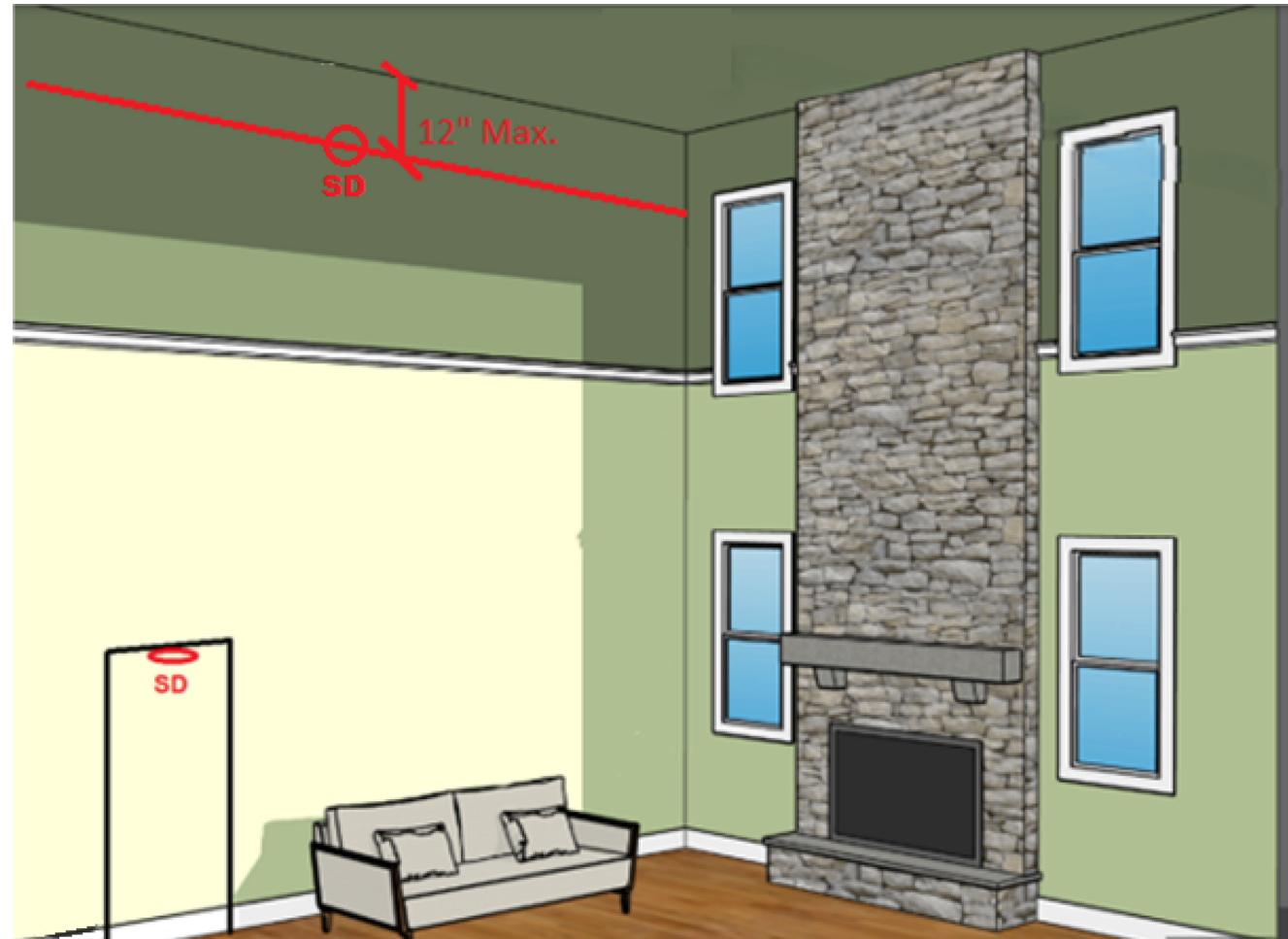
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## Smoke Alarm Locations – R314.3 #5 (con't)

- May be installed on wall or ceiling within 12 inches from the height point of the ceiling, if in accordance with manufacturer's installation instructions.





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## Smoke Alarm Installation Near Cooking Appliances – R314.3.1 #4

- Smoke alarms listed and marked “helps reduce cooking nuisance alarms” can be installed not less than 6 feet horizontally from a permanent installed cooking appliance.







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## Termite Certificate R318.1

### When to submit:

- Submission of the Termite Certificate is the responsibility of the permit applicant. **Timing is critical** to prevent delays in processing (i.e. obtaining a certificate of occupancy). The Certificate needs to be reviewed and approved for a Final Building Inspection.

### Where to submit:

- The Termite Certificate must be uploaded to your BuildHenrico portal at the time of your Final Building inspection request.
- Watch the following video for instructions:  
<https://www.youtube.com/watch?v=dxAZx9cWMtE>



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## Stationary Fuel Cell Power Systems - R330

Chapter 2 definition – A stationary energy generation system that converts the chemical energy of a fuel and oxidant to electric energy (DC or AC) by an electrochemical process.

Stationary fuel cell power systems in new and existing structures shall comply with IFC section 1206, which provides requirements for equipment and installation, fire separation, vehicle impact protection, and ventilation.

- There are 3 types of systems:
  - A) **Field-fabricated system** – a system that is assembled on site and is not a pre-engineered or pre-packaged, factory-assembled system.
  - B) **Pre-engineered system** – a system consisting of components and modules that are produced in a factory and shipped to the job site for assembly.
  - C) **Pre-packaged system** – a system that is factory-assembled as a single, complete unit and shipped as a complete unit for installation at the job site.



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# Building Planning

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## Stationary Fuel Cell Power Systems - R330

If installing the stationary fuel cell power systems, vehicle protection is governed by VSFPC R312.2.

**312.2 Posts.** Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.
5. Located not less than 3 feet (914 mm) from the protected object.



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## Anchor Bolts – R403.1.6



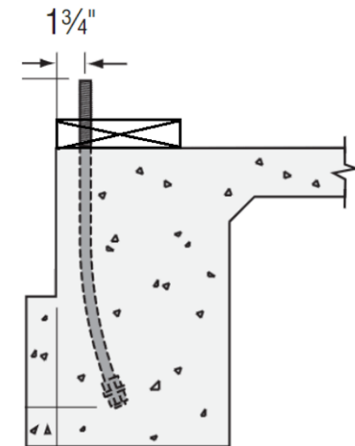
## Chapter 4

# Foundations

- When anchor bolts are placed in wet concrete and the bolt resists placement or the consolidation of concrete around the bolt is impeded, the concrete shall be vibrated to ensure full contact between the bolt and concrete.

- In other words, don't try to hammer the bolts into the wet concrete!

- As a reminder, anchor bolts are required to have a minimum of 1 3/4 inch edge distance from the sill plate.





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## Foundation / Basement Waterproofing – R406.2



### Chapter 4

# Foundations

- 6-mil poly vinyl chloride and 6-mil polyethylene can no longer be used for waterproofing.
  - The following materials may still be used for waterproofing:
    - A) Two-ply hot-mopped felts
    - B) 55 lbs. roll roofing
    - C) 40-mil polymer-modified asphalt
    - D) 60-mil flexible polymer cement
    - E) 1/8 inch cement-based, fiber-reinforced waterproof coating
    - F) 60-mil solvent-free, liquid-applied synthetic rubber



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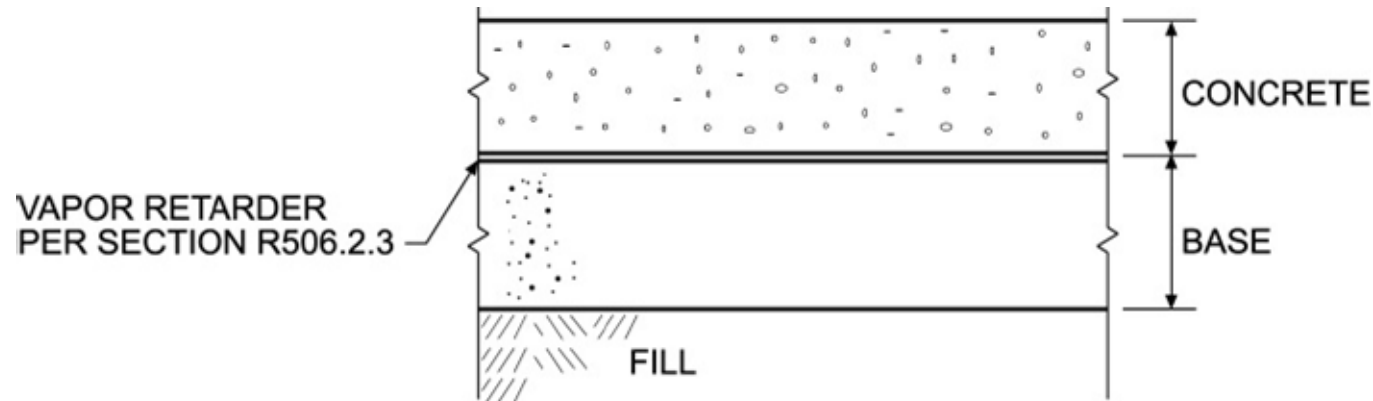
## Chapter 5

# Floors - Concrete (On Ground)

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## Vapor retarder – R506.2.3

- Concrete slab-on-grade floors now require 10-mil vapor barrier (The previous code requirement was 6-mil).







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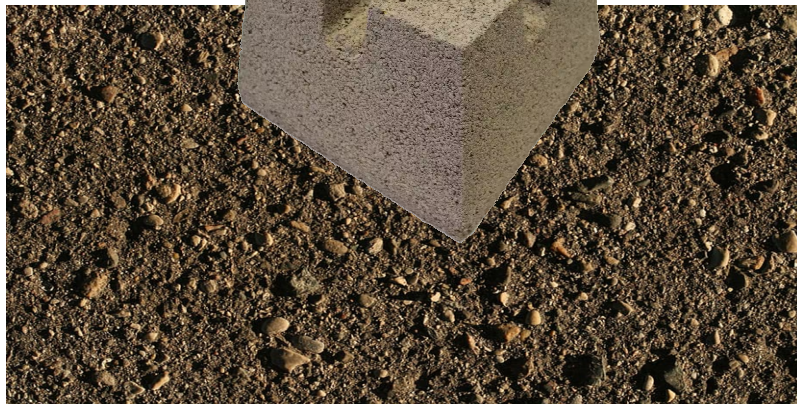
## Chapter 5

# Floors – Exterior Decks

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## Footing exceptions – R507.3

JOISTS ONLY! NO  
BEAMS, NO POSTS!



- If less than 200 square feet, and less than 20” above grade (measured from any point within 36”), deck joists are permitted to bear directly on precast concrete pier blocks at grade. Beams and posts are NOT permitted to be supported this way.





# Floors – Exterior Decks

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## Minimum footing size – R507.3.1

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

- Footings supporting 5 sq ft or less of tributary area may be 7”x7” square, or 8” diameter (previous minimum was 12”).
- See Table R507.3.1 for other reduced footing widths, depending on tributary area and soil bearing.  
[http://codes.iccsafe.org/content/VARC2021P1/chapter-5-floors#VARC2021P1\\_Ch05\\_SecR507.3.1](http://codes.iccsafe.org/content/VARC2021P1/chapter-5-floors#VARC2021P1_Ch05_SecR507.3.1)
- The footing table ranges from 5 ft<sup>2</sup> to 160 ft<sup>2</sup> of area.
- SOIL REPORT STILL GOVERNS WHEN REQUIRED!





# Floors – Exterior Decks

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## Deck posts – R507.4

- Deck post maximum height table has been expanded, to include tributary area and post species.

[http://codes.iccsafe.org/content/VARC2021P1/chapter-5-floors#VARC2021P1\\_Ch05\\_SecR507.4](http://codes.iccsafe.org/content/VARC2021P1/chapter-5-floors#VARC2021P1_Ch05_SecR507.4)

Post Species	Post Size	Tributary Area (ft <sup>2</sup> )							
		20	40	60	80	100	120	140	160
Maximum Deck Post Height (feet-inches)									
Southern Pine	4 × 4	14-0	13-8	11-0	9-5	8-4	7-5	6-9	6-2
	4 × 6	14-0	14-0	13-11	12-0	10-8	9-8	8-10	8-2
	6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0



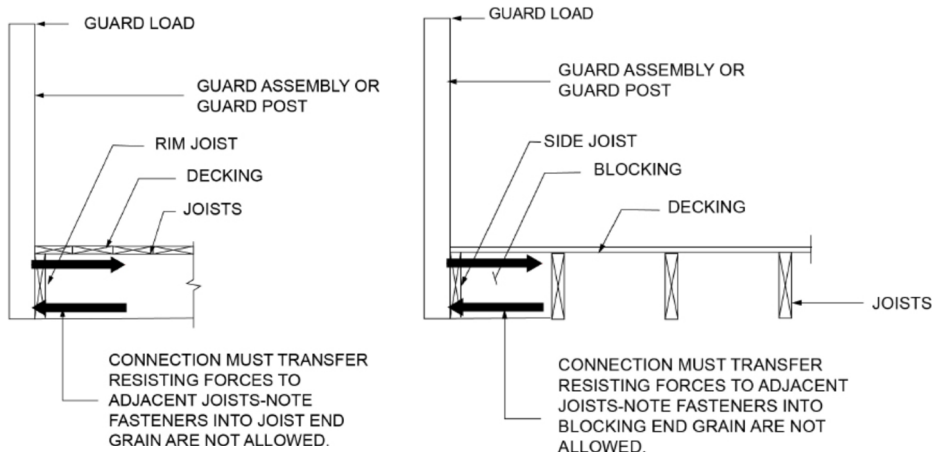
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## Chapter 5

# Floors – Exterior Decks

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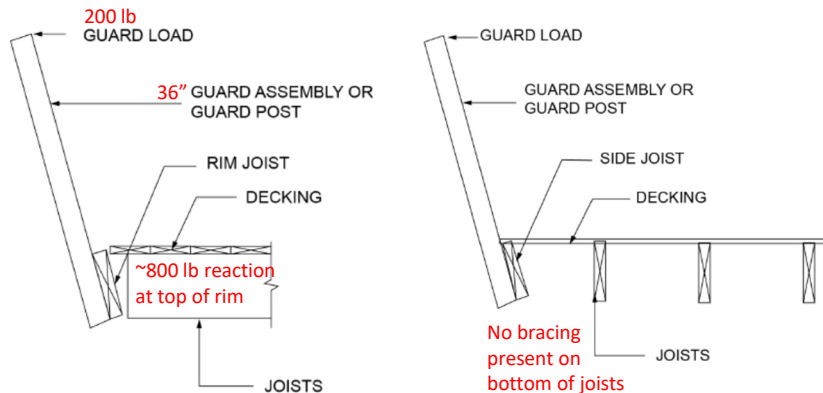
## Exterior guards – R507.10



- Deck guard post section added. Codifies specific design options that meet the live load requirements in Table R301.5.
- Block and anchor deck rim/band joists where guard rail posts are attached, to prevent twisting or pullout.
- 4x4 guard posts shall not be notched.
- Follow manufacturer's instructions for alternative mounts or anchorage.



## Exterior guards – R507.10



- Where guards are connected to the interior or exterior side of a deck joist or beam, the joist or beam shall be connected to the adjacent joists to prevent rotation of the joist or beam.
- Connections relying only on fasteners in end grain withdrawal are not permitted. There must be some kind of anchor to transfer point load through the rim board into the side of the joist.
- Deck boards help brace the top of the band board if screwed in, but there's nothing bracing the bottom. The blocking can be a little bit shorter, if the blocking starts at the bottom and goes up high enough to secure the top anchor.



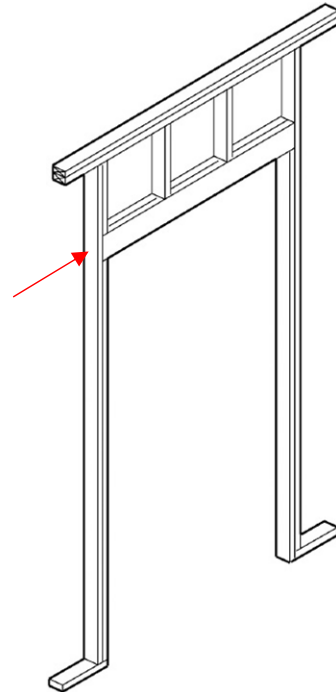
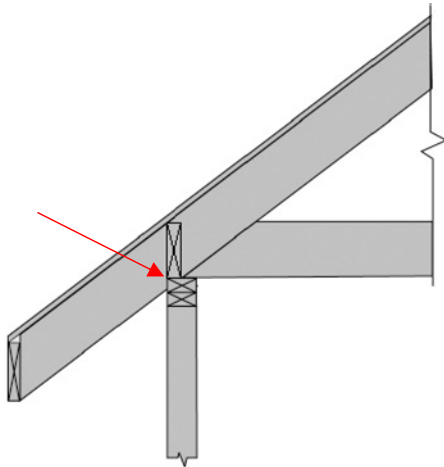
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## Chapter 6

# Wall Construction

### Fastening schedule – Table R602.3(1)



- Added fastening patterns for truss blocking, web fillers, and king studs.
- Reduced field fastener spacing for roof sheathing. Additional fastener options also added.
- **See tables on next slide.**



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

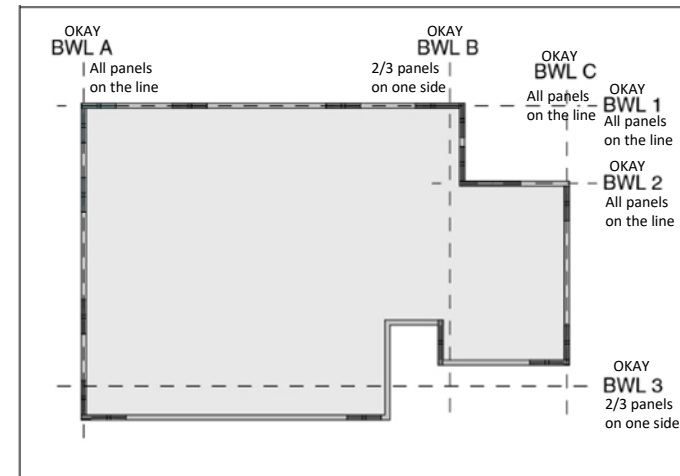
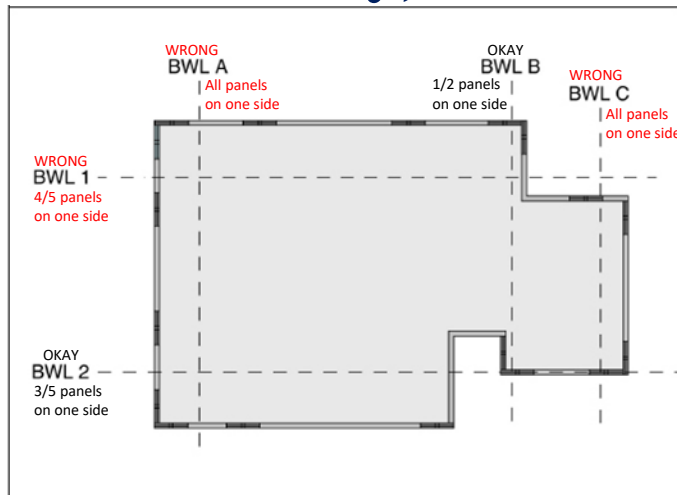
Item	Thickness	Number and Type of Fastener	Spacing of Fasteners	
			Edges (inches)	Interm. supports (inches)
<b>Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing</b>				
<b>30-31</b>	$\frac{3}{8}" - \frac{1}{2}"$	6d common or deformed (2" x 0.113" x 0.266" head) (subfloor, wall) <sup>f</sup> ; <del>8d common (2½" x 0.131") nail (subfloor, wall);</del> or 2 ⅜" x 0.113" x 0.266" head nail (subfloor, wall)	6 <sup>f</sup>	12-6 <sup>f</sup>
		8d common (2½" x 0.131") (roof) RSRS-01 (2⅜" x 0.113") nail (roof)	6 <sup>f</sup>	12-6 <sup>f</sup>
<b>31-32</b>	$\frac{19}{32}" - 1" \frac{3}{4}"$	8d common (2½" x 0.131") (subfloor, wall) Deformed 2 ⅜" x 0.113" x 0.266" head (wall or subfloor)	6	12
		8d common (2½" x 0.131") nail (roof) RSRS-01 (2⅜" x 0.113") nail (roof)	6 <sup>f</sup>	12-6 <sup>f</sup>
<b>32-33</b>	$1\frac{1}{8}" - \frac{7}{8}" - 1\frac{1}{4}"$	10d common (3" x 0.148") nail 8d (2½" x 0.131" x 0.281" head) deformed nail	6	12
<p><b>f.</b> 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 <u>6 4</u> 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.</p>				



# Wall Construction

## Location of braced wall lines and permitted offsets – R602.10.1.2 (Classic method only)

- Only two-thirds of the total required braced wall panel length is now permitted to be on one side of a braced wall line.





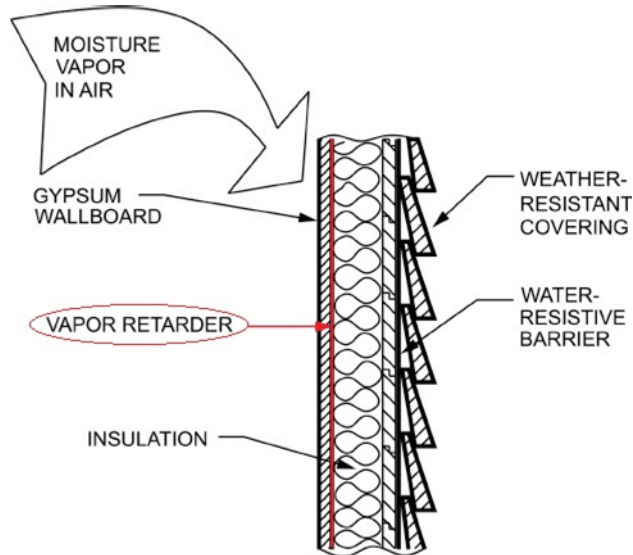
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## Chapter 7

# Wall Covering

## Vapor retarders – R702.7



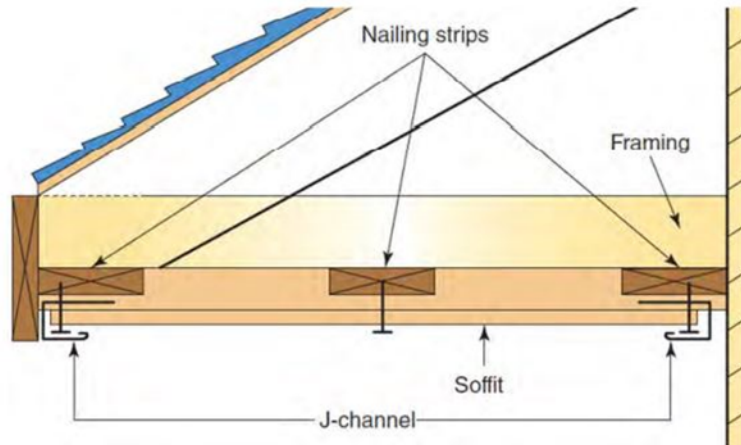
- Vapor barrier locations and materials clarified.
- Climate Zone 4 now requires kraft paper, latex paint, or some other Class II or III vapor retarder on the inside face of all exterior walls (excluding below-grade walls, since they're either treated studs or a vapor retarder is required between the wood and the masonry/concrete).
- Class I vapor retarders (e.x. polyethylene, foil) are not permitted on the inside face of exterior walls, except where required as an air barrier by energy code (See Table N1102.4.1.1).



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## Soffit installation – R704

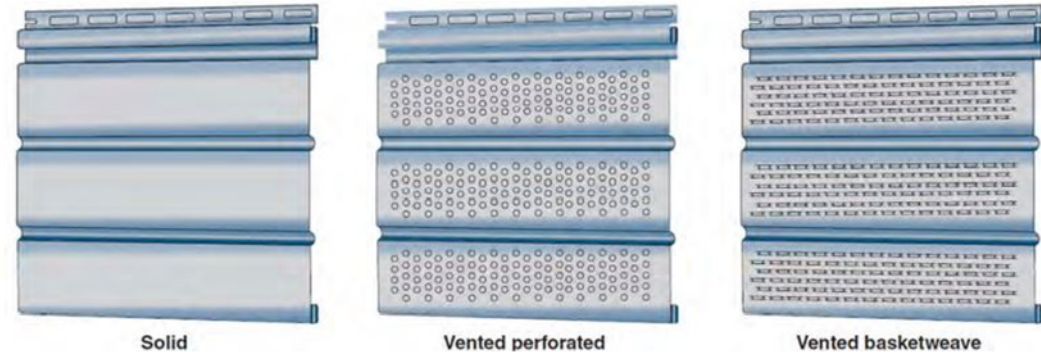


Intermediate nailing strip required  
where span is greater than 16"

## Chapter 7

# Wall Covering

- Soffits moved to different section (Previously located in R703.3.1).
- Soffit construction should still be 30 psf design wind pressure or less in all situations (per Tables R301.2.1(1) and (2)). Follow minimum requirements of Section R704.2.
- This will be checked during the veneer inspection



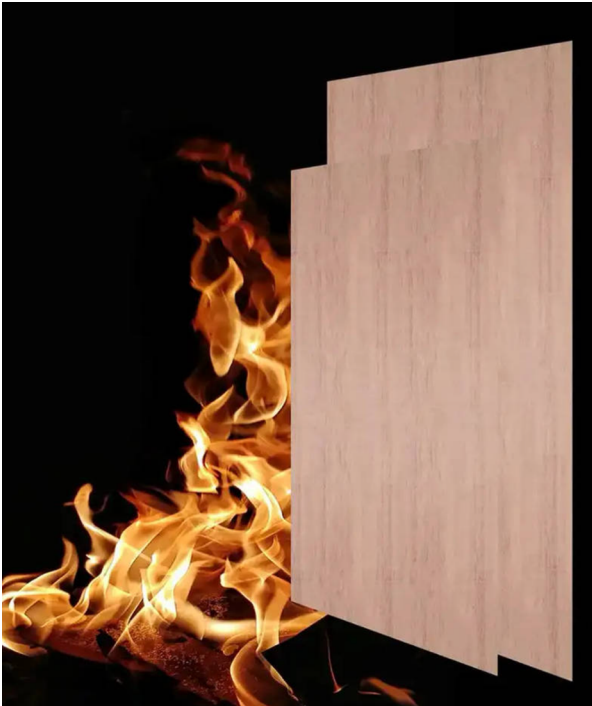




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## Fire-retardant treated wood– R802.1.5.2



## Chapter 8

# Roof-Ceiling Construction

- The use of paints, coatings, stains or other surface treatments are not an approved method of fire-retardant protection as required by this section.
- Approved methods:
  - Pressure process
  - Other means of chemical impregnation of wood



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## Chapter 8

# Roof-Ceiling Construction

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## Rafter/Ceiling Joist Heel Joint Connections - Table R802.5.2

- Table updated to 12-foot rafter spans and added a new row for rafters spaced at 19.2 inches.

RAFTER SLOPE	RAFTER SPACING (inches)	GROUND SNOW LOAD (psf)											
		20 <sup>a</sup>			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 <sup>a,b,c,d,f</sup>											
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
Sections for 7:12 and 9:12 Slopes not shown – see full code section													
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
a. 10d common (3" x 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. See code section table for all footnotes													



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**\* There are no significant changes to  
Chapters 9 and 10 of the 2021 VRC.**



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## **Permanent Energy Certificate – N1101.14**

- **Energy certificates shall be posted on one of the approved locations listed in N1101.14. Please do NOT upload the certificate to the customer portal.**

## Chapter11

# Energy Efficiency

- Expanded certificate requirements to include the following:
  - The array capacity, inverter efficiency, panel tilt and orientation of photovoltaic panel systems.
  - The Energy Rating Index score (ERI) is an alternative method to prescriptive criteria. Compliance is based on an ERI analysis of the rated proposed design and confirmed built dwelling to have an ERI less than or equal to 54 per table N1106.5 for climate zone 4.
  - Code and year the structure was permitted under, and the compliance path.
  - See following slide for example of approved energy certificate.



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# Chapter 11

# Energy Efficiency

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## Permanent Energy Certificate – N1101.14

- Printable/fillable version available on Henrico County website.

ENERGY EFFICIENCY CERTIFICATE			
<b>This certificate shall be permanently posted on or in the electrical distribution panel as required by energy/residential codes.</b>			
<b>Permit #:</b>			<b>Code Edition:</b>
<b>Address:</b>			
<b>Builder/Designer:</b>			
<b>Certified By:</b>		<b>Date:</b>	
<b>Compliance Path:</b>			
<b>Additional Efficiency Package:</b>			
Insulation Ratings		R-Value	R-Value
<b>Roof / Ceiling</b>	With attic:	R-	Without attic:
<b>Wall</b>	Frame:	R-	Mass:
	Basement:	R-	Crawl space:
<b>Floors</b>	Over unconditioned space:	R-	Slab edge:
<b>Ducts</b>	Attic:	R-	Other ( ): R-
			R- / ft
Fenestration Ratings		NFRC U-Factor	NFRC SHGC
<b>Opaque doors</b> (up to 1/2 lite)	U-		
<b>Windows &amp; sliding doors</b>	U-		
<b>Skylights</b>	U-		
Where there is more than one value for any component, indicate both the value covering the largest area and the area weighted average value if available.			
Air Leakage Test Results			
Blower door:	ACH/50 Pa.	Duct testing:	cfm/100 ft <sup>2</sup>
Equipment Performance		Type	Efficiency (circle one)
Heating system			HSPF / AFUE
Cooling system			COP / SEER
Water heater/boiler			EF / E <sub>c</sub> or E <sub>i</sub>
Indicate if the following have been installed (an efficiency need not be listed)			
<input type="checkbox"/> Electric furnace <input type="checkbox"/> Gas-fired unvented room heater <input type="checkbox"/> Baseboard electric heater			
On-Site Photovoltaic Panel Systems (Ignore if none installed)			
Array capacity:	watts	Inverter efficiency	
Panel tilt:		Panel orientation	
Energy Rating Index (ERI) Score (Ignore if not used)			
With on-site generation:		Without on-site generation:	
Approving agency:			
Additional notes:			



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## Chapter 11

# Energy Efficiency

## Insulation & Fenestration Requirements by Component – Table N1102.1.3

Allowed Insulation Methods	2021 VRC/IRC
Ceiling Insulation	R-60 or R-49 uncompressed
Slab Insulation (length)	4 feet

- Fenestration U-Factor = **0.30 (min)**
- Solar Heat Gain Coefficient (SHGC) = **0.40 (min)**
- For ceilings with an attic the insulation R-value **increased to R-60 (min)**; Alternative: installing R-49 uncompressed over 100% of the attic area including over the wall top plate.
- Slab R-value remained the same however the minimum depth/length **increased to 4 feet** . Required for slabs that are less than 12 inches below grade.



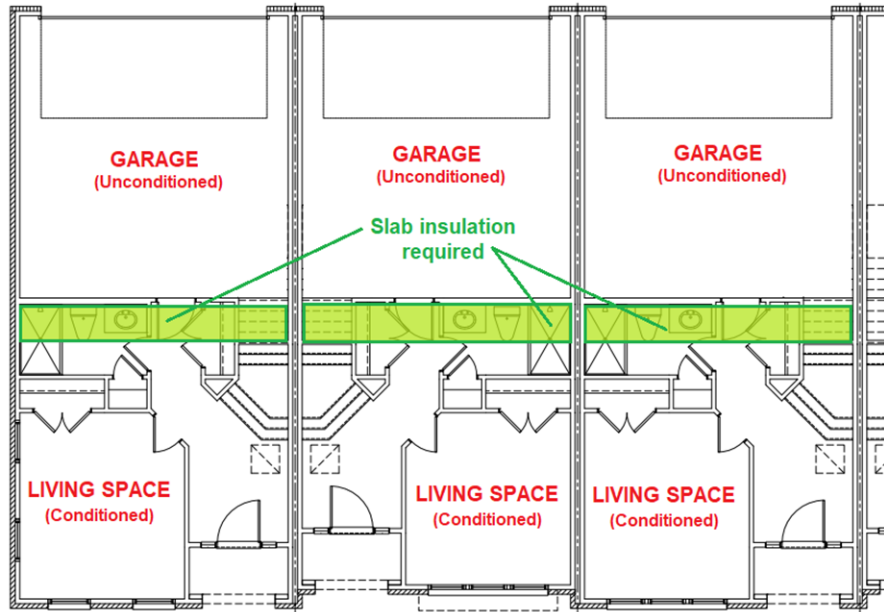
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## Chapter 11

# Energy Efficiency

## Slab insulation between conditioned and unconditioned areas



- **NOTE:** This is not a code change as it is a reinterpretation of an existing code.
  - In previous code cycles, Henrico County has not been requiring slab insulation where an unconditioned area (such as a garage) is adjacent to a conditioned area of a home.
  - After further review, the code requires insulation around the “thermal envelope” of the house. Since the walls and ceilings that are adjacent to an unconditioned space require insulation (as shown in this detail), slab insulation should also be required to complete the thermal envelope.





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## **Uninsulated Basements – N1102.2.8 - Exception**

### Chapter 11

# Energy Efficiency

All of the following requirements must be met for an unconditioned basement:

- A) The floor overhead, including the underside of the stairway leading to the basement must be insulated.
- B) Ducts, domestic hot water or hydronic heating surfaces must be insulated when exposed to the basement.
- C) There are no HVAC supply or return diffusers serving the basement.
- D) Walls surrounding the stairway and adjacent to conditioned spaces must be insulated per N1102.1.3 and N1102.2.
- E) Doors leading to the basement from conditioned spaces must be insulated per N1102.1.3, N1102.2, and weather-stripped per N1102.4.
- F) The building thermal envelope separating the basement from adjacent conditioned spaces complies with N1102.4 – Air leakage.



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## Chapter 11

# Energy Efficiency

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### **Heat pump as primary space heat source – N1103.1.3**

- Prohibits electric resistance heat (i.e. baseboard heaters) as a primary heat source **IF** a ducted or ductless heat pump can be installed.
- Electric resistance heating may be used for defrost, supplemental or emergency heat.
- The heat pump shall be designed so that the supplemental heating does not energize unless the outdoor temperature is below 40° F.



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## Duct Testing & Duct Leakage N1103.3.5, N1103.3.6



## Chapter 11

# Energy Efficiency

- Duct testing language has been modified and specific standards have been updated.
- Ducts that are **not integrated** with the heating & cooling system are exempt from testing.
- Ducts and systems that are entirely within the building thermal envelope **now** require duct leakage testing and are no longer exempt from testing.
- An additional testing option with limits on duct leakage has been added. When testing ducts entirely within the building thermal envelope - leakage shall be less than or equal to 8 cfm per 100 sq. ft. of conditioned floor area.



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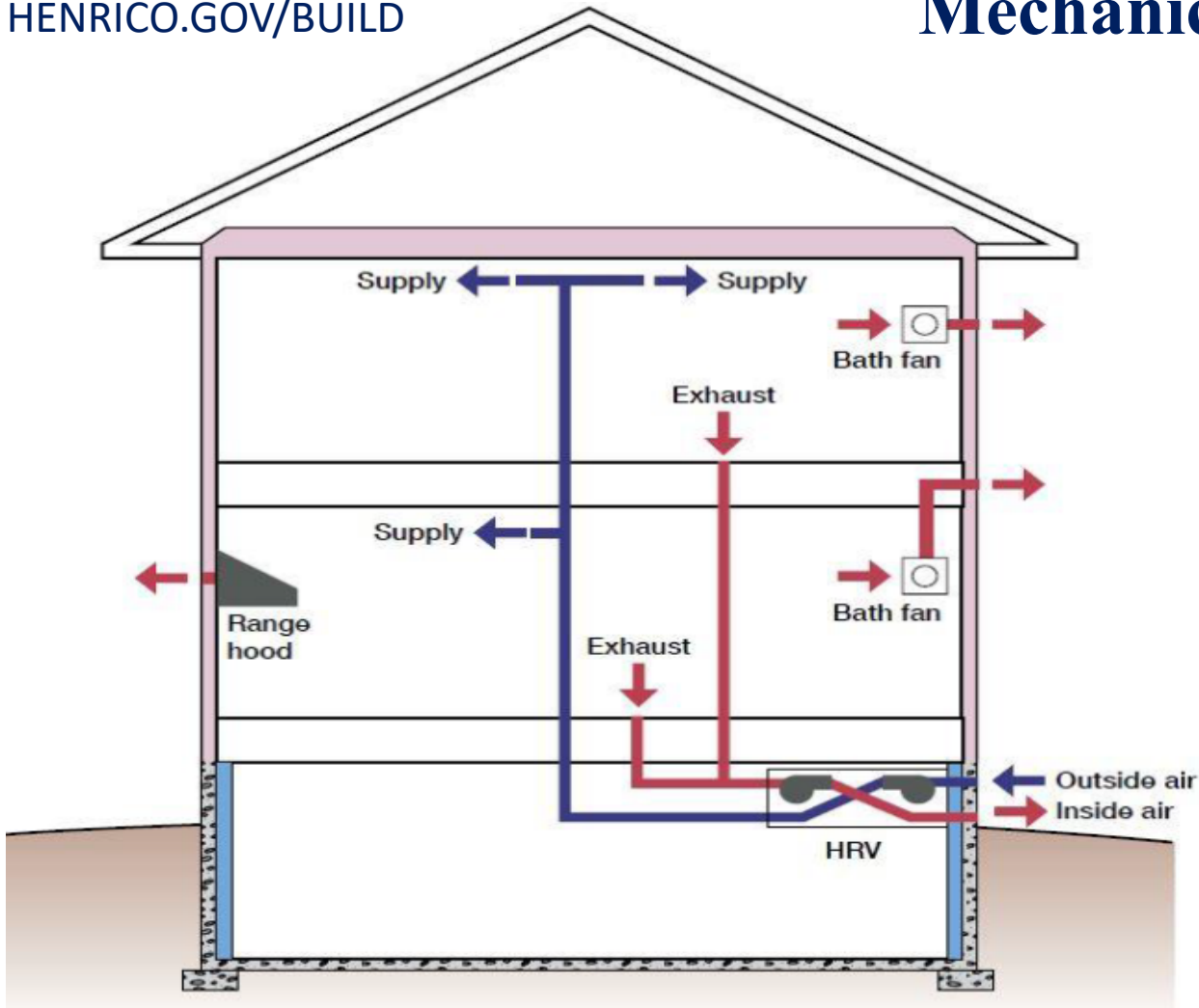
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# Energy Efficiency

## Mechanical Ventilation System

### Fan Efficacy – N1103.6.2

### Testing – N1103.6.3



- Mechanical ventilation systems are required to be tested according to equipment instructions or other airflow measuring devices (ie. flow hood).
- **A written report of the results shall be provided to the code official.**
- Fans used to provide whole-dwelling mechanical ventilation requirements shall meet specified efficacy ratings.
- Kitchen range hoods ducted to the outside with 6 inch or larger ducts with less than one 90-degree elbow are exempt.



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## Chapter 11

# Energy Efficiency

## Duct tightness & Whole-dwelling ventilation Testing/Reporting

Note: This testing requirement was present in the 2018 VRC and has been **expanded** in the 2021 VRC.

### **When to test:**

- The code allows for duct tightness testing to occur at: Rough-in or post construction. It is the permit applicant's choice when to perform the required testing.

### **When to submit:**

- Submission of the Blower Door test, Duct tightness test & Whole-dwelling ventilation tests are the responsibility of the permit applicant. **Timing is critical** to prevent delays in processing (i.e. obtaining a certificate of occupancy). Duct tightness test and whole-dwelling test results need to be reviewed and approved for a Final Mechanical Inspection to be passed. Blower door test results need to be reviewed and approved for a Final Building Inspection to be passed. Test results need to clearly define what was tested and must include permit number.



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## Chapter 11

# Energy Efficiency

## Duct tightness & Whole-dwelling ventilation Reporting

### What and when to submit:

- Duct tightness test and whole house ventilation system test to be submitted when scheduling the Final Mechanical Inspection.
- Blower door test to be submitted when scheduling the Final Building Inspection.

### How to submit:

- For duct tightness and whole house ventilation systems, see the following video:  
<https://www.youtube.com/watch?v=dgeMbpRTbZc&feature=youtu.be>
- For blower door test, see the following video:  
<https://www.youtube.com/watch?v=dxAZx9cWMtE>



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## Lighting equipment – N1104.1



## Chapter 11

# Energy Efficiency

- Now requires all permanently installed lighting fixtures to contain only high-efficacy lighting sources.
  - **Excludes** kitchen appliance lighting fixtures.





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## Interior Lighting Controls – N1104.2

### Chapter 11

# Energy Efficiency

- Permanently installed lighting fixtures shall be controlled with:
  - A) Dimmer;
  - B) An occupant sensor control; OR
  - C) Another control that is installed or built into the fixture.

**Exception:** Lighting controls are not required for the following:

- A) Bathrooms
- B) Hallways
- C) Exterior lighting fixtures
- D) Lighting designed for safety or security



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Section 305

# International Swimming Pool and Spa Code

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## Construction Fencing required – 305.1.1

- **NEW!** Sites of in-ground swimming pools and spas now are required to be surrounded with a construction fence starting at the time any excavation is performed and until the permanent barrier is completed.
- Construction fence shall be 4 ft min. in height.



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## Section 305

# International Swimming Pool and Spa Code

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## Setback for Mesh Fences – 305.2.4.1

- In prior code editions Section 305.2.10 was located such that it was applicable to all types of barriers, not just removable mesh fences.
- Requirement now moved to Section 305.2.4.1.
- Inside of a mesh fence shall not be closer than 20 inches to the nearest edge of the water of a pool or spa.
- This change could have a significant impact on the size and/or design of the pool or spa.



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## Section 305

# International **Swimming Pool and Spa Code**

## **Clear Zone – 305.2.9**

- Now provides clarification that it only applies to equipment “located on the same lot as the pool or spa”.



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# International and Virginia Residential Code

- Again, changes indicated in this presentation are not all of the changes included in this code cycle. Please check the 2021 VRC for other possible code changes.