Welcome

In Person Format

2024 NCRBC Significant Changes & Code Defects

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Board Rule: 21 NCAC 12B .0301 Course Requirements

Disclaimer:

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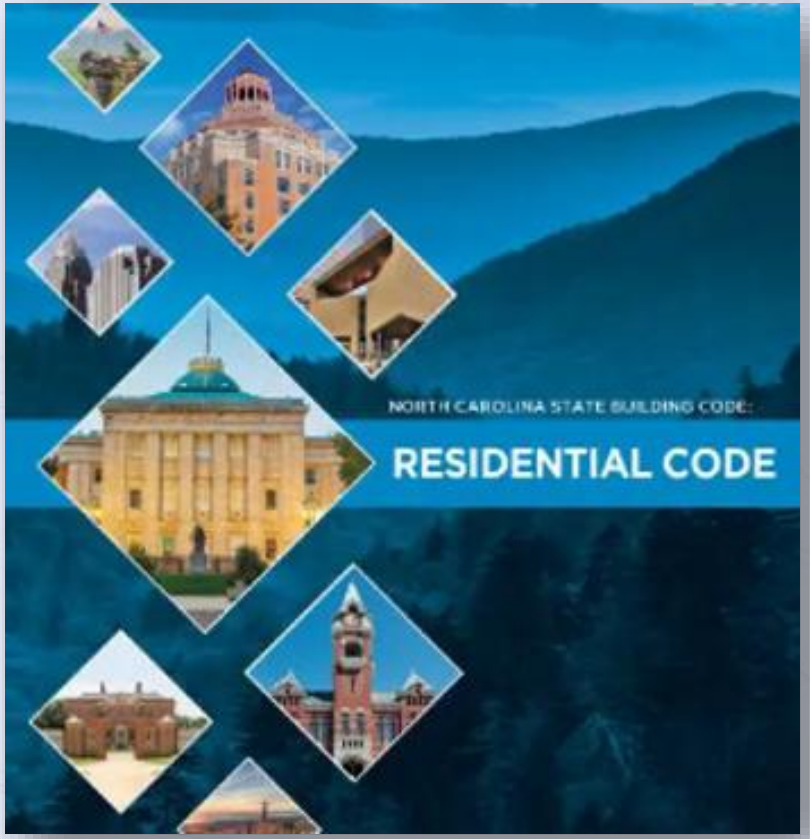
Residential Code – Title

Section R101.1 Title

- Provisions shall be known as the **North Carolina** *Residential Code for* ***One- and Two-family Dwellings***.
- Adopted by the NCBCC on June 13, 2024, effective **January 1, 2025**.
- References to the *International Codes* shall mean the *North Carolina Codes*. The North Carolina Amendments to the *International Codes* are underlined.
- Farms (as defined by NCGS) are exempt from the residential building code.



Residential Code – Scope

Applies to

R101.2 Scope

- **Construction**
- **Alterations**
- **Movement**
- **Enlargement**
- **Replacement**
- **Repair**
- **Equipment**
- **Use and occupancy**
- **Location**
- **Removal**
- **Demolition**

Also includes:

- **Bed & Breakfast homes**
- **Live Work Units**

Looking to change to one to 4 family dwellings to cover duplex, triplex & quads- New Council to work on language

The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal, and demolition of **one or more** detached one- and two-family dwellings and *townhouses* **located on a parcel** not more than **three stories above *grade plane* in height with a separate means of egress** and their ***accessory structures*** not more than three stories above *grade plane* in height. **Single family dwellings otherwise permitted by this Code shall include *bed and breakfast* homes**.

Residential Code – Scope

R101.2 Scope (continued)

Live/work units complying with the requirements of Section 508.5 of the *International Building Code* shall be permitted to be built as one- and two-family dwellings or townhouses. Fire suppression required by Section 508.5.7 of the International Building Code where constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section P2904.

- A *dwelling unit* or sleeping unit in which **more than 10 percent and less than 50 percent** of the space includes a nonresidential use that is operated by the tenant.

Why 10% & 50%?

Residential Code – Scope

R101.2 Scope (continued)

Additional items by occupant load coming over from NC Building Code

428.2 Residential care homes. Homes keeping **no more than six adults or six unrestrained children** who are able to respond and evacuate the facility without assistance, determined by the state agency having jurisdiction to be licensable, shall be classified as single-family residential (North Carolina Residential Code) and comply with the requirements of this section and the North Carolina Residential Code for detached one- and two-family dwellings and townhouses.

428.3 Licensed Small Residential Care Facilities. The following facilities when determined by the state agency having jurisdiction to be licensable, shall be classified as Single-Family Residential and comply with the requirements of this section and the North Carolina Residential Code for detached one- and-two family dwellings and townhouses.

1. Residential Care Facilities keeping no more than **six adults or six unrestrained children** with no more than **three** who are unable to respond and evacuate without assistance.
2. Residential Care Facilities keeping no more than **five adults or five children who are unable to respond** and evacuate without assistance, when certifiable for Medicaid reimbursement, and when staffed 24-hours per day with at least two staff awake at all times.
3. Residential Care Facilities keeping no more **than nine adults or nine children** who are able to respond and evacuate without assistance.

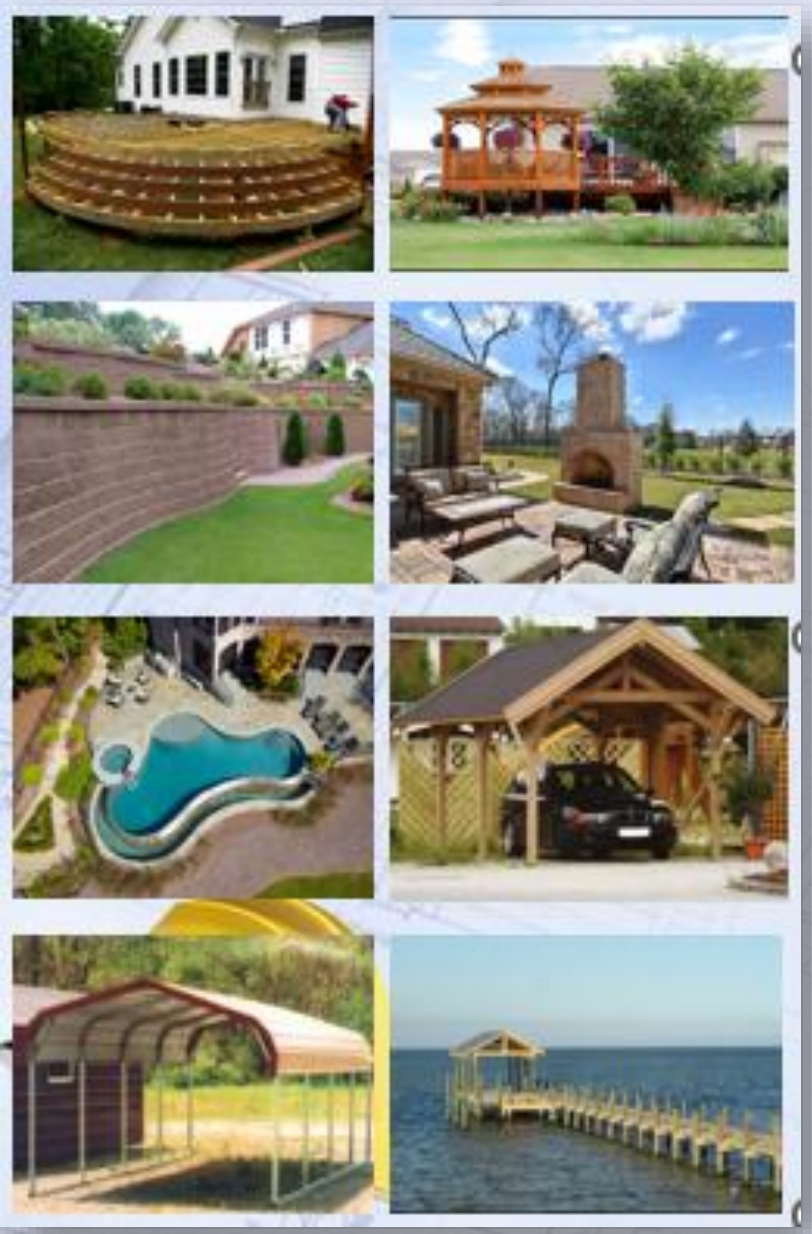
Residential Code – Scope (Accessory Buildings)

R101.2.1 Accessory buildings. *Accessory buildings* with any dimension **greater than 12 feet** (3658 mm) shall meet the provisions of this code. *Accessory buildings* are permitted to be constructed without a masonry or concrete foundation, except in *coastal high hazard* or *ocean hazard areas*, provided **all of the following conditions are met**:

- 1. The *accessory building* shall not exceed **400 square feet** (37 m2) or one story in height;
- 2. The building is supported on a **wood foundation** of minimum **2-inch by 6-inch** or **3-inch by 4-inch** mudsill of approved wood in accordance with Section R317;
- 3. The building is **anchored** to resist overturning and sliding by installing a minimum of one ground anchor at each corner of the building. The total resisting force of the anchors shall be equal to **20 psf** (958 Pa) times the plan area of the building.

Common Defects on Accessory Buildings

Residential Code – Scope (Accessory Structures)



- **R101.2.2 Accessory structures. Only** the following *accessory structures* shall meet the provisions of this code.
- 1. Decks, see Appendix M,
- 2. Gazebos,
- 3. Retaining walls, see Section R404.4,
- 4. Detached masonry chimneys located less than 10 feet (3048 mm) from other buildings or lot lines,
- 5. Swimming pools and spas, see Appendix NC-A,
- 6. Detached carports,

  Exception: Portable, lightweight carports not exceeding 400 square feet (37 m2) or 12 feet (3658 mm) mean roof height.
- 7. *Docks, piers, bulkheads*, and waterway structures, see Section R331
- 8. Ground mounted photovoltaic system, see Section R324.7

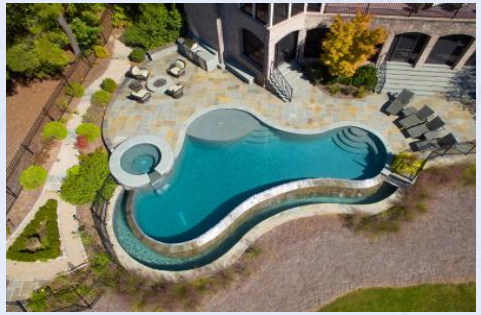
Key Definitions

ACCESSORY BUILDING. A building that does not contain a sleeping room, the use of which is **accessory** to that of the dwelling, that is detached and located on the same lot as the dwelling and is roofed over with more than 50 percent of its exterior walls enclosed.

Possible defect-is it accessory?

Key Definitions

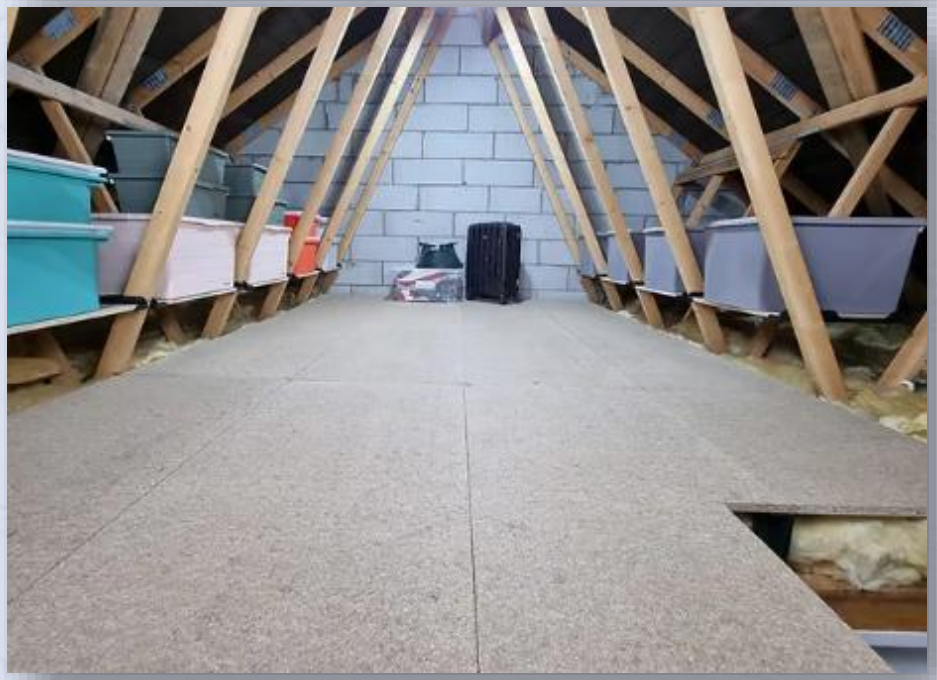
ACCESSORY STRUCTURE. A **detached structure** that is accessory to and incidental to that of the *dwelling(s)* and that is located on the same *lot*. the dwelling and not defined as an accessory building. Examples of accessory structures are fencing, decks, gazebos, arbors, retaining walls, barbecue pits, detached chimneys, playground equipment, yard art, docks, piers, etc.



Key Definitions

ATTIC STORAGE. A floored area, regardless of size, within an attic space that is served by an attic access.

Exception: A floor walkway not less than **24 inches** wide or greater than **48 inches** wide that serves as an access for the service of utilities or equipment, and a level service space not less than **30 inches** deep or greater than **48 inches** deep and not less than **30 inches** wide or greater than **48 inches** wide at the front or service side of the appliance, shall not be considered as attic storage. Such floored area shall be labeled at the attic access opening, **"NOT FOR STORAGE."** The lettering shall be a minimum of 2 inches (51 mm) in height.



Key Definitions

FARM BUILDING. Any building not used for sleeping purposes that is not accessed by the general public and is used primarily for a farm purpose. Farm purposes includes structures or buildings for equipment, storage and processing of agricultural products or commodities such as: crops, fruits, vegetables, ornamental or flowering plants, dairy, timber, livestock, poultry and all other such forms of agricultural products by the specific farm on which the structure or building is located. Farm purposes do not include structures or buildings for uses such as education facilities, research facilities, or aircraft hangers.

Key Definitions

TOWNHOUSE. A single-family dwelling unit constructed in a group of **two or more attached units separated by property lines, or three or more attached units separated by assumed property lines** based on the location of the double wall or common wall in which each unit extends from foundation to roof and with a yard or public way on not less than two sides.

[RB] 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.

Knowledge Check

Q: A business in a home must have at least _____% and not more than ____% of work area in a residence to be considered a live/work unit.

A: 10%, 50%.

Q: two attached dwelling units separate by a property line is_____.

A: a) Duplex
b) Townhouse
c) Single Family
d) None of the above

Q: A 12x12 storage building has to have a permit?
a) True
b) False

R301.1.4 Intermodal shipping containers

R301.1.4 Intermodal shipping containers.
Intermodal shipping containers that are repurposed for use as buildings or structures shall be designed in accordance with the structural provisions in Section 3115 of the *International Building Code*.

Intermodal defined: "involving two or more different modes of transportation in conveying goods".

TABLE R301.2
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

ROOF LOAD (psf)	WIND SPEED (mph)	SEAIMIC DESIGN CATEGORY	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP	ICE BARRIER UNDERLAYMENT REQUIRED	FLOOD HAZARD[b]	AIR FREEZING INDEX	MEAN ANNUAL TEMP
			Weathering[a]	Frost Line Depth [d]	Termite[c]					
20	Tables R301.2 (4) & (5)	Table R301.2(7)	Moderate	12”	Moderate-Heavy	Local	Local	Local	Local	Local

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

a) Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The grade of masonry units shall be determined from ASTM C34, C55, C62, C73, C90, C129, C145, C216 or C652.

b) The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction’s entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the currently effective FIRM and FBFM or other flood hazard map adopted by the community, as may amended.

c) Protection is required in all of North Carolina in accordance with Section R318

d) Check with local jurisdiction for frost line depth.

R301.2.2 Seismic Design Category C

R301.2.2 Townhouses seismic provisions. *Townhouses* in *Seismic Design Categories Category* C, shall be constructed in accordance with the requirements of this section and other seismic requirements of this code.

TABLE R301.2(7) COUNTIES IN SEISMIC DESIGN CATEGORY C

Transylvania	Jackson
Madison	Macon
Cherokee	Henderson
Clay	Buncombe
Graham	Swain
Haywood	

Note: Counties not listed are in Seismic Design Category A or B.

Reduction in the # of Counties in C impacting townhouses

With permission from ICC 08/02/2024 to 08/02/2025

Table R302.1 Exterior Walls

See footnote c

TABLE R302.1
EXTERIOR WALLS

Walls	**Fire-resistance rated**	**1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.3 of the *International Building Code* with exposure from both sides**	**< 3 feet** **< 5 feet[c]**
	Not fire-resistance rated	**0 hours**	**≥ 3 feet** **≥ 5 feet[c]**
Projections	**Fire-resistance rated**	**1 hour on the underside, or heavy timber, or fire-retardant-treated wood [a,b]**	**< 3 feet** **< 5 feet[c]**
	Not fire-resistance rated	**0 hours**	**≥ 3 feet** **≥ 5 feet[c]**
Openings in walls	**Not allowed**	**NA**	**< 3 feet** **< 5 feet[c]**
	Unlimited	**0 hours**	**≥ 3 feet** **≥ 5 feet[c]**
Penetrations	**All**	**Comply with Section R302.4**	**< 3 feet** **< 5 feet[c]**
		None required	**≥ 3 feet** **≥ 5 feet[c]**

For SI: 1 foot = 304.8 mm.
NA = Not Applicable.
a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.
b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where gable vent openings are not installed.
c. **Fire separation distance requirement for multiple dwellings on a single parcel.**

R302.1.1 Soffit protection

R302.1.1 Soffit protection. In construction using vinyl or aluminum soffit material, the following application shall apply. Soffit assemblies located on buildings with less than a **5 feet** fire separation distance shall be securely attached to framing members and applied over fire-retardant-treated wood, 23/32-inch wood sheathing or 5/8-inch exterior grade or moisture resistant gypsum board. Venting requirements shall be provided in both soffit and underlayment's. Vents shall be either nominal 2-inch continuous or equivalent intermittent and shall not exceed the minimum net free air requirements established in Section R806.2 by more than 50 percent. *Townhouse* construction shall meet the additional requirements of Sections R302.2.5 and R302.2.6.

Exceptions:

1. Any portion of soffits having 5 feet (3048 mm)or more *fire separation distance*.

2. Roof rake lines where the soffit does not communicate to the attic are not required to be protected per this section.

3. Soffits with less than 3 feet (914 mm) *fire separation distance* shall meet the projection fire rating requirements of Table R302.1.

4. Soffits between buildings located on the same lot.

Started as a townhouse issue but applies to detached single family with vinyl and aluminum soffit

R302.2 Townhouses

Each Townhouse is considered a separate building. Fire-resistance-rated wall assemblies are required between buildings with **3 options given**.

R302.2 Townhouses. Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 or R302.2.2 and shall comply with Sections 302.2.3 through 302.2.5.

3 Options

1. Double walls or 2-1 hour walls
2. Common wall 1-1 hour with sprinkler system
3. Common wall 1-2 hour without sprinkler system **(limitations on what can be in common walls applies)**

R302.2 Townhouses

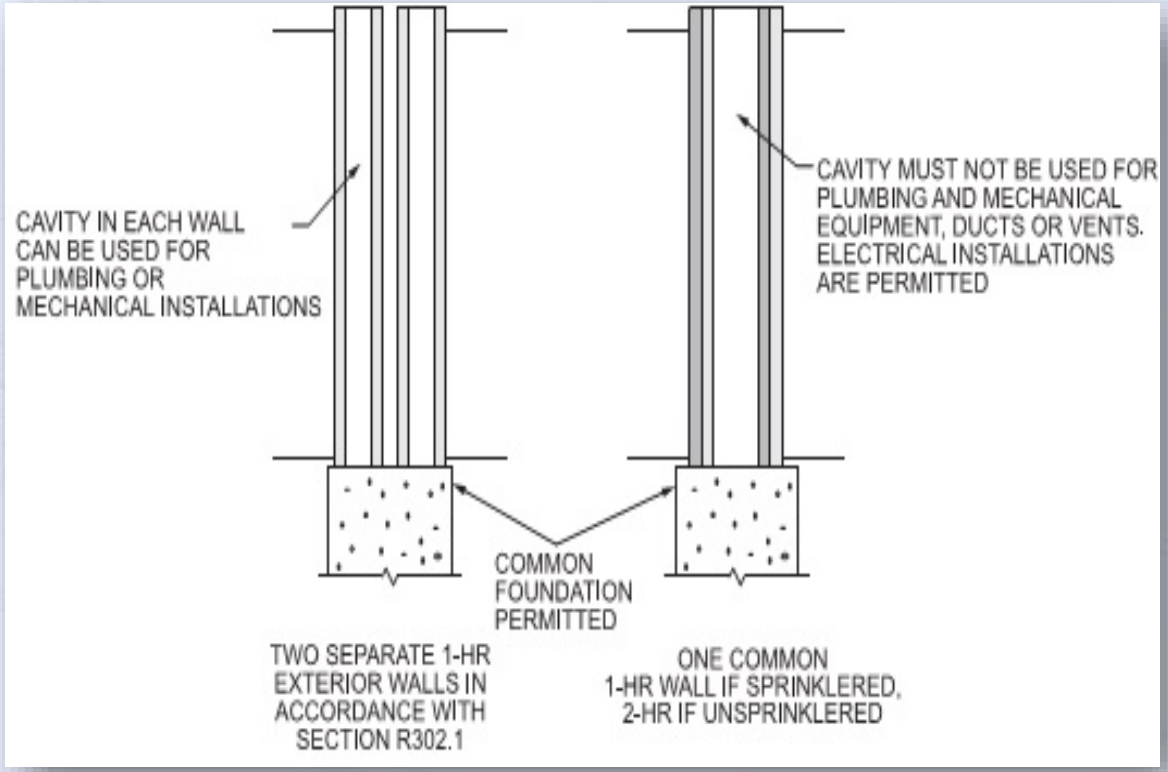
Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 or R302.2.2 and shall comply with Sections 302.2.3 through 302.2.5.

R302.2.1 Double walls. Each *townhouse unit* shall be separated from other *townhouse units* by **two 1-hour fire-resistance-rated wall assemblies** tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International 2024 North Carolina Building Code.*

R302.2.2 Common walls. Common walls separating *townhouse units* shall be assigned a fire-resistance rating in accordance with **Item 1 or 2** and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.

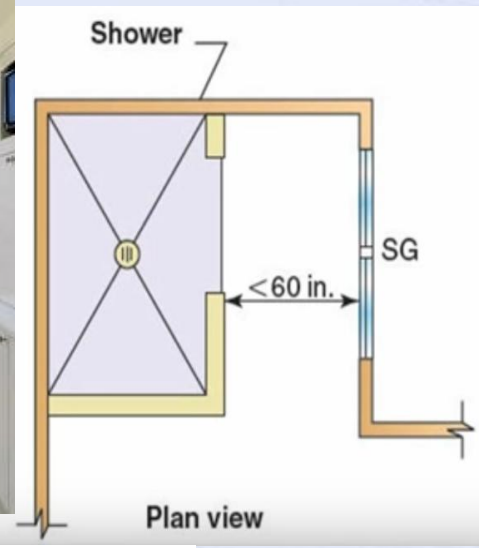
Exception: Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

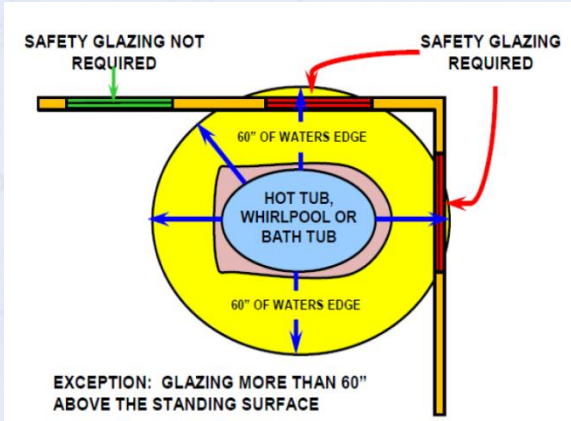


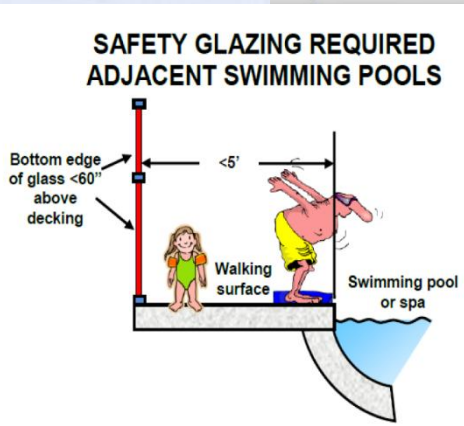
R308.4.5 Glazing and wet surfaces

R308.4.5 Glazing and wet surfaces. Glazing in **walls, enclosures or fences** containing or adjacent to facing the direction of exit from hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than **60 inches** measured vertically above any standing or walking surface shall be considered to be a hazardous location. This shall apply to single glazing and each pane in multiple glazing.

Exception: Glazing that is **more than 60 inches**, measured horizontally, from the water's edge. of a bathtub, hot tub, spa, whirlpool or swimming pool or from the edge of a shower, sauna or steam room.







R311.1 Means of egress

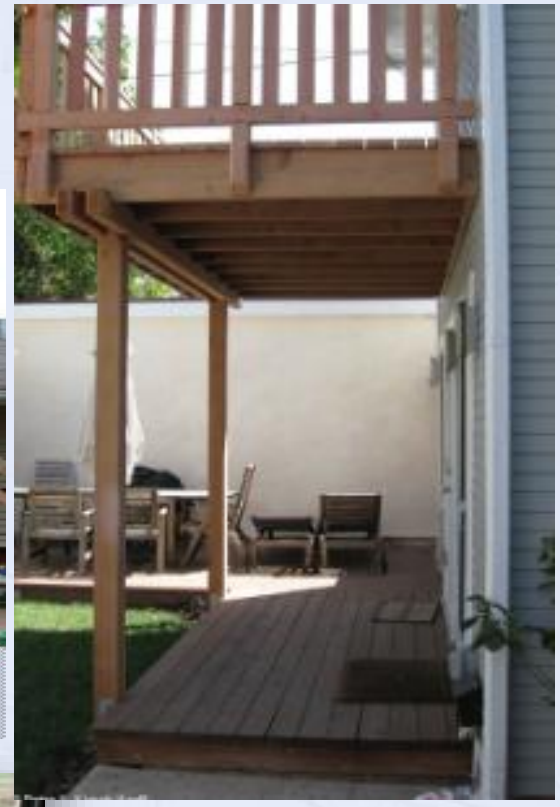
Dwellings and accessory buildings shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the ***dwelling and accessory buildings*** to the required **egress door** without requiring travel through a garage. The required egress door shall open directly into a *public way* or to a *yard* or court that opens to a *public way*.

Exceptions:

1. **Equipment service platforms** may be served by **ladders** constructed in accordance with Section R310.4.2.1
2. **Detached garages and storage buildings**

R311.5 Landing, deck, balcony and stair construction and attachment

Exterior landings, decks, balconies, stairs and similar facilities shall be **positively anchored** to the primary structure to resist both vertical and lateral forces **or** shall be designed to be self-supporting. Attachment shall not be accomplished by use of **toenails or nails subject to withdrawal**.



R311.7 Stairways

Where required by this code or provided, *stairways* shall comply with this section.

Exceptions:

1. Stairways **not within or serving** a building, porch or deck.
2. Stairways leading to **non-habitable attics.**
3. Stairways leading to ***crawl spaces***.

R320 Accessibility

Only applies

R320.1 Scope. Where there are **four or more** *dwelling units* or *sleeping units* in a single structure, the provisions of Chapter 11 of the *International Building Code* for Group R-3 shall apply.

Exception: **Owner-occupied** *lodging houses* with **eight or fewer** guestrooms are not required to be accessible.

R320.2 Live/work units. In *live/work units,* the **nonresidential portion** shall be accessible in accordance with Sections 508.5.9 and 508.5.11 of the *International Building Code*. In a structure where there are **four or more** *live/work units,* the **dwelling portion** of the *live/work unit* shall comply with Section 1108.6.2.1 of the *International Building Code*.

R321.1 Elevators

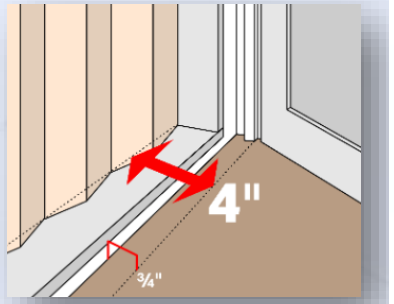
Where provided, passenger elevators, limited-use and limited-application elevators or private residence elevators shall comply with **ASME A17.1/CSA B44.**

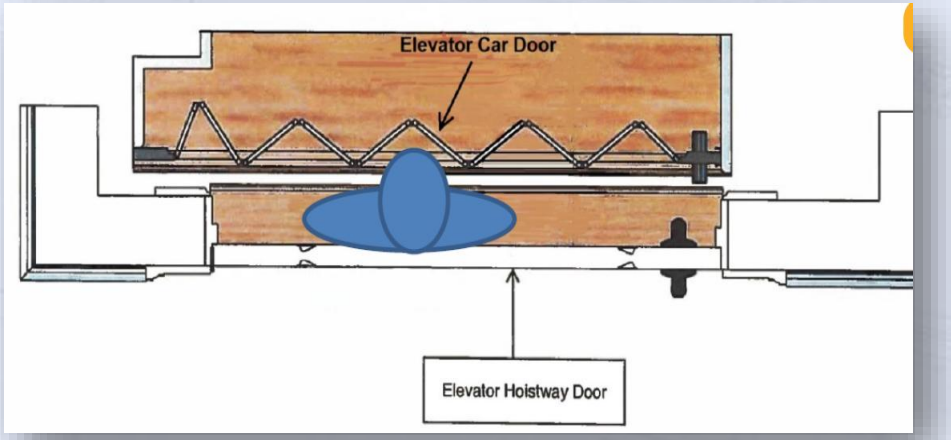
R321.1.1 Clearance Between Hoistways Doors and Car Doors or Gates

The **clearance between** the hoistway doors or gates and the hoistway edge of the landing sill shall **not exceed 3/4 inch**. The distance between the hoistway face of the landing door or gate and the car door or gate **shall not exceed 4 inches** as follows:

1. **Horizontal sliding car doors and gates** shall be designed and installed to withstand a force of **75 pounds** applied horizontally on an area **4 inches by 4 inches** at right angles to and at any location on the car door without permanent deformation. The deflection may not exceed **3/4 inch** and may not displace the door from its guides or tracks. The force must be applied while the door is in the fully closed position.

2. **Folding car doors** shall be designed and installed to withstand a force of **75 pounds** applied horizontally using a **4-inch-diameter sphere** at any location within the folds on the car door without permanent deformation. The deflection may not exceed **3/4 inch** and may not displace the door from its guides. The force must be applied while the door is in the fully closed position.





R321.1.1 Clearance Between Hoistways Doors and Car Doors or Gates (continued)

Exception: A **permanent installation** of a nonremovable, **hoistway door space guard**, a full height door baffle or door baffle that is **at least 31.75"** in height is allowed. The door space guard, full height door baffle or 31.75" door baffle must be designed and installed to withstand a force of **75 pounds** applied horizontally using a **4-inch-diameter sphere** at any location of the space guard without permanent deformation while allowing no more than **3/4"**sill.

R321.4 Certification

The installer shall certify that the following conditions have been met.

1. The elevator or platform lift has been installed in accordance with the manufacturer's installation instructions.
2. The elevator meets the requirements of **ASME A17.1/CSA B44**.
3. The elevator or platform lift meets the requirements of the **North Carolina Electrical Code**. Before a Certificate of Occupancy is issued, the permit holder shall provide the code enforcement official a letter of certification from the installer, evidencing compliance with the above conditions. Any maintenance requirements required by the manufacturer must be stated and affixed to the component.

Certification letter requires these 3 elements and #3 may require a separate letter if installer is not the license electrician performing the electrical work

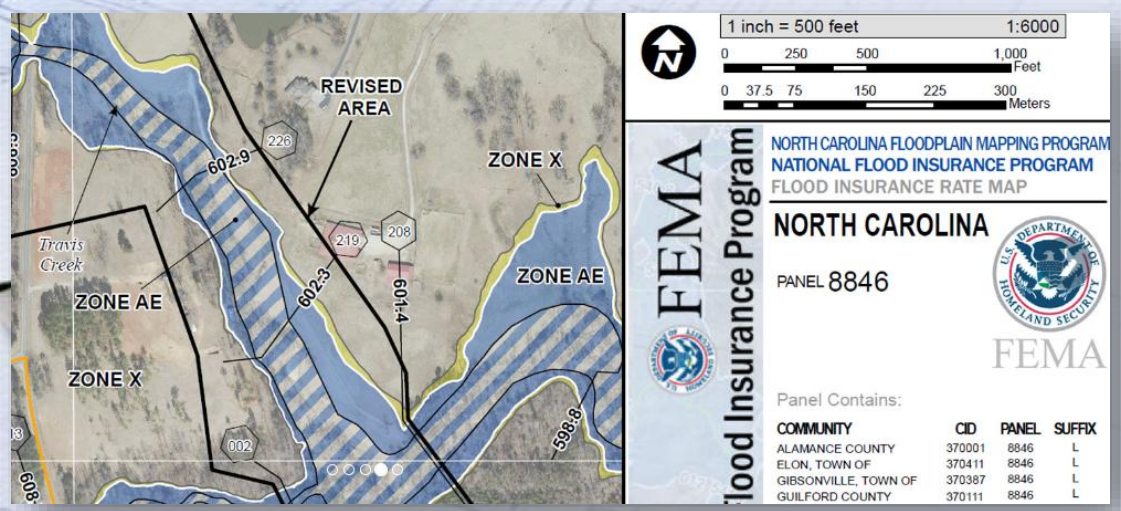
Section R322 Flood-Resistant Construction

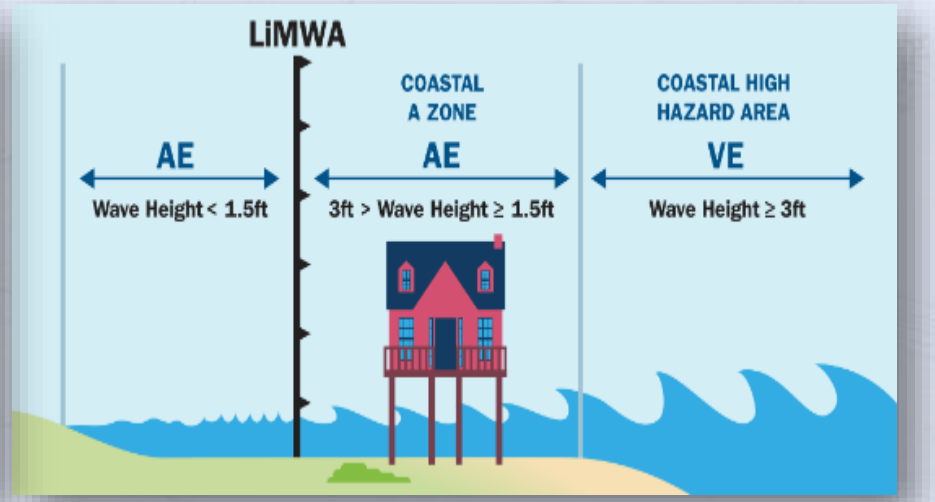
Visit:
Flood.NC.com

R322.1 General. This section covers buildings and structures that are:

1. Constructed in Flood hazard areas including A or V
2. Constructed in Coastal A Zones per Table R301.2
3. Substantial Improvement and repairs per this section **(substantial 50% of value rule per FEMA)**
4. More than one flood hazard area per the most restrictive
5. Designed and constructed in Floodways per ASCE-24
6. Additional provision in Chapter 46 (North Carolina chapter)

R322.1.1 Alternative provisions. As an alternative to the requirements in Section R322, ASCE 24 is permitted subject to the limitations of this code and the limitations therein.





Section R324 Solar Energy Systems

R324.1 General. Solar energy systems shall comply with the provisions of this section.

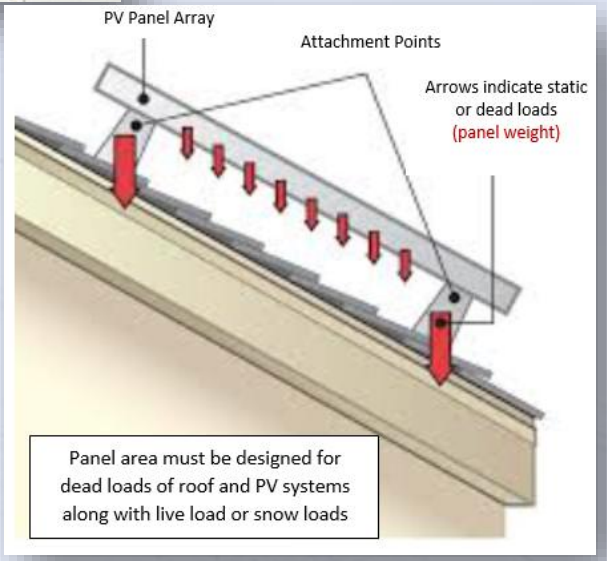
R324.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with **Chapter 23.**

R324.3 Photovoltaic systems. Photovoltaic (PV) systems shall be designed and installed in accordance with **Sections R324.3.1 through R324.7.1 and the manufacturer's installation instructions.** The electrical portion of solar PV systems shall be designed and installed in accordance with NFPA 70.

R324.3.1 Equipment listings. *Photovoltaic panels* and modules shall be *listed* and *labeled* **in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2**. Inverters shall be *listed* and *labeled* in accordance with **UL 1741**. Systems connected to the utility grid shall use inverters *listed* for utility interaction. **Mounting systems** *listed* and *labeled* in accordance with **UL 2703** shall be installed in accordance with the manufacturer's installation instructions and their listings.

Section R324 Solar Energy Systems (continued)

Roof Mounted



R324.4 Rooftop-mounted photovoltaic systems. Rooftop-mounted *photovoltaic panel systems* installed on or above the roof covering shall be designed and installed in accordance with this section.

R324.4.1 Structural requirements. Rooftop-mounted *photovoltaic panel systems* shall be **designed to structurally support the system and withstand applicable gravity loads in accordance with Chapter 3**. The roof on which these systems are installed shall be designed and constructed to support the loads imposed by such systems in accordance with **Chapter 8.**

R324.4.1.1 Roof load. Portions of roof structures not covered with *photovoltaic panel systems* shall be designed for dead loads and roof loads in accordance with Sections R301.4 and R301.6. **Portions of roof structures covered with *photovoltaic panel systems* shall be designed for the following load cases:**

1. Dead load (including *photovoltaic panel* weight) plus snow roof load in accordance with Table R301.2.
2. Dead load (excluding *photovoltaic panel* weight) plus roof *live load* or snow load, whichever is greater, in accordance with Section R301.6.

Dead loads

R324.4.1.2 Wind load. Rooftop-mounted *photo-voltaic panel* or *module* systems and their supports **shall be designed** and installed to resist the component and cladding loads specified in **Table R301.2.1(1), adjusted for height and exposure** in accordance with Table R301.2.1(2).

Wind loads

R324.4.2 Fire classification. Rooftop-mounted *photovoltaic panel systems* shall have the same fire classification as the *roof assembly* required in **Section R902**.

Fire classification
(Typically, C but same as roof covering)

R324.4.3 Roof penetrations. Roof penetrations shall be **flashed and sealed** in accordance with **Chapter 9.**

Roof coverings Penetrations sealed

Section R324 Solar Energy Systems (continued)

Roof covering-integrated

R324.5 Building-integrated photovoltaic systems. Building-integrated photovoltaic (BIPV) systems that serve as roof coverings shall be **designed and installed in accordance with Section R905**.

R324.5.1 Photovoltaic shingles. Photovoltaic shingles shall comply with **Section R905.16**.

R324.5.2 Fire classification. *Building-integrated photovoltaic systems* shall have a **fire classification** in accordance with Section R902.3.

R324.5.3 BIPV roof panels. BIPV roof panels shall comply with **Section R905.17**.

Roof decking requirements, slope, underlayment, etc..

Section R324 Solar Energy Systems (continued)

R324.6 Roof access and pathways. Roof access, pathways and setback requirements shall be provided in accordance with Sections R324.6.1 through R324.6.2.1. **Access and minimum spacing shall be required to provide emergency access** to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

Exceptions:

1. Detached, nonhabitable structures, including but not limited to **detached garages, parking shade structures, carports, solar trellises and similar structures,** shall not be required to provide roof access.
2. Roof access, pathways and setbacks need not be provided where the **code official has determined that rooftop operations will not be employed**.
3. These requirements shall not apply to roofs with **slopes of 2 units vertical in 12 units** horizontal (17-percent slope) or less.
4. **BIPV systems** *listed* in accordance with Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to **not expose a fire fighter to electrical shock hazards**.

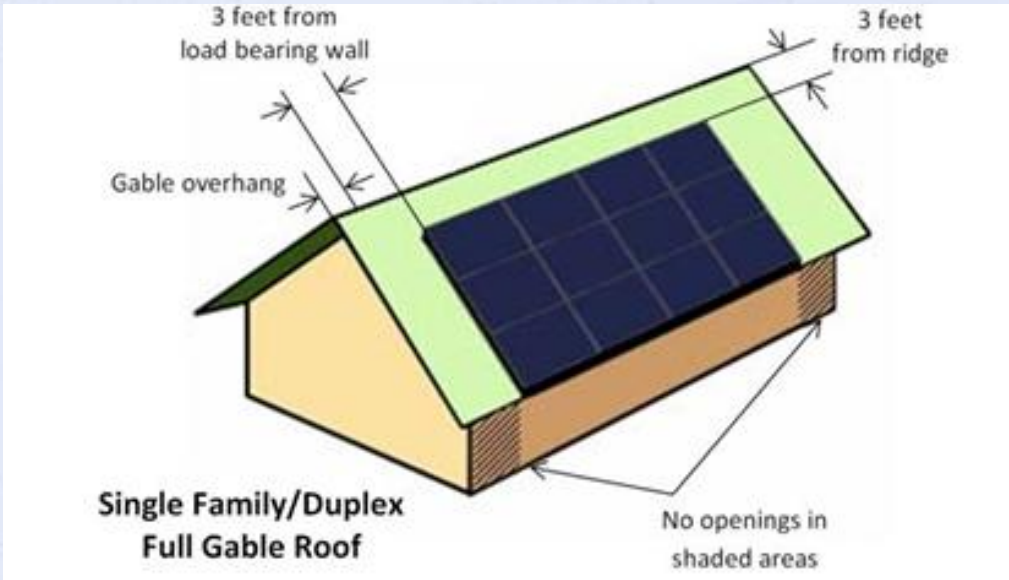
Section R324 Solar Energy Systems (continued)

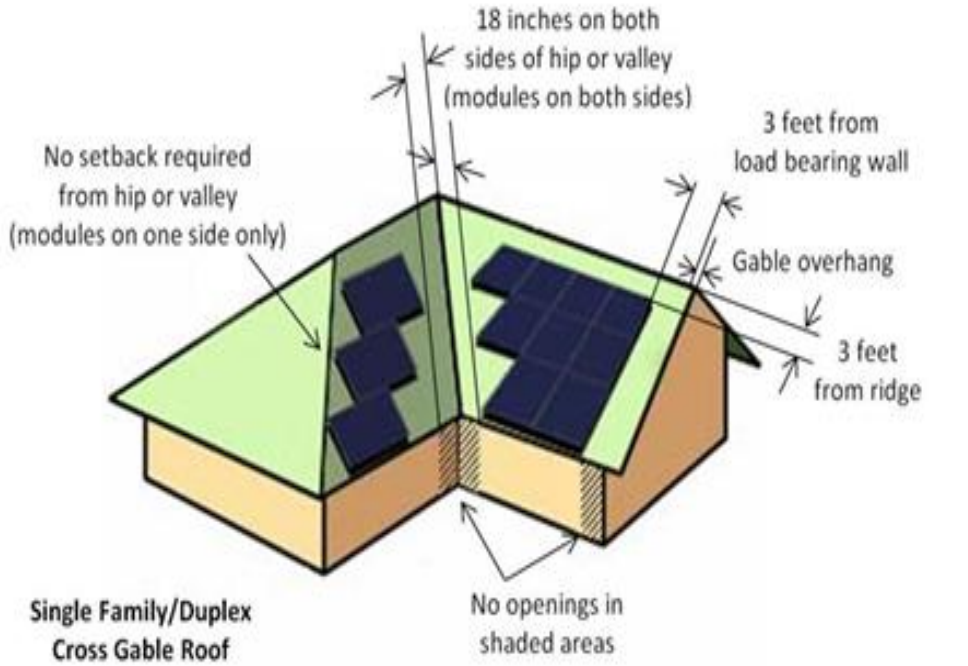
R324.6.1 Pathways. Not fewer than **two pathways, on separate roof planes from lowest roof edge to ridge and not less than 36 inches** wide, shall be provided on all buildings. Not fewer than **one pathway** shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, a pathway not less than **36 inches wide** shall be provided from the lowest roof edge to ridge on the same roof plane as the photovoltaic array, on an adjacent roof plane, or straddling the same and adjacent roof planes. **Pathways shall be over areas capable of supporting fire fighters accessing the roof.** Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.

R324.6.2 Setback at ridge. For photovoltaic arrays occupying not more than **33 percent** of the plan view total roof area, not less than an **18-inch** clear setback is required on both sides of a **horizontal ridge**. For photovoltaic arrays occupying more than **33 percent** of the plan view total roof area, not less than a **36-inch** clear setback is required on both sides of a horizontal ridge.

R324.6.2.1 Alternative setback at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with **NFPA 13D or Section P2904**, setbacks at ridges shall comply with one of the following:

1. For photovoltaic arrays occupying not more than **66 percent** of the plan view total roof area, not less than an **18-inch clear setback** is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying **more than 66 percent** of the plan view total roof area, not less than a **36-inch clear setback** is required on both sides of a horizontal ridge.





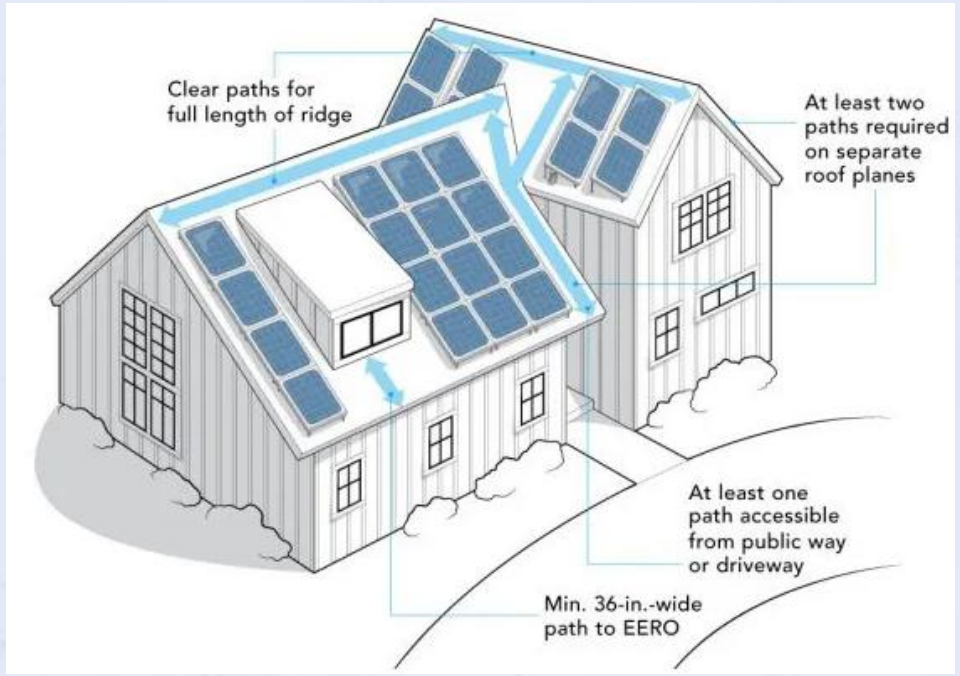
Section R324 Solar Energy Systems (continued)

R324.6.3 Emergency escape and rescue openings. Panels and modules installed on dwellings shall not be placed on the portion of a roof that is **below an *emergency escape and rescue opening***. A pathway not less than 36 inches wide shall be provided to the emergency escape and rescue opening.

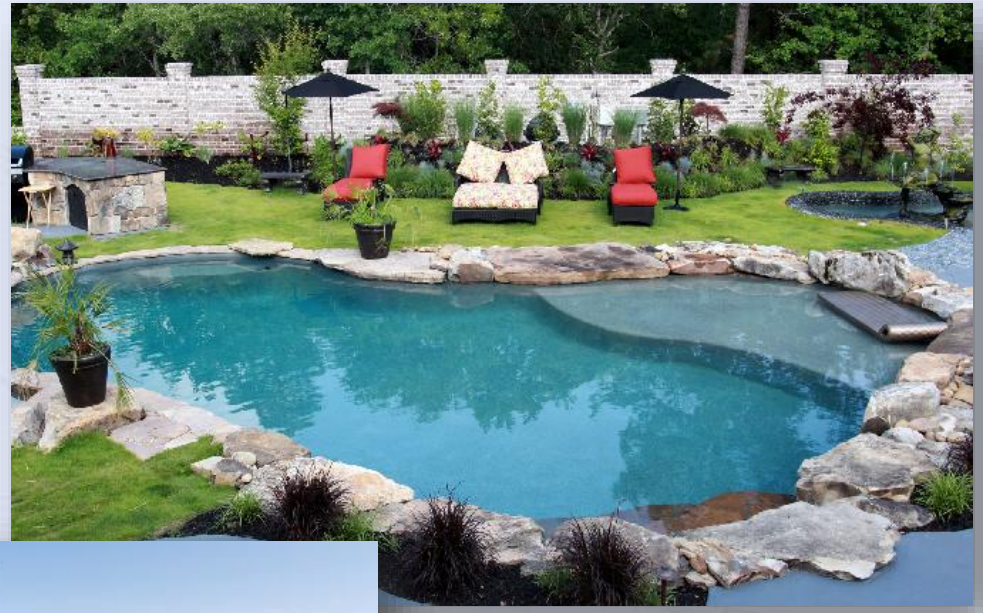
Exception: **BIPV systems** *listed* in accordance with Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

R324.7 Ground-mounted photovoltaic systems. **Ground-mounted photovoltaic systems shall be designed and installed in accordance with Section R301.**

R324.7.1 Fire separation distances. Ground-mounted photovoltaic systems shall be subject to the ***fire separation distance*** requirements determined by the local *jurisdiction*.



SECTION R327 SWIMMING POOLS, SPAS AND HOT TUBS



R327.1 General. The design and construction of pools and spas shall comply **Appendix NC-A**.

Section R328 Energy Storage Systems

R328.1 General. *Energy storage systems (ESS)* shall comply with the provisions of this section.

Exceptions:

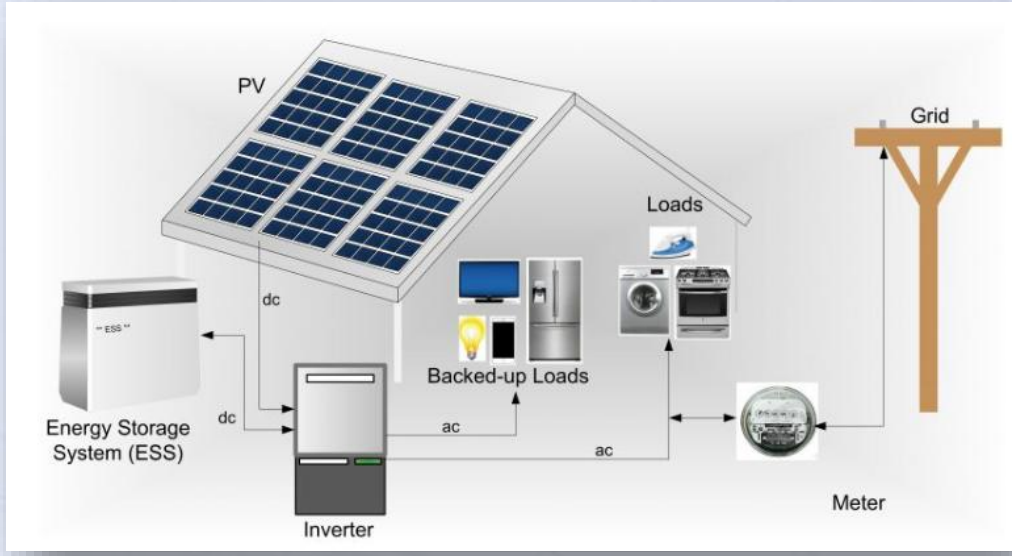
1. *ESS listed* and *labeled* in accordance with **UL 9540** and marked "For use in residential dwelling units" where installed in accordance with the manufacturer's instructions and **NFPA 70**.
2. ESS less than **1 kWh** (3.6 megajoules).

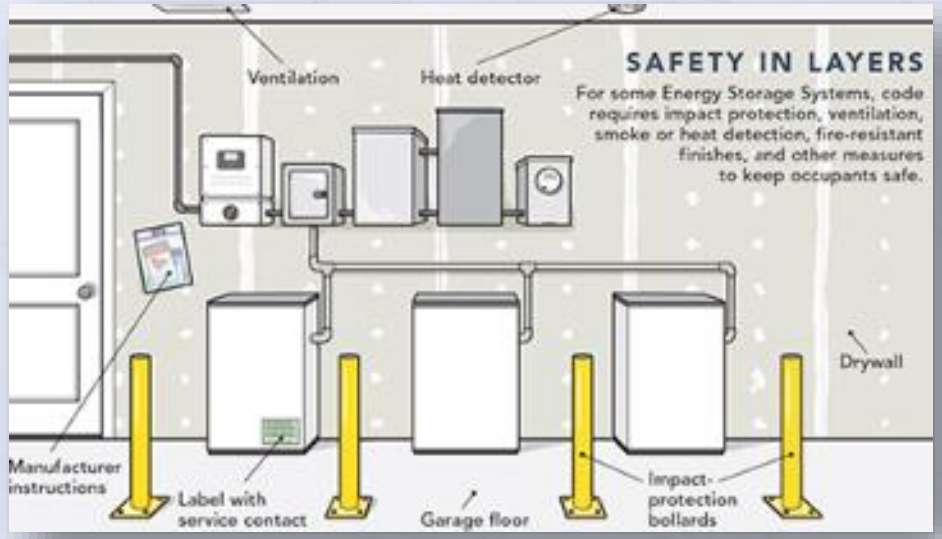
R328.2 Equipment listings. *Energy storage systems (ESS)* shall be *listed* and *labeled* in accordance with **UL 9540**.

Exception: Where *approved*, repurposed **unlisted battery systems** from electric vehicles are allowed to be installed outdoors or in detached sheds located **not less than 5 feet** from exterior walls, property lines and public ways.

R328.3 Installation. *ESS* shall be installed in accordance with the **manufacturer's instructions** and their *listing*.

R328.3.1 Spacing. Individual units shall be separated from each other by not less than **3 feet** except where smaller separation distances are documented to be adequate based on large-scale fire testing complying with **UL 9540A**





Section R328 Energy Storage Systems (Continued)

R328.4 Locations. *ESS* shall be installed only in the following locations:

1. **Detached** garages and detached accessory structures.
2. **Attached garages** separated from the *dwelling unit* living space in accordance with Section R302.6.
3. **Outdoors** or on the exterior side of exterior walls located not less than **3 feet** from doors and windows directly entering the *dwelling unit*.
4. **Enclosed utility closets, basements, storage or utility spaces** within *dwelling units* with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than **5/8-inch Type X gypsum wallboard.**

***ESS* shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.**

R328.5 Energy ratings. Individual *ESS* units shall have a maximum rating of **20 kWh**. The **aggregate rating** of the *ESS* shall not exceed:

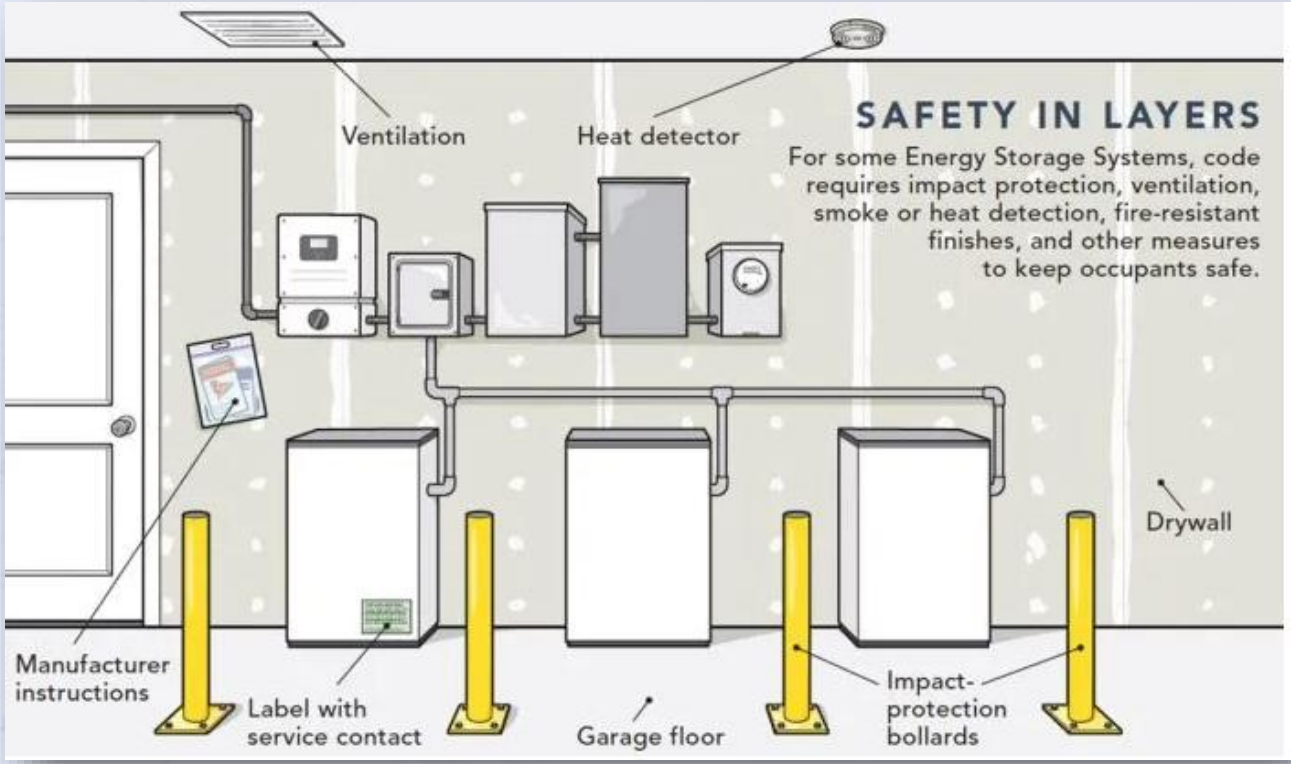
1. **40 kWh** within utility closets, basements and storage or utility spaces.
2. **80 kWh** in attached or detached garages and detached accessory structures.
3. **80 kWh** on exterior walls.
4. **80 kWh** outdoors on the ground.

Section R328 Energy Storage Systems (Continued)

R328.6 Electrical installation. *ESS* shall be installed in accordance with **NFPA 70**. Inverters shall be *listed* and *labeled* in accordance with **UL 1741** or provided as part of the **UL 9540** listing. Systems connected to the utility grid shall use **inverters *listed* for utility interaction.**

R328.7 Fire detection. Rooms and areas **within *dwelling units*, basements and attached garages** in which *ESS* are installed shall be protected by **smoke alarms in accordance with Section R314. A heat detector, *listed* and interconnected to the smoke alarms**, shall be installed in locations within *dwelling units* and attached garages where smoke alarms cannot be installed based on their listing.

R328.8 Protection from impact. *ESS* installed in a location subject to **vehicle damage** shall be protected by *approved* barriers.



Section R328 Energy Storage Systems (Continued)

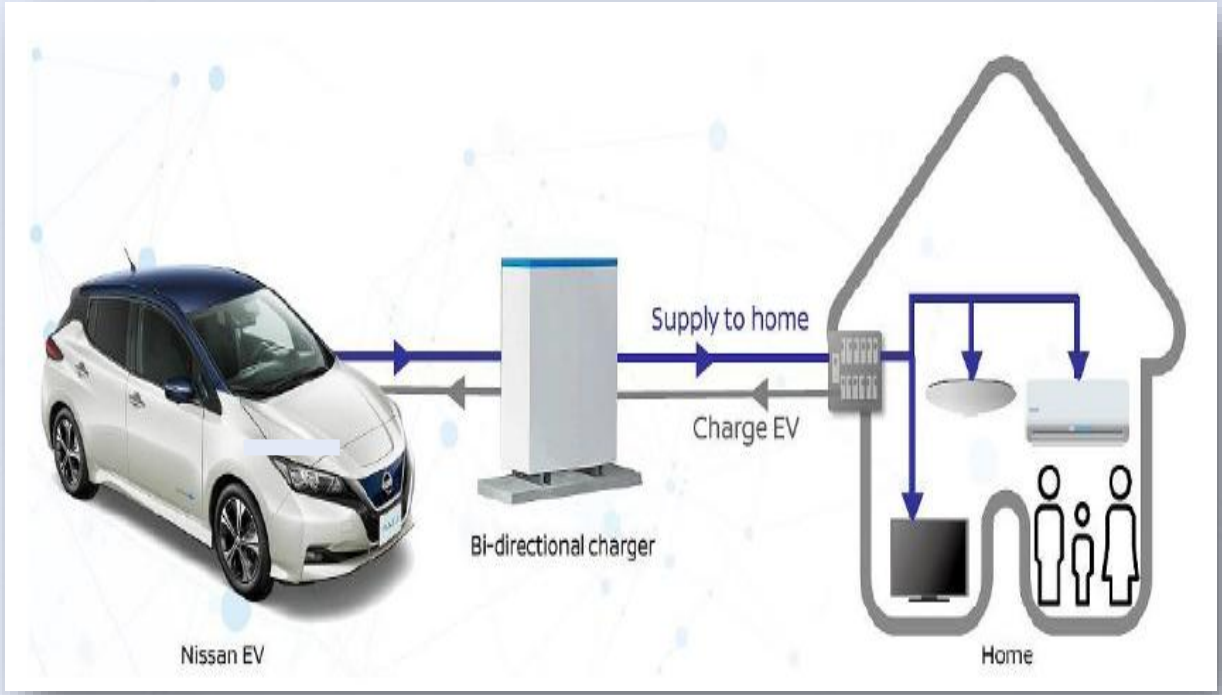
R328.9 Ventilation. Indoor installations of *ESS* **that produce hydrogen or other flammable gases** during charging shall be provided with mechanical *ventilation* in accordance with Section M1307.4.

R328.10 Electric vehicle use. The temporary use of an *owner* or occupant's **electric-powered vehicle to power a *dwelling unit*** while parked in an attached or detached garage or outdoors shall comply with the vehicle manufacturer's instructions and **NFPA 70**.

R328.11 Documentation and labeling. The following information shall be provided:

1. **A copy of the manufacturer's installation, operation, maintenance and decommissioning instructions** shall be provided to the owner or placed in a conspicuous location near the *ESS* equipment.

2. A label on the installed system containing the **contact information** for the qualified maintenance and service providers.



Section R329 Stationary Engine Generators

R329.1 General. Stationary engine generators shall be *listed* and *labeled* in accordance with **UL 2200** and shall comply with this section. The connection of stationary engine generators to the premise wiring system shall be by means of a ***listed*** **transfer switch.**

R329.2 Installation. The installation of stationary engine generators shall be in an ***approved*** **location** and in accordance with the listing, the manufacturer's installation instructions and Chapters 34 through 43.

Section R331 Docks, Piers, Bulkheads and Waterway Structures

R331.1 General. Docks, piers, bulkheads and waterway structures **shall be constructed in accordance with Chapter 36 of the North Carolina Building Code**.

Exceptions: Structures complying with the following are not required to meet the provisions of this code.

1. Docks and Piers built **over private ponds**.
2. Fixed in place walkways, docks, and piers not covered in Exception 1 and **not exceeding 144 square feet** for single family dwelling.
3. **Minor repairs to existing** docks, piers and waterway structures.

Knowledge Check

Q: Are exterior stairways not serving a building, porch or deck regulated by the code.

A: No

Q: Seismic Design requirements in Category C only apply to _____?

A: Townhomes

Q: The distance required between two detached single-family homes on a single parcel of land so that no fire resistant rated wall is required is _____ feet.

A: 10’ or 5’ from an assumed property line.

SECTION R332 LICENSED RESIDENTIAL CARE

Remains a single-family structure however these additional requirements apply

R332.1 General. Buildings in which more than three people are harbored for medical, charitable or other care or treatment shall be classified as residential care facilities. **The state agency having jurisdiction shall classify the facility as a residential care home, small residential care facility or small non-ambulatory care facility**.

R332.1.1 Fire extinguishers. Fire extinguishers shall be installed in licensed residential care facilities in accordance with the North Carolina Fire Prevention Code.

R332.1.2 Means of egress. Where **two means of egress exits are required**, the exits or exit access doors shall be so located and constructed to minimize the possibility that both may be blocked by any one fire or other emergency condition.

R332.2 Residential Care Facilities. Homes keeping no more than **six adults or six unrestrained children who are able to respond and evacuate** the facility without verbal or physical assistance, determined by the state agency having jurisdiction to be licensable, shall be classified as Single-Family Residential and comply with the requirements of this section.

R332.2.1 Means of egress. Each normally **occupied story of the facility shall have two remotely located means of egress exits**. The exits or exit access doors shall be so located and constructed to minimize the possibility that both may be blocked by any one fire or other emergency condition.

R332.2.2 Smoke Detection Systems. Smoke detectors shall be provided on all levels.

R332.2.3 Interior finishes. Interior wall and ceiling finishes shall be **Class A, B or C.**

R332.2.4 Heating appliances. Unvented fuel-fired heaters and portable electric heaters shall be prohibited.

SECTION R332 LICENSED RESIDENTIAL CARE
(continued)

R332.3 Licensed Small Residential Care Facilities. The following facilities when determined by the State Agency having jurisdiction to be licensable, shall be classified as Single-Family Residential and comply with the requirements of this section.

1. Residential Care Facilities keeping no more than six adults or six unrestrained children with no more than three who are unable to respond and evacuate without verbal or physical assistance.

2. Residential Care Facilities keeping no more than five adults or five children who are unable to respond and evacuate without verbal or physical assistance, when certifiable for Medicaid reimbursement, and when staffed 24-hours per day with at least two staff awake at all times.

3. Residential Care Facilities keeping no more than nine adults or nine children who are able to respond and evacuate without verbal or physical assistance.

R332.3.1 Fire Resistance Construction. The building shall be of **one-hour fire resistant rated construction** including all walls, partitions, floors and ceilings. Bedroom doors shall be 1.75 inches solid wood core.

Exception: No rating shall be required if the building is NFPA 13D sprinklered with a wet pipe system with a 30-minute water supply. Bathrooms, toilets, closets, pantries, storage spaces, attached garages, and utility spaces shall be sprinklered. The sprinkler system shall be monitored per North Carolina Fire Code, Section 903.4 (Section 903.4, Exception 1 is not applicable in this occupancy)

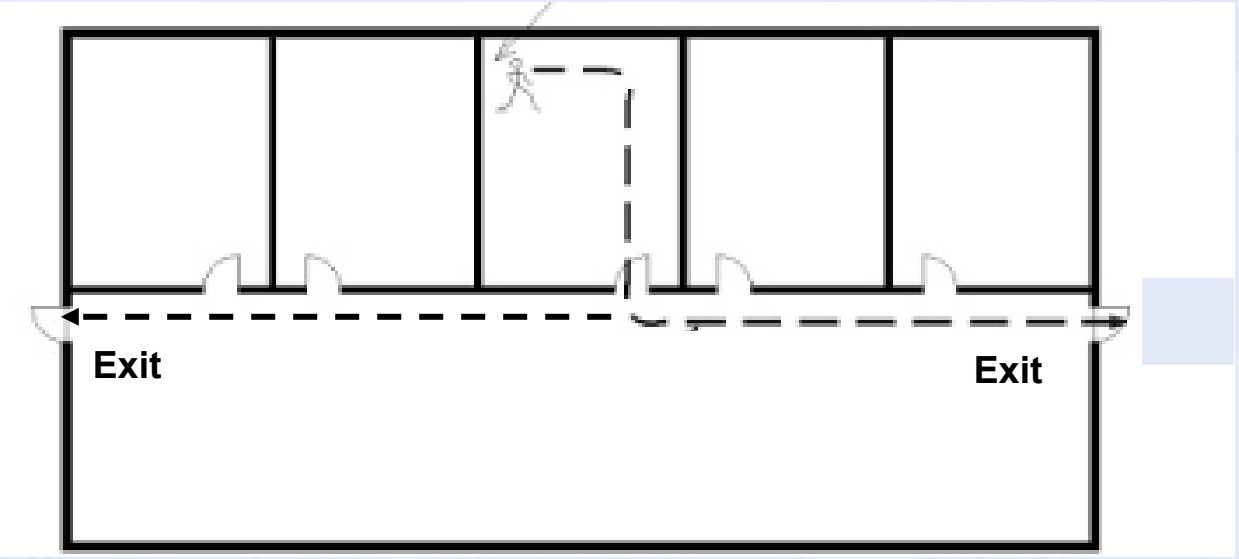
R332.3.2 Building height and area. Buildings shall not exceed two stories in height and shall not exceed 7,000 square feet per story for dwellings applying the exception in Section R332.2.1 and 12,000 square feet per story for all other dwellings. For purposes of this section, attics and basements used as habitable spaces shall be considered as stories.

SECTION R332 LICENSED RESIDENTIAL CARE (continued)

R332.3.3 Quantity of exits. **Each normally occupied story of the facility shall have two remotely located exits**. The exits doors shall be so located and constructed to minimize the possibility that both may be blocked by any one fire or other emergency condition.

R332.3.4 Egress stairs. Required facility egress stairways shall be **either exterior unenclosed or interior enclosed on each level with one-hour fire-resistant rated construction and self-closing 20-minute labeled doors**. Other interior stairways shall be enclosed on one floor level with one-hour fire resistant walls and self-closing 20-minute labeled doors.

R332.3.5 Smoke and heat detectors. **Smoke detectors** shall be provided on all levels. **Heat detectors** shall be installed in all attic spaces. The heat detectors shall be connected to the fire alarm and detection system.



SECTION R332 LICENSED RESIDENTIAL CARE (continued)

R332.3.6 Incidental accessory occupancies. Any incidental use area, as defined by North Carolina Building Code, Table 508.2.5, shall be enclosed with **one-hour fire-resistant rated construction and self-closing 20-minute labeled door or provided with an automatic sprinkler system and smoke resistant separation from other areas.**

R332.3.7 Fire alarm systems. A building fire alarm system shall be provided in accordance with NFPA 72. Provisions shall be made to **activate the internal evacuation alarm at all required exits.**

R332.3.8 Interior finishes. Interior wall and ceiling membranes shall be gypsum wallboard, plaster or other **non-combustible material.**

R332.3.9 Heating appliances. Unvented fuel-fired heaters, floor furnaces, and portable electric heaters **shall not be installed.**

R332.3.10 Occupants. Occupants **younger than six-years of age** shall **sleep on the level of exit discharge with adult supervision.**

SECTION R332 LICENSED RESIDENTIAL CARE (continued)

R332.4 Small Non-ambulatory Care Facilities. Facilities keeping **no more than six adults or six children** who are **unable to respond and evacuate without verbal or physical assistance**, when determined by the State Agency having jurisdiction to be licensable shall comply with the requirements of R332.3 for Licensed Small Residential Care Facilities.

R332.4.1 Automatic sprinkler systems. The building shall be sprinklered with a wet pipe system in accordance with **NFPA 13D with a 30-minute water supply** including bathrooms, toilets, closets, pantries, storage spaces, attached garages, and utility spaces. The sprinkler **system shall be monitored** per North Carolina Fire Code, Section 903.4. North Carolina Fire Code, Section 903.4, Exception 1 shall not apply to this section.

SECTION R333 LICENSED ADULT AND CHILD DAY CARE

Remains a single-family structure however these additional requirements apply

R333.1 Means of egress.

R333.1.1 Location. Rooms where occupants receive care shall be on the **level of exit discharge**.

R333.1.2 Quantity of Exits. Adult and child day care facilities shall have **two or more** remote means of egress.

Exception: A room where occupants receive care and comply with all of the following:

a. Located on the level of exit discharge, and

b. Has an exit door directly to the exterior.

R333.1.3 Walls and Ceilings. All walls and ceilings in rooms which are used for day care purposes and are part of an egress (exiting) path shall have **interior membranes of noncombustible construction** such as but not limited to plaster or gypsum wallboard or shall comply with Section 803 of the North Carolina Building Code.

R333.2 Portable Fire Extinguishers. At least **one 2-A:10-B:C fire extinguisher** shall be provided per floor with a maximum of 40 feet travel distance to the extinguisher.

SECTION R334 DEMOLITION

R334.1 Demolition. Where a building or structure regulated by this code has been demolished or removed, the **lot shall not create a new hazard to the site** or to adjoining properties. All utilities shall be properly terminated.

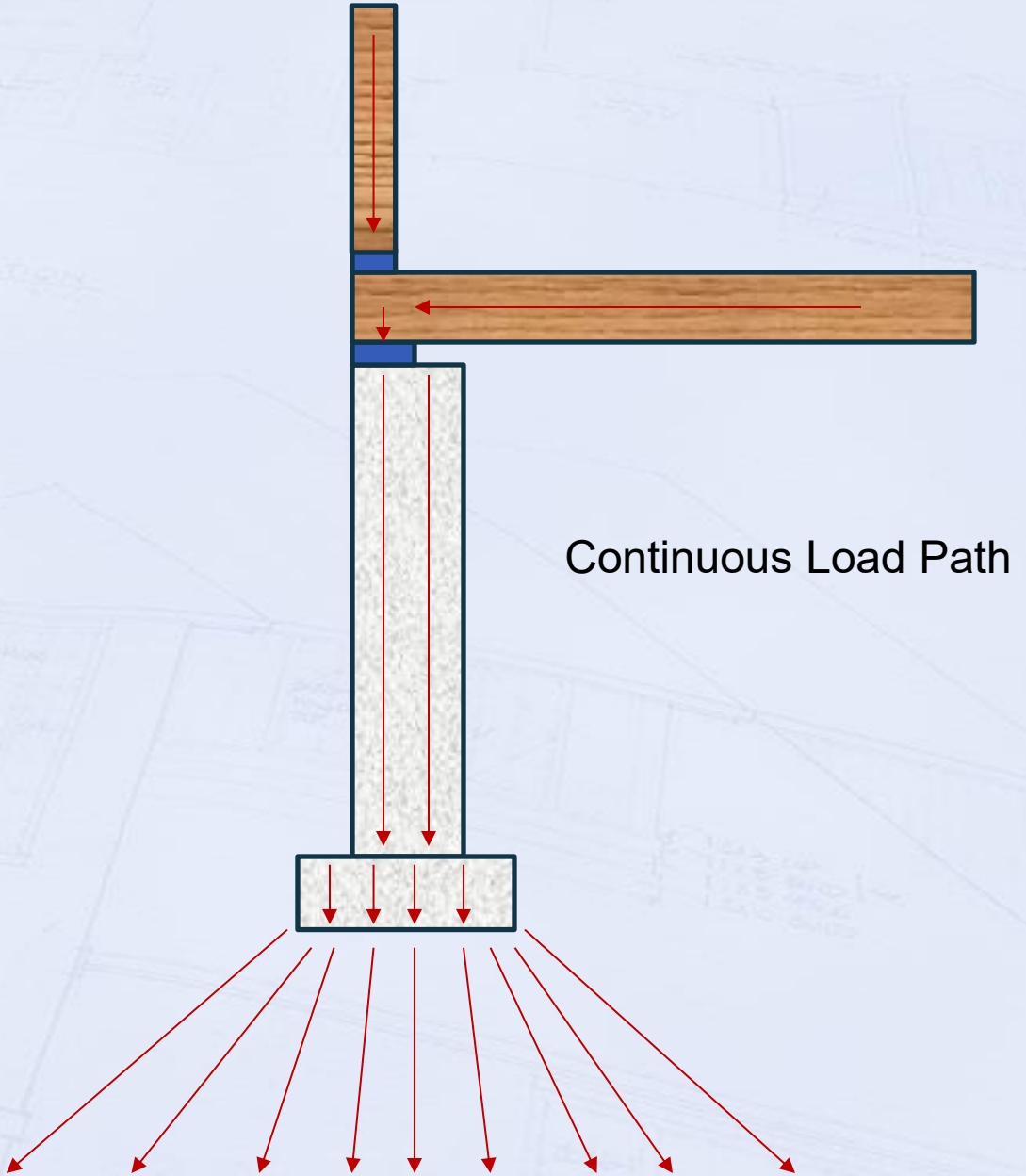
Residential Code

Chapter 4 Foundations

R401.2 Requirements

- Foundation construction shall be capable of **accommodating all loads** in accordance with **Section R301** and of transmitting the resulting loads to the supporting soil.

- **Fill soils** that support footings and foundations **shall be designed**, installed and tested in accordance with accepted engineering practice.



Continuous Load Path

R401.3 Drainage

R401.3 Drainage. Surface drainage shall be diverted to a **storm sewer conveyance** or **other *approved* point of collection** that does not create a hazard. *Lots* shall be graded to drain surface water away from foundation walls. The *grade* shall fall not fewer than **6 inches within the first 10 feet**.

Exception: Where *lot lines*, walls, slopes or other physical barriers prohibit 6 inches of fall within 10 feet, **drains or swales** shall be constructed to ensure drainage away from the structure. **Impervious surfaces within 10 feet** of the building foundation shall be sloped not less than **2 percent** away from the building.

Soil Properties

Soil properties considered for adequate support of the foundation and stability to prevent future damage to the structure.

Based on experience and known local soil conditions, the building official will often permit design based on a presumptive load-bearing value without soil testing or a geotechnical report.

The building official can allow 2000psf presumptive bearing without testing. Footnote b indicates less than 2,000 or questionable soils must be tested and R401.4.1 require a test for values over 2,000psf.

TABLE R401.4.1
PRESUMPTIVE LOAD-BEARING VALUES OF FOUNDATION MATERIALS[a]

CLASS OF MATERIAL	LOAD-BEARING PRESSURE (pounds per square foot)
Crystalline bedrock	12,000
Sedimentary and foliated rock	6,000
Sandy gravel and/or gravel (GW and GP)	5,000
Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	3,000
Clay, sandy, silty clay, clayey silt, silt and sandy siltclay (CL, ML, MH and CH)	2,000[b]

For SI: 1 pound per square foot = 0.0479 kPa.

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

b. Where the building official determines that in-place soils with an allowable bearing capacity of less than 2,000 psf are likely to be present at the site, the allowable bearing capacity shall be determined by a soils investigation.

R401.4.2 Compressible or shifting soil. Instead of a complete geotechnical evaluation, where top or subsoils are compressible or shifting, they shall be removed to a depth and width sufficient to ensure stable moisture content in each active zone and shall not be used as fill or stabilized within each active zone by chemical, dewatering or presaturation.

Table R403.1(1) [a,b,c,d]
Minimum Width of Concrete, Precast or Masonry Footings (Inches)
Load-Bearing Value of Soil (psf)

	1500	2000	3000	4000
	Light-frame wood construction			
1-STORY-Slab on grade	12	12	12	12
1-STORY-Crawlspace	14	12	12	12
1-STORY-plus basement wall	17	13	12	12
2-STORY-Slab on grade	13	12	12	12
2-STORY-Crawlspace	18	13	12	12
2-STORY-plus basement wall	21	16	12	12
3-STORY-Slab on grade	16	12	12	12
3-STORY- Crawlspace	21	16	12	12
3-STORY- plus basement wall	24	18	12	12
	Light-frame wood construction with brick veneer or 8-inch hollow concrete masonry			
1-STORY-Slab on grade	12	12	12	12
1-STORY-Crawlspace	17	13	12	12
1-STORY-plus basement wall	20	15	12	12
2-STORY-Slab on grade	19	14	12	12
2-STORY-Crawlspace	24	18	12	12
2-STORY-plus basement wall	27	20	14	12
3-STORY-Slab on grade	25	19	13	12
3-STORY- Crawlspace	30	23	15	12
3-STORY- plus basement wall	33	25	17	13
	[illegible]			
1-STORY-Slab on grade	15	12	12	12
1-STORY-Crawlspace	20	15	12	12
1-STORY-plus basement wall	23	17	12	12
2-STORY-Slab on grade	23	18	12	12
2-STORY-Crawlspace	28	21	14	12
2-STORY-plus basement wall	31	24	16	12
3-STORY-Slab on grade	32	24	16	12
3-STORY- Crawlspace	37	28	19	14
3-STORY- plus basement wall	40	30	20	15

Table Footnote

The table is based on the following conditions and loads: Building width: 36 feet; Wall height: 9 feet; Crawl space wall height: 10 feet; Basement wall height: 10 feet
Basement wall height: 8 feet

TABLE R403.1(2)
PIER[a] AND FOOTING[b] SIZES FOR SUPPORT OF GIRDERS

AREA[e]	1 (ONE) STORY		2 (TWO) STORY		$2\frac{1}{2}$ (TWO & ONE HALF) STORY	
	Pier[c, d]	Footing	Pier[c, d]	Footing	Pier[c, d]	Footing
50	8″ × 16″	1′-4″ × 2′-0″ × 8″	8″ × 16″	1′-4″ × 2′-6″ × 8″	8″ × 16″	1′-4″ × 2′-6″ × 8″
100	8″ × 16″	1′-4″ × 2′-0″ × 8″	8″ × 16″	2′-0″ × 2′-0″ × 10″	16″ × 16"	2′-6″ × 2′-6″ × 10″
150	8″ × 16″	2′-0" × 2′-0″ × 8″	16″ × 16″	2′-8″ × 2′-8″ × 10″	16″ × 16″	3′-0″ × 3′-0″ × 10″
200	8″ × 16″	2′-4" × 2′-4″ × 10″	16″ × 16″	3′-0″ × 3′-0″ × 10″	16″ × 16″	4′-0″ × 4′-0″ × 1′-0″
250	—	—	16″ × 16″	3′-4″ × 3′-4″ × 1′-0"	16″ × 24″	4′-0″ × 4′-0″ × 1′-0″
300	—	—	16″ × 16″	3′-8″ × 3′-8″ × 1′-0"	16″ × 24″	4′-6″ × 4′-6″ × 1′-0″

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

a. Pier sizes are based on hollow CMU capped with 4 inches of solid masonry or concrete for 1 (one) story and 8 inches of solid masonry or concrete for 2 (two), $2\frac{1}{2}$ (two and one half) or 3 (three) story houses or shall have cavities of the top course filled with concrete or grout or other approved methods. Mortar shall be Type S. A minimum footing width of 12 inches is acceptable for monolithic slab foundations.

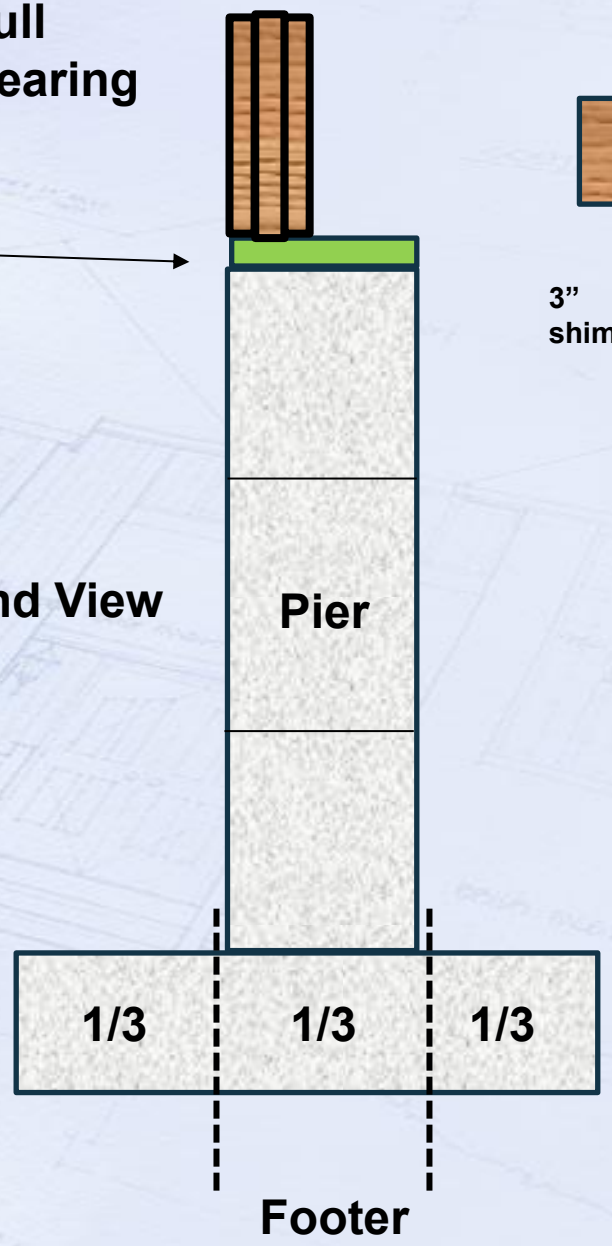
b. Footing sizes are based on 2000 psf allowable soil bearing and 2500 psi concrete. This table is based on the limitations of a tributary area using dimensional framing lumber only.

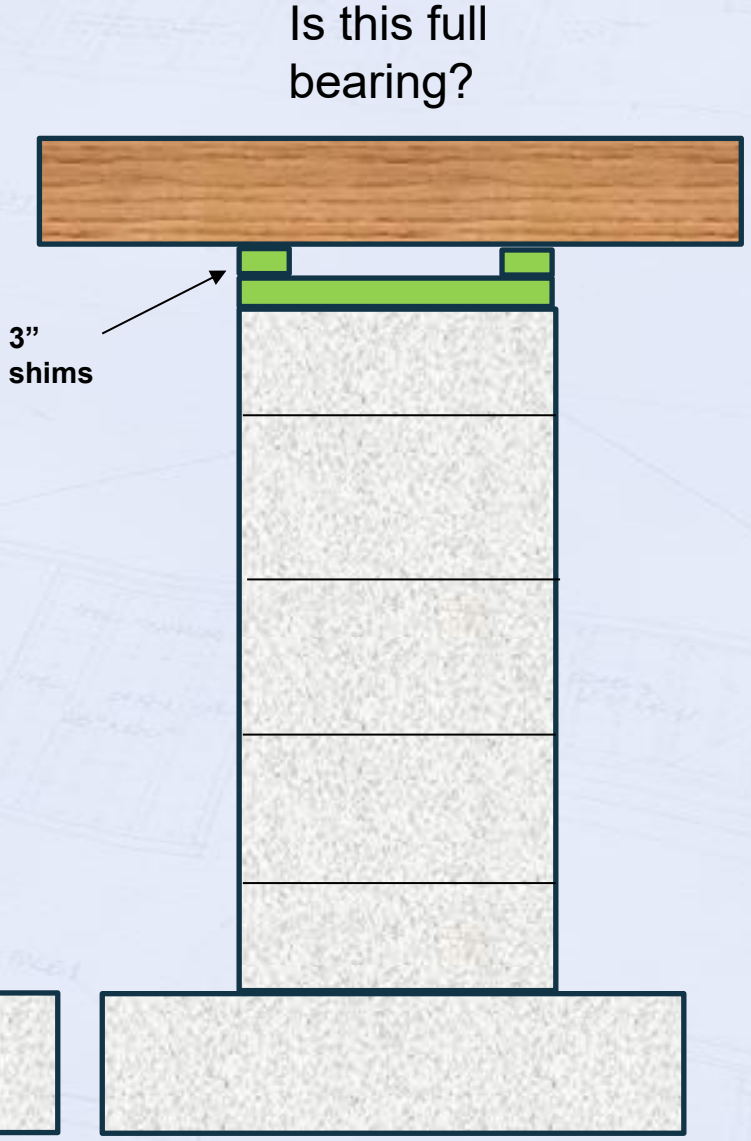
c. Centers of piers shall bear in the middle one-third of the footings. Girders must have full bearing on piers. Footings shall be full thickness over the entire area of the footing.

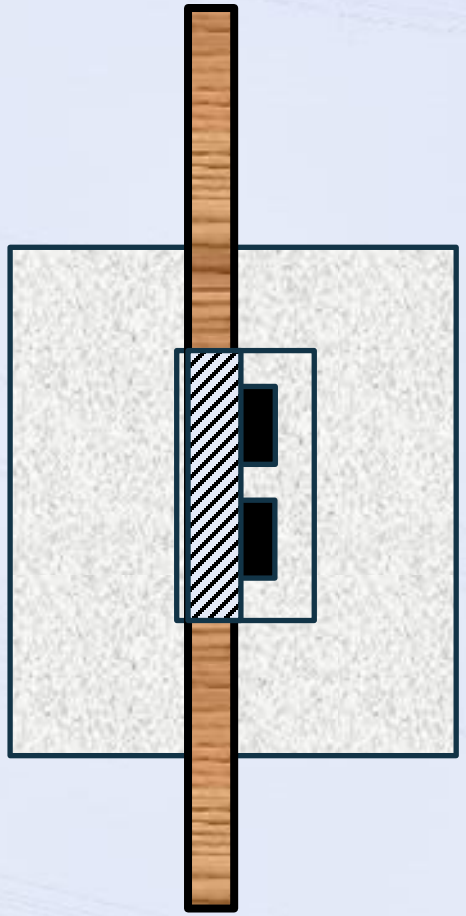
d. Pier sizes given are minimum. For height/thickness limitations see Section R606.7.

e. Area at first level supported by pier and footing in square feet.

Table R403.1(2)
Footnote c







R403.1.4 Minimum depth

All foundation systems and exterior footings shall extend below the frost line specified in Table R301.2(1). In no case shall the **bottom of the exterior footings be less than 12 inches** below the finished grade.

Exception: Footings and foundations erected on solid rock shall not be required to extend below the frost line.

SUBJECT TO DAMAGE FROM		
Weathering[a]	Frost line depth[d]	Termite[e]
Moderate	Minimum 12 inches	Moderate-Heavy

d) Check with local jurisdiction for frost line depth.

R404.1.5.4 Piers

The unsupported height of masonry piers shall not exceed **10 times their least dimension.** When structural clay tile or hollow concrete masonry units are used for isolated piers to support beams and girders, the cellular spaces shall be filled solidly with concrete or Type M or S mortar, except that unfilled hollow piers may be used if their unsupported height is not more than **four times their least dimension**. When hollow masonry units are solidly filled with concrete or Type M or S mortar, the allowable compressive stress may be increased as provided in Table R606.9.

10X Solid

4X Hollow

R404.4 Retaining walls

Retaining walls **that meet the following** shall be **designed by a registered design professional**.

1. Any retaining walls on a residential site that **cross over adjacent property lines** regardless of vertical height, or

2. Retaining walls that **support buildings and their accessory structures**, undercutting footings 10’ or less per R403.1.9 and Figure 403.1.9, or

3. Individual retaining walls supporting unbalanced backfill **exceeding 5 feet in height within a horizontal distance of 15 feet or less**, or

4. Multiple retaining walls providing a cumulative vertical relief of unbalanced backfill heights greater than **5 Feet within a horizontal distance of 15 feet or less**.

Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning.

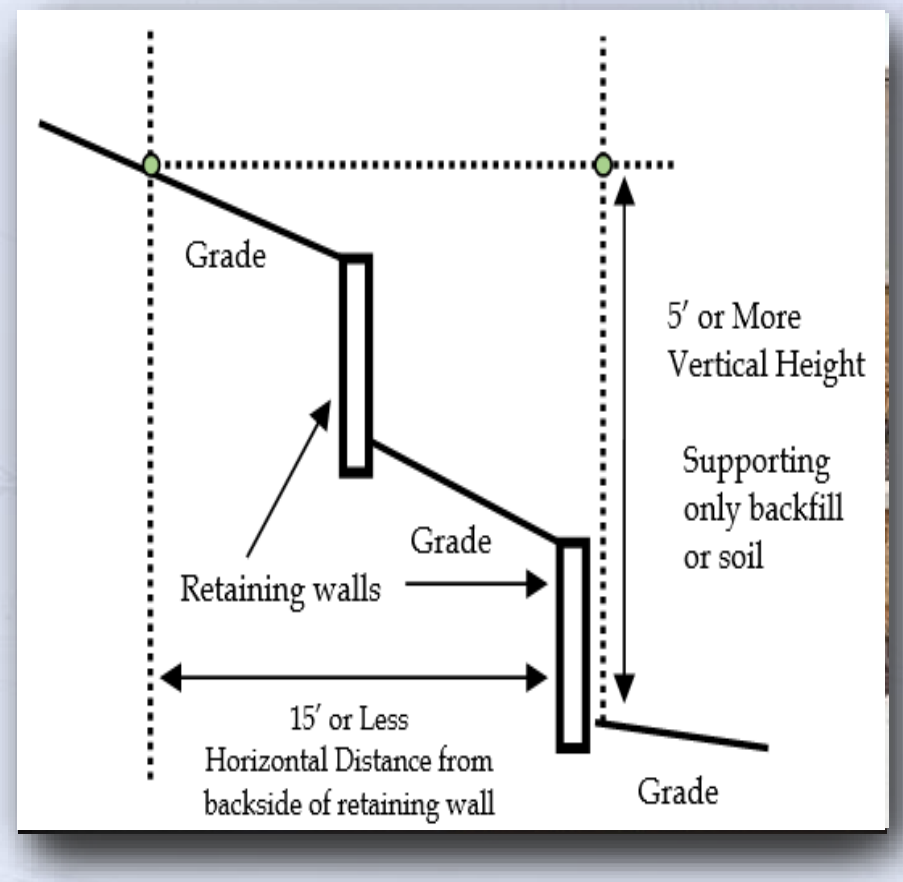
Multiple walls 5’ in 15’ rule

Walls supporting Buildings/Structures

Single walls 5’ in 15’ rule

Multiple walls 5’ in 15’ rule

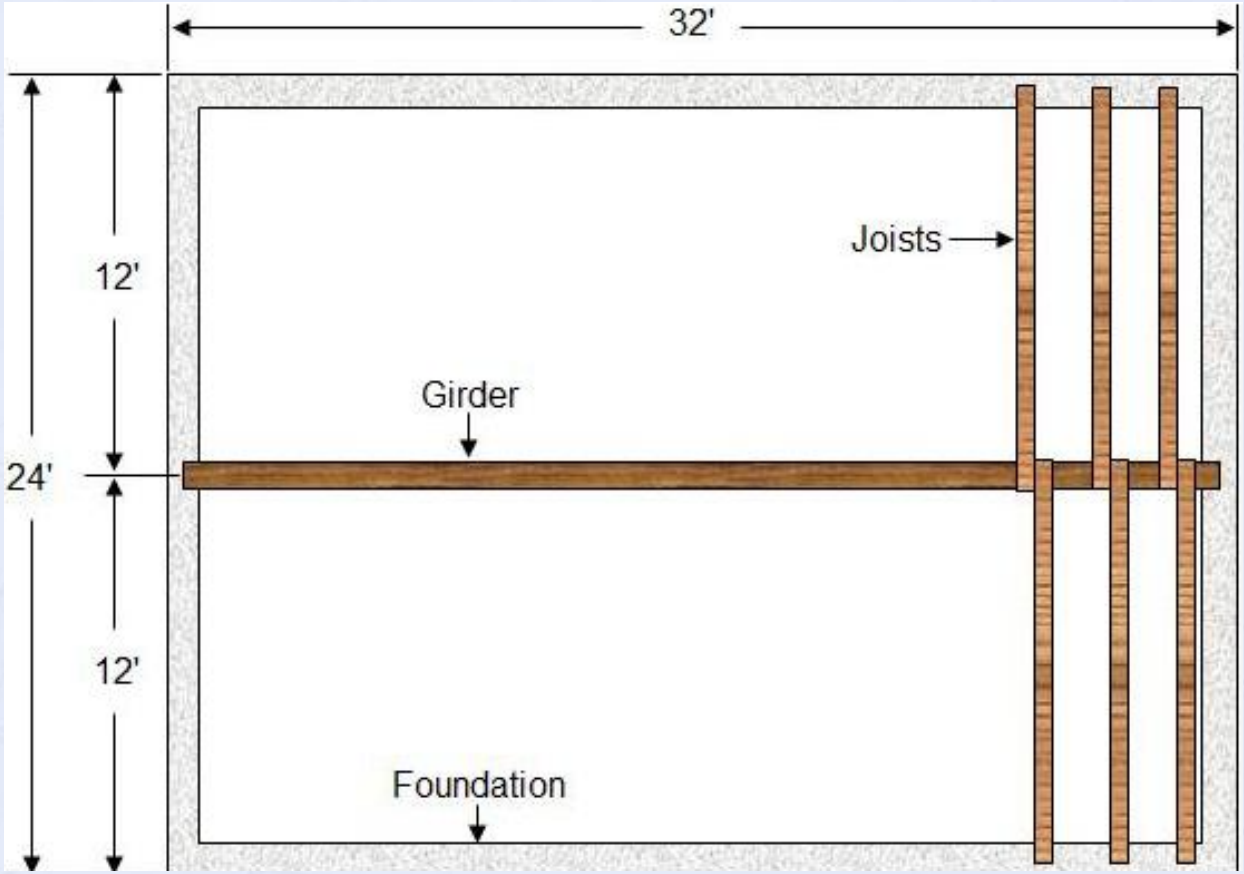
Safety factor design 1.5



R502.5 Allowable Girder Spans

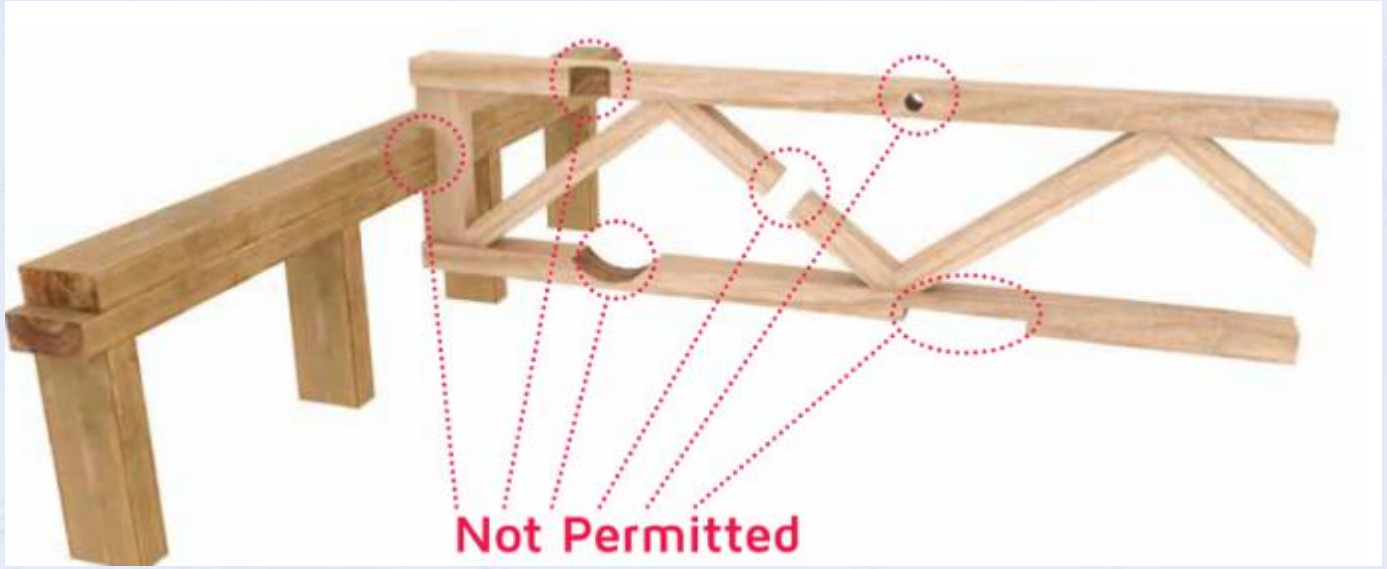
Tables R602.7(1), R602.7(2) and R602.7(3) list allowable spans for girders:

- Table R602.7(1) for **exterior bearing walls**.
- Table R602.7(2) for **interior bearing walls or the center girder** in a basement that supports floors above.
- Table R602.7(3) for **open porches**

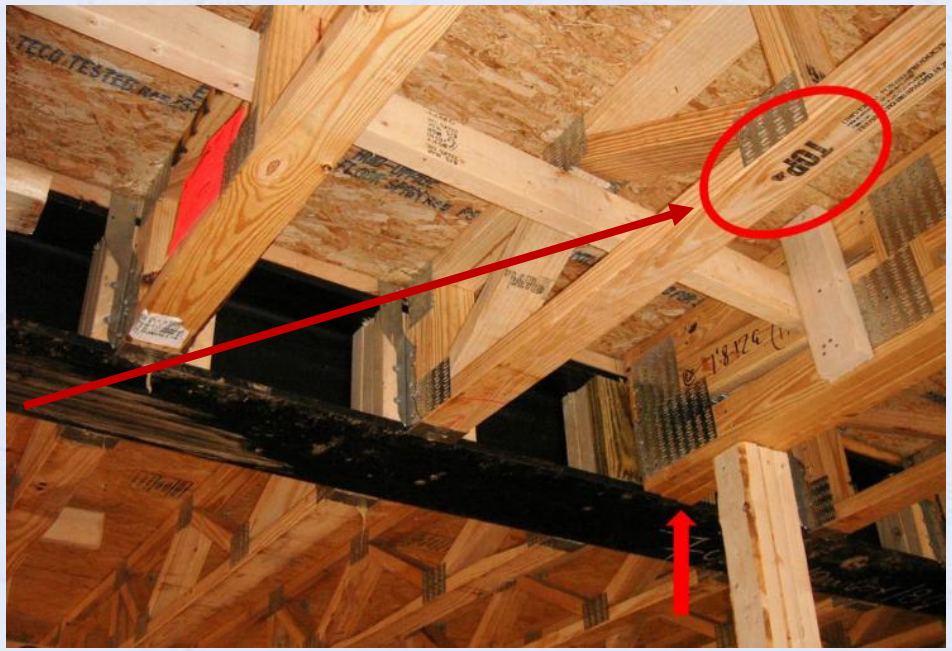


R502.11.3 Alterations to Trusses

Truss members and components shall **not be cut, notched, spliced or otherwise altered in any way** without the approval of a *registered design professional*. *Alterations* resulting in the addition of load that exceeds the design load for the truss, shall not be permitted without verification that the truss is capable of supporting the additional loading.



Is this an alteration



R506.2.3 Vapor retarder

A **minimum 6-mil** vapor retarder **conforming to ASTM E1745 Class A requirements** with joints lapped not less than **6 inches** shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.

Exception: The vapor retarder is not required for the following:

1. **Garages, utility buildings** and other unheated *accessory structures*.
2. For **unheated storage rooms** having an area of less than **70 square feet** and carports.
3. **Driveways, walks, patios** and other flatwork not likely to be enclosed and heated at a later date.
4. **Where *approved* by the *building official***, based on local site conditions.

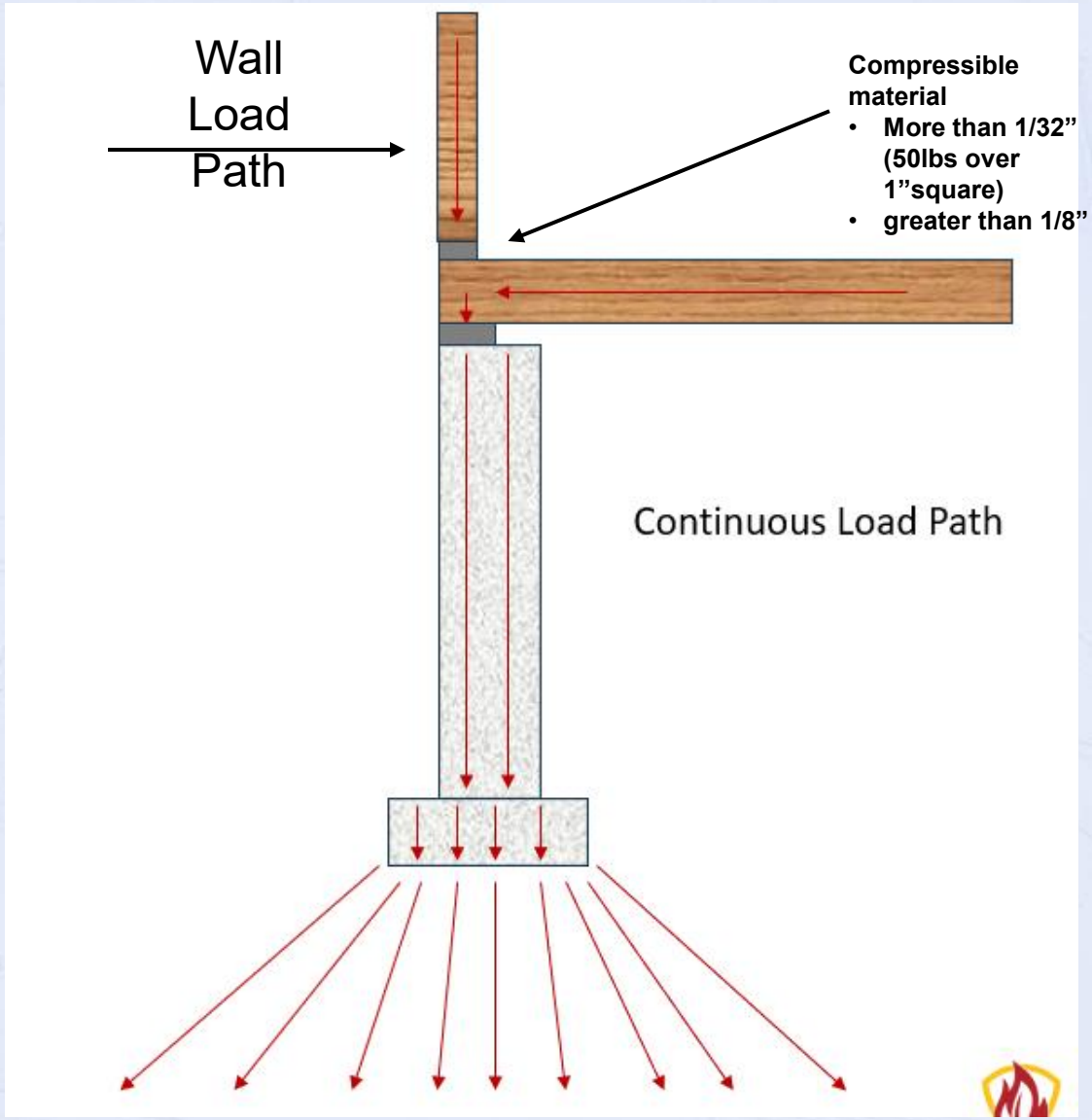
Residential Code

Chapter 6 Walls

Section R601 General

R601.2 Requirements. Wall construction shall be capable of **accommodating all loads imposed** in accordance with Section R301 and of transmitting the resulting loads to the supporting structural elements.

R601.2.1 Compressible floor-covering materials. Compressible floor-covering materials that compress **more than 1/32 inch** when subjected to **50 pounds** (23 kg) applied **over 1 inch square** of material and are **greater than 1/8 inch** in thickness in the uncompressed state **shall not extend beneath walls, partitions or columns, which are fastened to the floor.**



R602.7.5 Supports for headers

Headers shall be supported on each end with **one or more jack studs** or with *approved* framing anchors in accordance with **Table R602.7(1)** or R602.7(2). The full-height stud adjacent to each end of the header shall be end nailed to each end of the header in accordance with **Table R602.3(1).** The **minimum number of full-height stu**ds at each end of a header shall be in accordance with **Table R602.7.5**.

TABLE R602.7.5

MINIMUM NUMBER OF FULL-HEIGHT STUDS AT EACH END OF HEADERS IN EXTERIOR WALLS[a]

MAXIMUM HEADER SPAN (feet)	ULTIMATE DESIGN WIND SPEED AND EXPOSURE CATEGORY	
	< 140 mph, Exposure B or < 130 mph, Exposure C	≤ 115 mph, Exposure B[b]
4	1	1
6	2	1
8	2	1
10	3	2
12	3	2
14	3	2
16	4	2
18	4	2

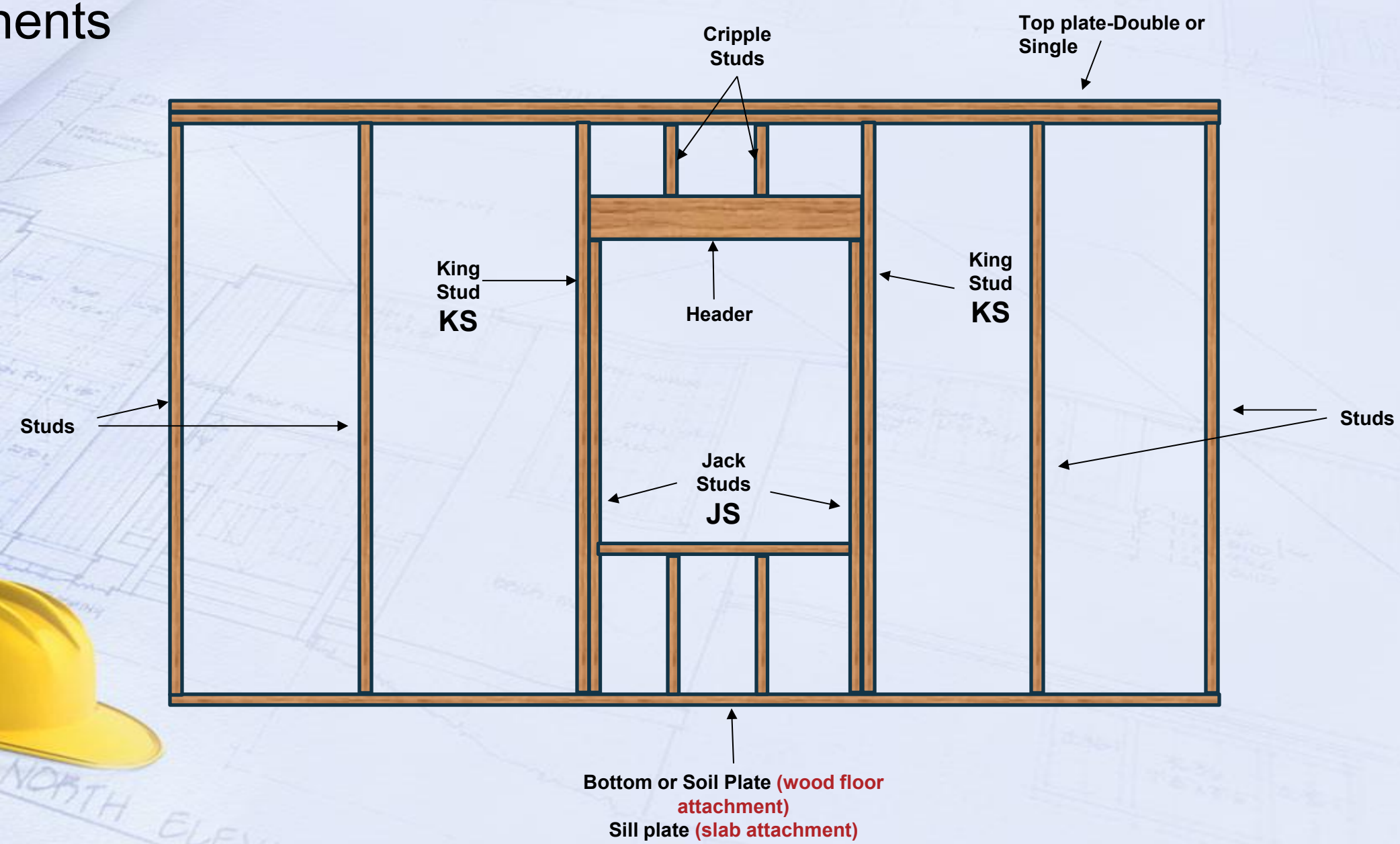
King Studs

R602.3 Design and construction (continued)

Studs shall be continuous from support at the **sole plate to a support at the top plate** to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof *diaphragm* or shall be designed in accordance with accepted engineering practice.

Exception: Jack studs, trimmer studs and cripple studs at openings in walls that comply with Tables R602.7(1) and R602.7(2).

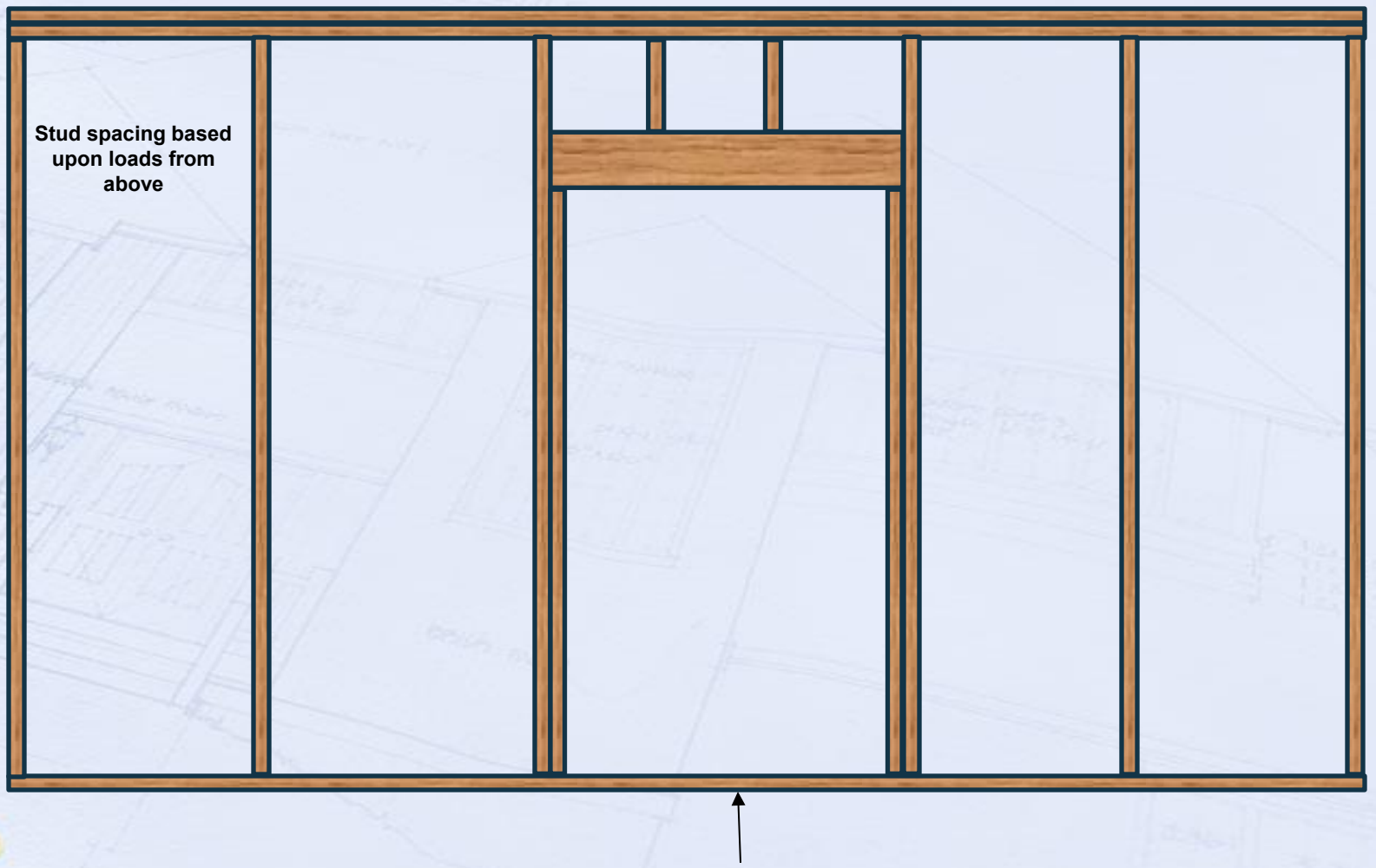
What makes up a wall-Key components



What makes up a wall

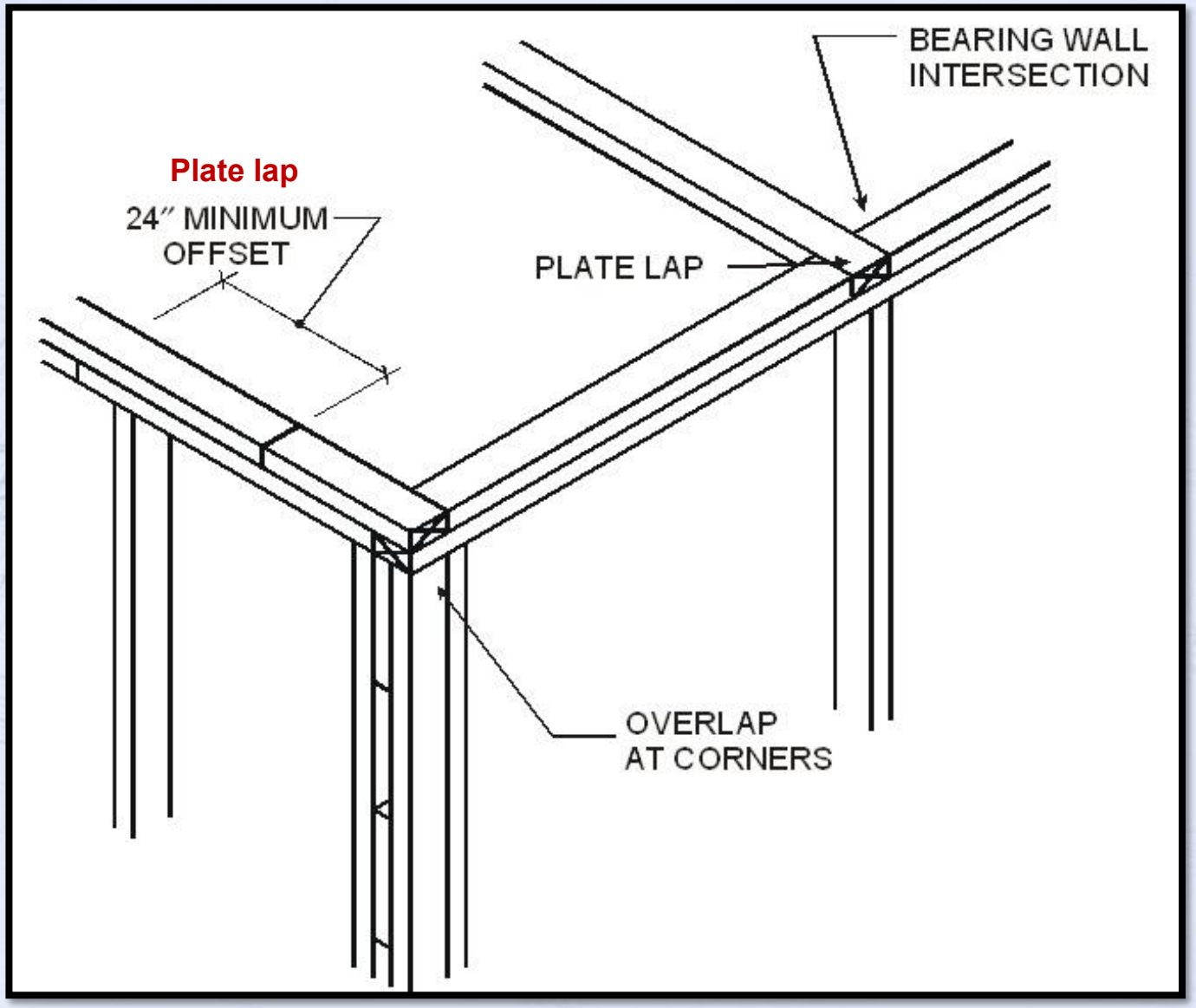
2 Types of wall-
Bearing or Non-Bearing
Different rules apply

BEARING WALL



Stud height 10’ per table R602.3(5) or limited application alternate table R

R602.3.2 Top Plate



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R602.6 Drilling and Notching of Studs

Stud in exterior wall or bearing partition

- Notch ≤ 25% of width.

Stud in non-bearing partition

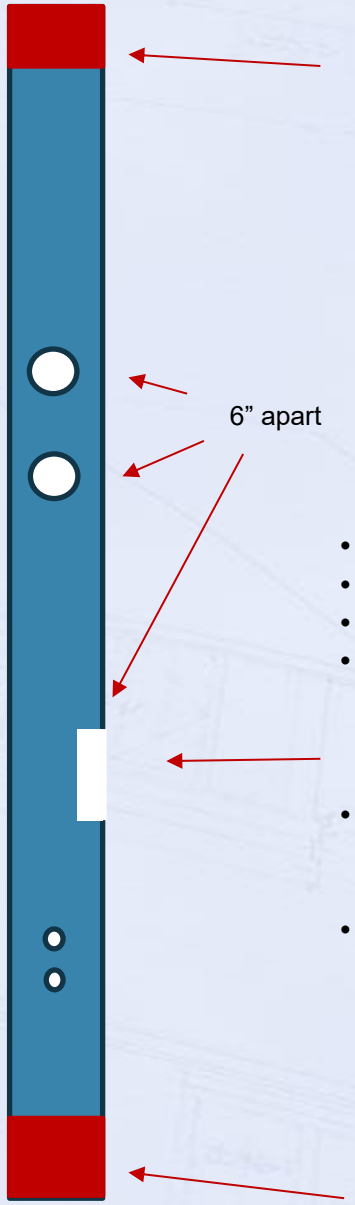
- Notch ≤ 40% of its width.

Notch can only be on one side of the stud

Bored holes:

Studs in exterior walls or bearing partitions drilled 40%–60% must be doubled, with no more than two successive doubled studs bored.

- 40% Bearing
- 60% non-bearing
- Holes must be 6” from each other except 5/8” hole can be as close as 1 ½”
- Hole must be 5/8” or more from edge of stud or treat as a notch
- Extra options for bearing:
- 60% allowed if doubled and no more than 2 successive & holes must be 6” from each other



- 25% Bearing
- 40% non-bearing
- One side only
- No notch in top or bottom 6” of bearing stud

- Holes and notches cannot be closer than 6” from each other
- Can increase notching to 65% if reinforced

R602.6 Drilling and Notching of Studs

3. Cutting

Cutting and notching of studs may be increased to 65% of the width of the stud in exterior and interior walls and bearing partitions, provided that one of the following conditions are met:

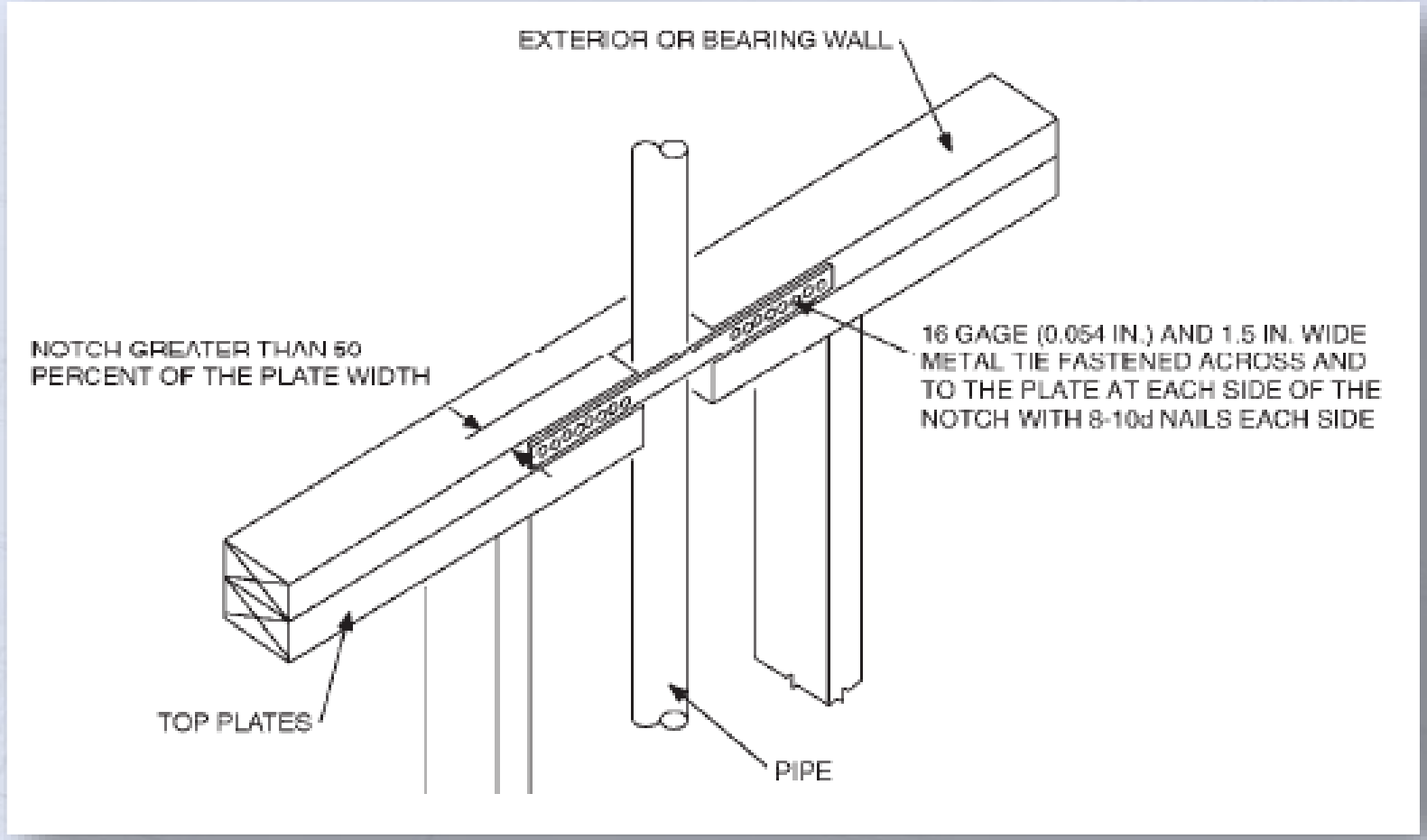
(a). The wall section is reinforced with ½-inch exterior grade plywood or equivalent reinforcement on the notched side of the wall. Plywood, if used, shall reach from the floor to ceiling and at least one stud further on each side of the section that has been notched or cut.

(b)The exterior walls of a kitchen may be reinforced by placing 1/2 inch plywood or equivalent reinforcement on the notched side of the wall. Plywood, if used, shall reach from the floor to counter-top height and at least one stud further on each side of the section that has been notched or cut.

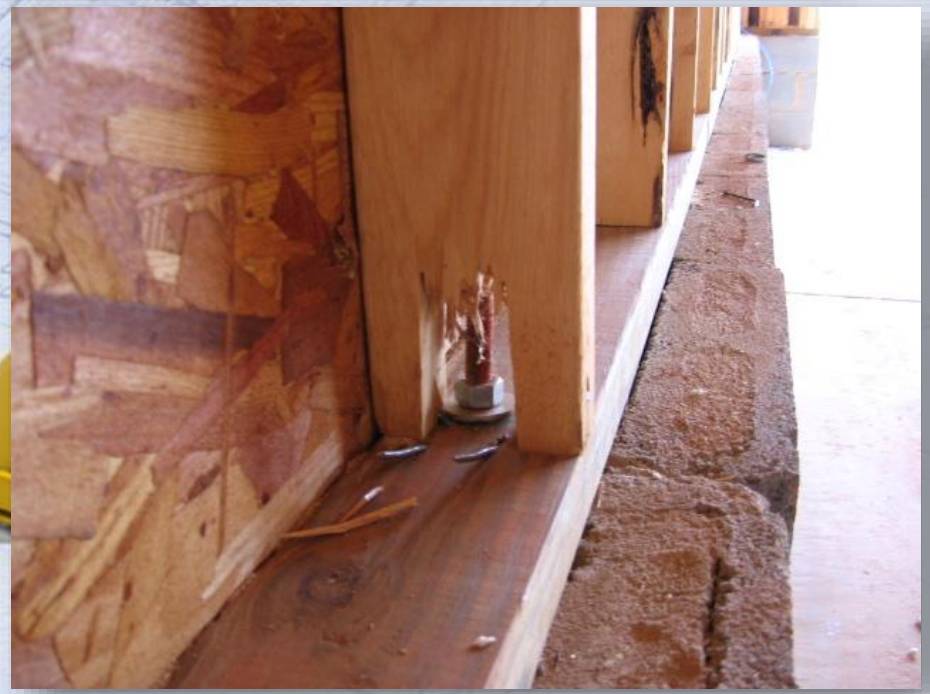
R602.6.1 Drilling and Notching of Top Plate

When a metal tie is required:

- Extend at least 6 inches beyond each side of the opening
- 0.054-inches thick (16 ga)
- 1 ½-inches wide
- Fasteners must be 1½ inch long, 10D nails (joist hanger nails). A minimum of 8 must be used.




HOME



Knowledge Check

Q: Can a 5/8” hole be drilled in the bottom 6” of a load bearing stud.

A: Yes, the limitation on top and bottom 6” applies only to notches.

Q: The standard rule for grade fall away from a structure is 2%? (True or False)

A: False, 2% applies to areas like porches, the grade is 6” in 10’ as a standard rule.

Q: A masonry pier must have full bearing on a footer? (True or False)

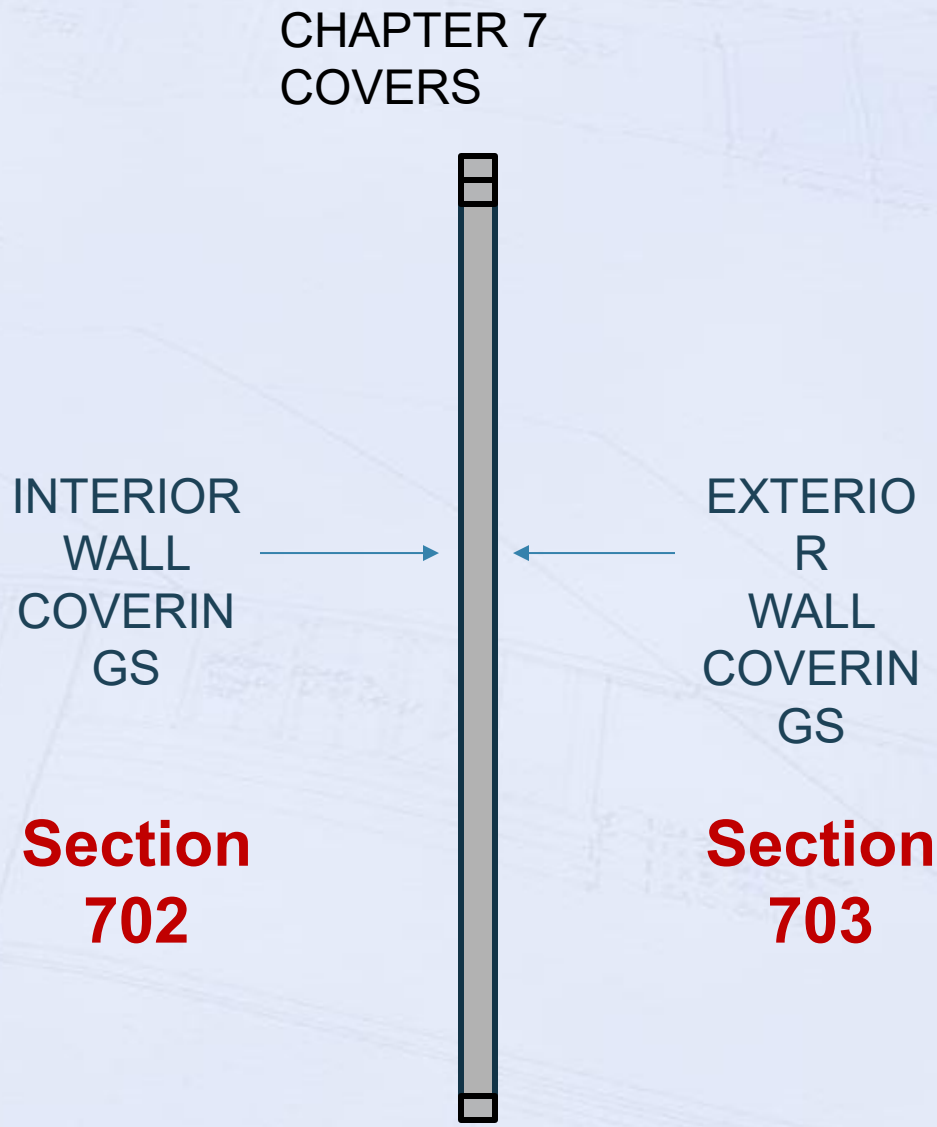
A: False, a pier must be in the center 1/3 of a footer, girder must have full bearing.

Residential Code

Chapter 7 Wall Covering

SECTION R701 GENERAL

R701.2 Installation. Products sensitive to adverse weather shall not be installed until adequate weather protection for the installation is provided. **Exterior sheathing shall be dry before applying exterior cover.**



R703.2 Water-resistive Barrier

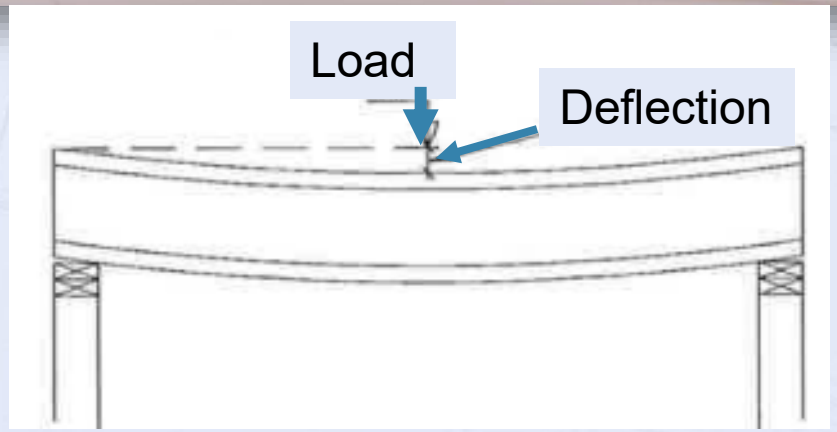
A minimum one layer of water-resistive barrier shall be applied over studs or sheathing of all exterior walls with flashing as indicated in **Section R703.4**, in such a manner as to provide a continuous water-resistive barrier **behind the exterior wall veneer**. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Water-resistive barrier materials shall comply with one of the following:

1. **No. 15 felt** complying with ASTM D226, Type 1.
2. **ASTM E2568**, Type 1 or 2.
3. **ASTM E331** in accordance with Section R703.1.1.
4. **Other approved materials** in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and water-resistive barriers complying with **ASTM E2556 shall be applied horizontally**, with the upper layer lapped over the lower layer not less than **2 inches** and where joints occur, shall be lapped not less than **6 inches**.

R703.8.2 Exterior veneer support

Exterior masonry veneers having an installed weight of **40 pounds per square foot or less shall be permitted to be supported on wood construction.** Where masonry veneer supported by wood construction adjoins masonry veneer supported by the foundation, there shall be a movement joint between the veneer supported by the wood construction and the veneer supported by the foundation. The wood construction supporting the masonry veneer shall be designed to limit the **deflection to 1/600 of the span** for the supporting members. The design of the wood construction shall consider the weight of the veneer and any other loads.



R703.8.2.1 Support by steel angle

A minimum 6-inch by 4-inch by 5/16-inch steel angle, with the long leg placed vertically, shall be anchored to **double 2-inch by 4-inch** wood studs at a maximum on-center spacing of **16 inches**. Anchorage of the steel angle at every double stud spacing shall be a minimum of **two 7/16-inch-diameter by 4-inch lag screws at every double stud or shall be a minimum of two 7/16-inch diameter by 4 inches lag screws into solid double blocking with each pair of lag screws spaced at horizontal intervals not to exceed 16 inches**. The steel angle shall have a minimum clearance to underlying construction of **1/16 inch**. A minimum of **two-thirds** the width of the masonry veneer thickness shall bear on the steel angle. Flashing and weep holes shall be located in the masonry veneer in accordance with **Figure R703.8.2.1.** The maximum height of masonry veneer above the steel angle support shall be **12 feet 8 inches**. The airspace separating the masonry veneer from the wood backing shall be in accordance with Sections **R703.8.4 and R703.8.4.2**. The method of support for the masonry veneer on wood construction steel angle shall be constructed in accordance with **Figure R703.8.2.1**.

The maximum slope of the roof construction **without stops** shall be 7:12. Roof construction with slopes greater than 7:12 but not more than 12:12 shall have stops of a minimum **3-inch by 3-inch by 1/4-inch steel plate welded to the angle at 24 inches on center** along the angle or as *approved* by the *building official*.

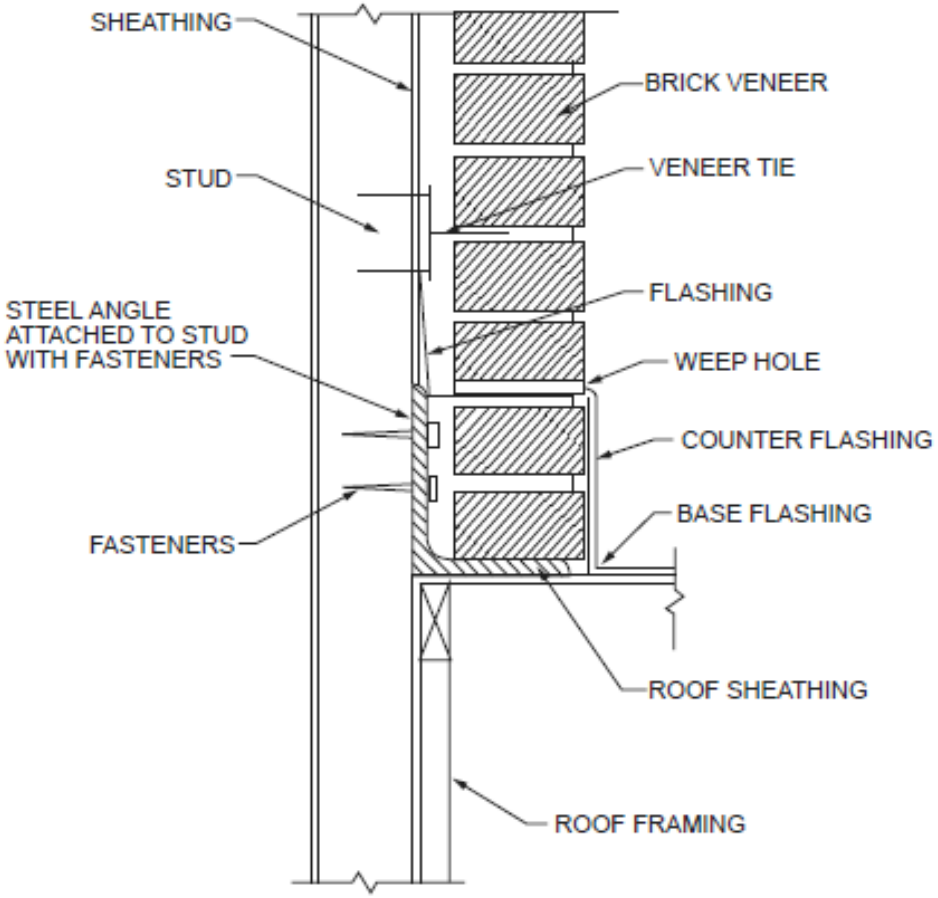


FIGURE R703.8.2.1
EXTERIOR MASONRY VENEER SUPPORT BY STEEL ANGLES

R703.8.2.1 Support by roof construction

A steel angle shall be placed directly on top of the roof construction. The roof supporting construction for the steel angle shall consist of not fewer than **three 2-inch by 6-inch wood members** for wood construction or three 550S162 cold-formed steel members for cold-formed steel light frame construction. A wood member abutting the vertical wall stud construction shall be anchored with not fewer than **three 5/8-inch diameter by 5-inch lag screws to every wood stud spacing**. Each additional wood roof member shall be anchored by the use of two 10d nails at every wood stud spacing. A cold-formed steel member abutting the vertical wall stud shall be anchored with not fewer than nine No. 8 screws to every cold-formed steel stud. Each additional cold-formed steel roof member shall be anchored to the adjoining roof member using two No. 8 screws at every stud spacing. Not less than **two-thirds the width** of the masonry veneer thickness shall bear on the steel angle. **Flashing and weep holes** shall be located in the masonry veneer wythe in accordance with **Figure R703.8.2.2**. The maximum height of the masonry veneer above the steel angle support shall be **12 feet 8 inches**. The **airspace** separating the masonry veneer from the wood backing shall be in accordance with **Sections R703.8.4 and R703.8.4.2**. The support for the masonry veneer shall be constructed in accordance with Figure R703.8.2.2. The maximum slope of the roof construction **without stops** shall be 7:12. Roof construction with slopes greater than 7:12 but not more than 12:12 shall have stops of a **minimum 3-inch by 3-inch by 1/4-inch steel plate welded to the angle at 24 inches on center along the angle** or as *approved* by the *building official*.

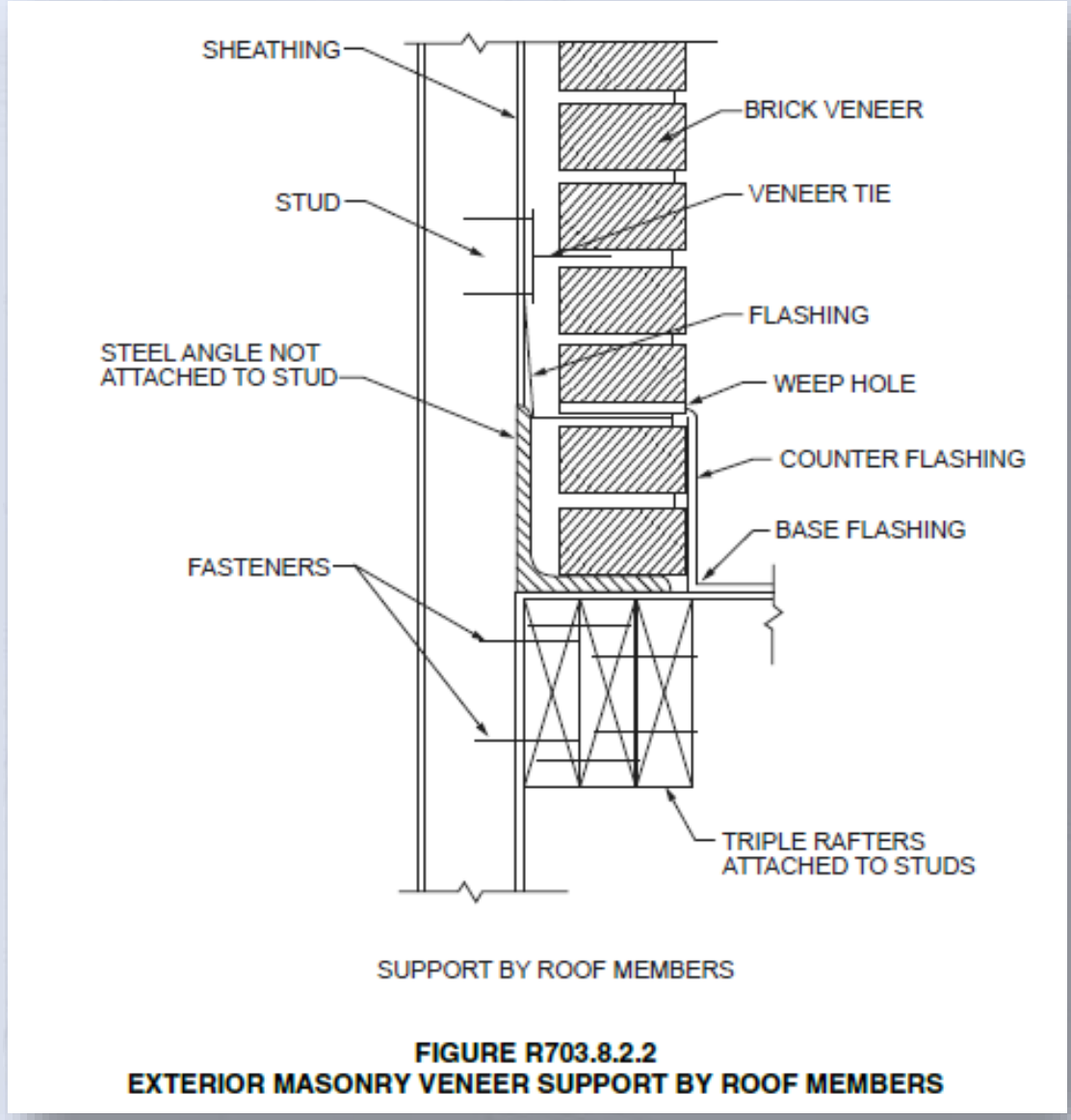


FIGURE R703.8.2.2
EXTERIOR MASONRY VENEER SUPPORT BY ROOF MEMBERS

R703.8.3 Lintels

Masonry veneer **shall not** support any vertical load other than the **dead load of the veneer above**. Veneer above openings shall be supported on lintels of ***noncombustible materials***. The lintels shall have a length of bearing not less than **4 inches**. Steel lintels shall be shop coated with a **rust-inhibitive paint, except for lintels made of corrosion-resistant steel or steel treated with coatings to provide corrosion resistance**. Construction of openings shall comply with either Section R703.8.3.1 or 703.8.3.2.

R703.8.3.1 Allowable span. The allowable span shall not exceed the values set forth in Table R703.8.3.1.

TABLE R703.8.3.1
ALLOWABLE SPANS FOR LINTELS SUPPORTING MASONRY VENEER [a, b, c, d, e]

SIZE OF STEEL ANGLE [a, c, d] (inches)	NO STORY ABOVE	ONE STORY ABOVE	TWO STORIES ABOVE	NO. OF 1/2-INCH OR EQUIVALENT REINFORCING BARS IN REINFORCED LINTEL [b, d]
3 × 3 × 1/4	6′-0″	4′-6″	3′-0″	1
4 × 3 × 1/4	8′-0″	6′-0″	4′-6″	1
5 × 31/2 × 5/16	10′-0″	8′-0″	6′-0″	2
6 × 31/2 × 5/16	14′-0″	9′-6″	7′-0″	2
2-6 × 31/2 × 5/16	20′-0″	12′-0″	9′-6″	4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. Long leg of the angle shall be placed in a vertical position.
b. Depth of reinforced lintels shall be not less than 8 inches and all cells of hollow masonry lintels shall be grouted solid. Reinforcing bars shall extend not less than 8 inches into the support.
c. Steel members indicated are adequate typical examples; other steel members meeting structural design requirements shall be permitted to be used.
d. Either steel angle or reinforced lintel shall span opening.
e. Span over 4 feet (1219 mm) shall be shored until cured.

With permission from ICC
08/02/2024 to 08/02/2025

TABLE R703.8.3.2
HEIGHT OF MASONRY VENEER ABOVE OPENING

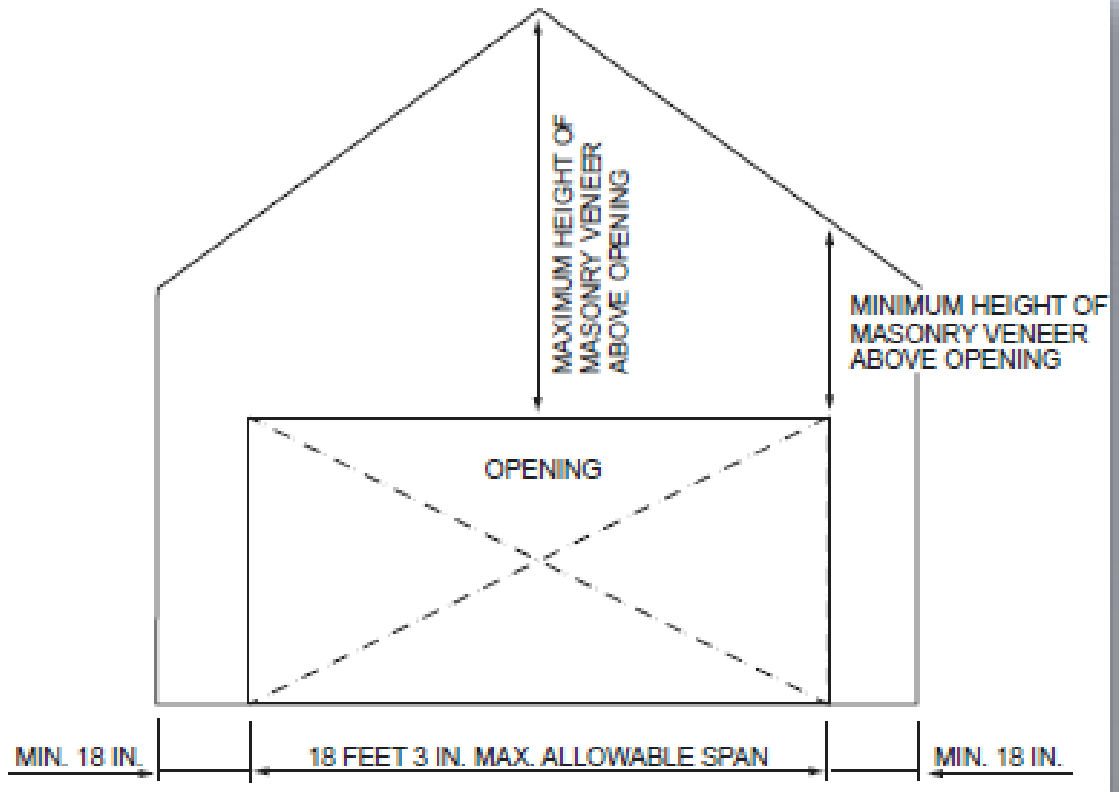
MINIMUM HEIGHT OF MASONRY VENEER ABOVE OPENING (INCH)	MAXIMUM HEIGHT OF MASONRY VENEER ABOVE OPENING (FEET)
13	< 5
24	5 to < 12
60	12 to height above support allowed by Section R703.8

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

R703.8.3.2 Maximum span

The allowable span **shall not exceed 18 feet 3 inches** and shall be **constructed to comply with Figure R703.8.3.2** and the following:

1. Provide a minimum length of **18 inches** of masonry veneer on each side of opening as shown in Figure R703.8.3.2.
2. Provide a minimum **5-inch by 31/2-inch by 5/16-inch steel angle** above the opening and shore for a minimum of 7 days after installation.
3. Provide **double-wire joint reinforcement** extending **12 inches** beyond each side of the opening. Lap splices of joint reinforcement not less than **12 inches**. Comply with **one** of the following:
    - 3.1. Double-wire joint reinforcement shall be **3/16-inch** diameter and shall be placed in the **first two bed joints** above the opening.
    - 3.2. Double-wire joint reinforcement shall be **9 gauge** and shall be placed in the **first three bed joints** above the opening.
4. Provide the **height** of masonry veneer above opening, in accordance with **Table R703.8.3.2**



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

FIGURE R703.8.3.2
MASONRY VENEER OPENING

TABLE R703.8.3.2
HEIGHT OF MASONRY VENEER ABOVE OPENING

MINIMUM HEIGHT OF MASONRY VENEER ABOVE OPENING (INCH)	MAXIMUM HEIGHT OF MASONRY VENEER ABOVE OPENING (FEET)
13	< 5
24	5 to < 12
60	12 to height above support allowed by Section R703.8

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

New Section

SECTION R704 SOFFITS

R704.1 General wind limitations. Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, soffits shall comply with **Section R704.2**. Where the design wind pressure exceeds 30 pounds per square foot (1.44 kPa), soffits shall comply with **Section R704.3**. The design wind pressure on soffits shall be determined using the component and cladding loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.93 m2) and adjusted for height and exposure in accordance with Table R301.2.1(2).

R704.2 Soffit installation where the design wind pressure is 30 psf or less

Where the design wind pressure is **30 pounds per square foot (1.44 kPa) or less**, soffit installation shall comply with **Section R704.2.1, R704.2.2, R704.2.3 or R704.2.4. Soffit materials not addressed in Sections R704.2.1 through R704.2.4 shall be in accordance with the manufacturer's installation instructions.**

R704.2.1 Vinyl soffit panels. Vinyl soffit panels shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with **Figure R704.2.1(1)**. Where the unsupported span of soffit panels is greater than 16 inches (406 mm), intermediate nailing strips shall be provided in accordance with **Figure R704.2.1(2)**. Vinyl soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.

R704.2.2 Fiber-cement soffit panels. Fiber-cement soffit panels shall be a minimum of **1/4 inch** in thickness and shall comply with the requirements of **ASTM C1186, Type A, minimum Grade II, or ISO 8336, Category A, minimum Class 2**. Panel joints shall occur over framing or over wood structural panel sheathing. Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions.

R704.2.3 Hardboard soffit panels. Hardboard soffit panels shall be not less than **7/16-inch** in thickness and shall be fastened to framing or nailing strips with **2 1/2-inch by 0.113-inch siding nails** spaced not more than **6 inches** on center at panel edges and **12 inches** on center at intermediate supports.

R704.2.4 Wood structural panel soffit. The minimum nominal thickness for wood structural panel soffits shall be **3/8-inch** and shall be fastened to framing or nailing strips with **2-inch by 0.099-inch nails**. Fasteners shall be spaced not less than **6 inches** on center at panel edges and **12 inches** on center at intermediate supports.

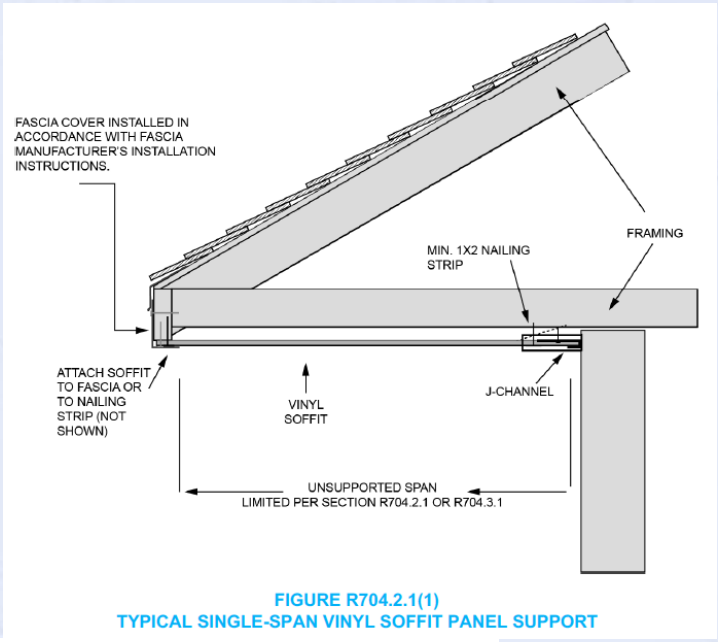


FIGURE R704.2.1(1)
TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT

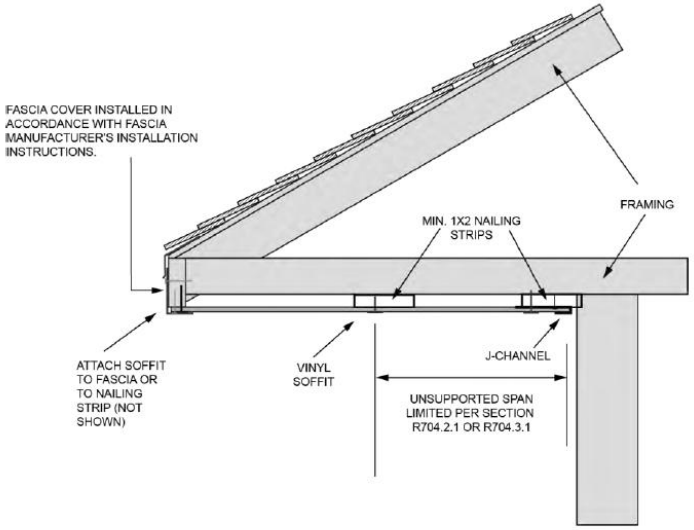


FIGURE R704.2.1(2)
TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

R704.3 Soffit installation where the design wind pressure **exceeds 30 psf**

Where the design wind pressure **is greater than 30 psf**, soffit installation shall comply with **Section R704.3.1, R704.3.2, R704.3.3 or R704.3.4.** Soffit materials not addressed in Sections R704.3.1 through R704.3.4 shall be in accordance with the **manufacturer's installation instructions**.

R704.3.1 Vinyl soffit panels. Vinyl soffit panels and their attachments shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet and adjusted for height and exposure in accordance with Table R301.2.1(2). Vinyl soffit panels shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with **Figure R704.2.1(1).** Where the unsupported span of soffit panels is greater than 12 inches (305 mm), intermediate nailing strips shall be provided in accordance with **Figure R704.2.1(2).** Vinyl soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.

R704.3.2 Fiber-cement soffit panels. Fiber-cement soffit panels shall comply with Section R704.2.2 and shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of **10 square feet** and adjusted for height and exposure in accordance with Table R301.2.1(2).

R704.3.3 Hardboard soffit panels. Hardboard soffit panels shall comply with the manufacturer's installation instructions and shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of **10 square feet** and adjusted for height and exposure in accordance with Table R301.2.1(2).

R704.3.4 Wood structural panel soffit. Wood structural panel soffits shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet and adjusted for height and exposure in accordance with Table R301.2.1(2). Alternatively, wood structural panel soffits shall be installed in accordance with Table R704.3.4.

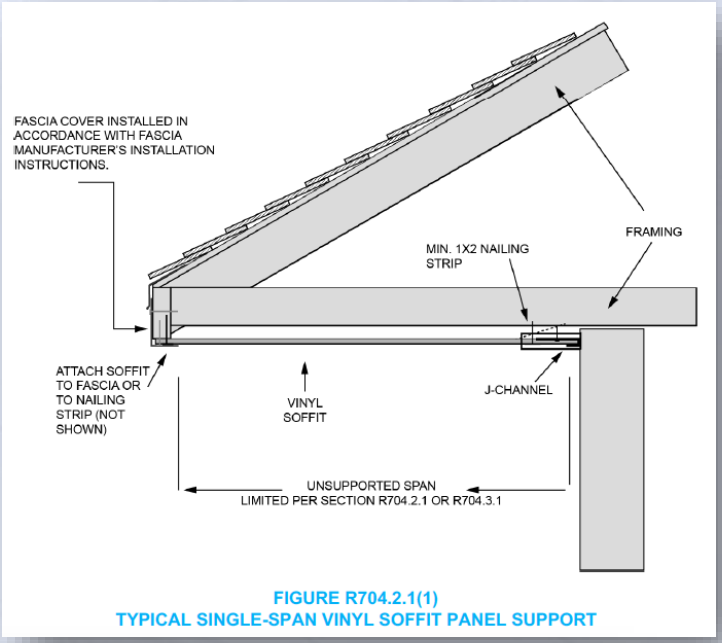


FIGURE R704.2.1(1)
TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT

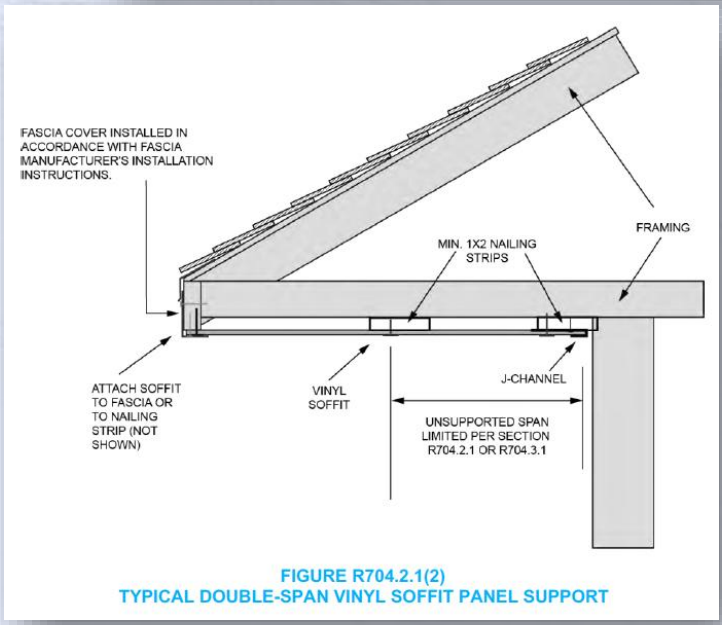


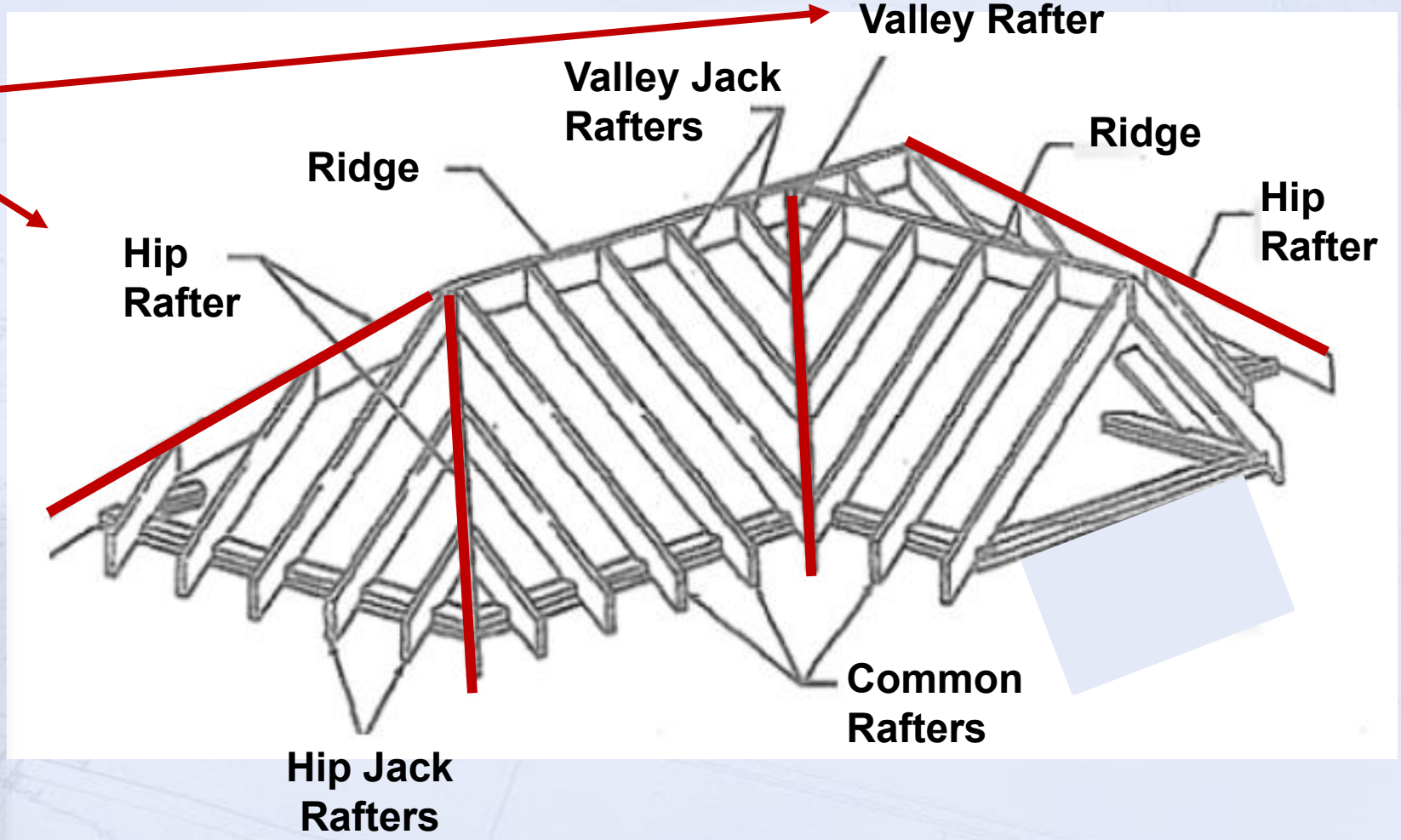
FIGURE R704.2.1(2)
TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

Residential Code

Chapter 8
Roof and Ceiling Construction

R802.4.3 Hips and valleys

Hip and valley rafters shall be not less than **2 inches** nominal in thickness and not less in depth than the cut end of the rafter. Hip and valley rafters **shall be supported at the ridge by a brace** to a **bearing partition** **or** be designed to carry and distribute the specific load at that point.



R802.5.2 Ceiling joist and rafter connections

Where ceiling joists run parallel to rafters and are located in the bottom third of the rafter height, they shall be installed in accordance with Figure R802.4.5 and **fastened to rafters** in accordance with **Table R802.5.2(1).** Where the ceiling joists are installed **above the bottom third of the rafter height**, the ridge shall be designed as a **beam** in accordance with Section R802.3. **Where ceiling joists do not run parallel to rafters**, rafters shall be tied across the structure with a rafter tie in accordance with Section R802.5.2.2, or the ridge shall be designed as a beam in accordance with Section R802.3.

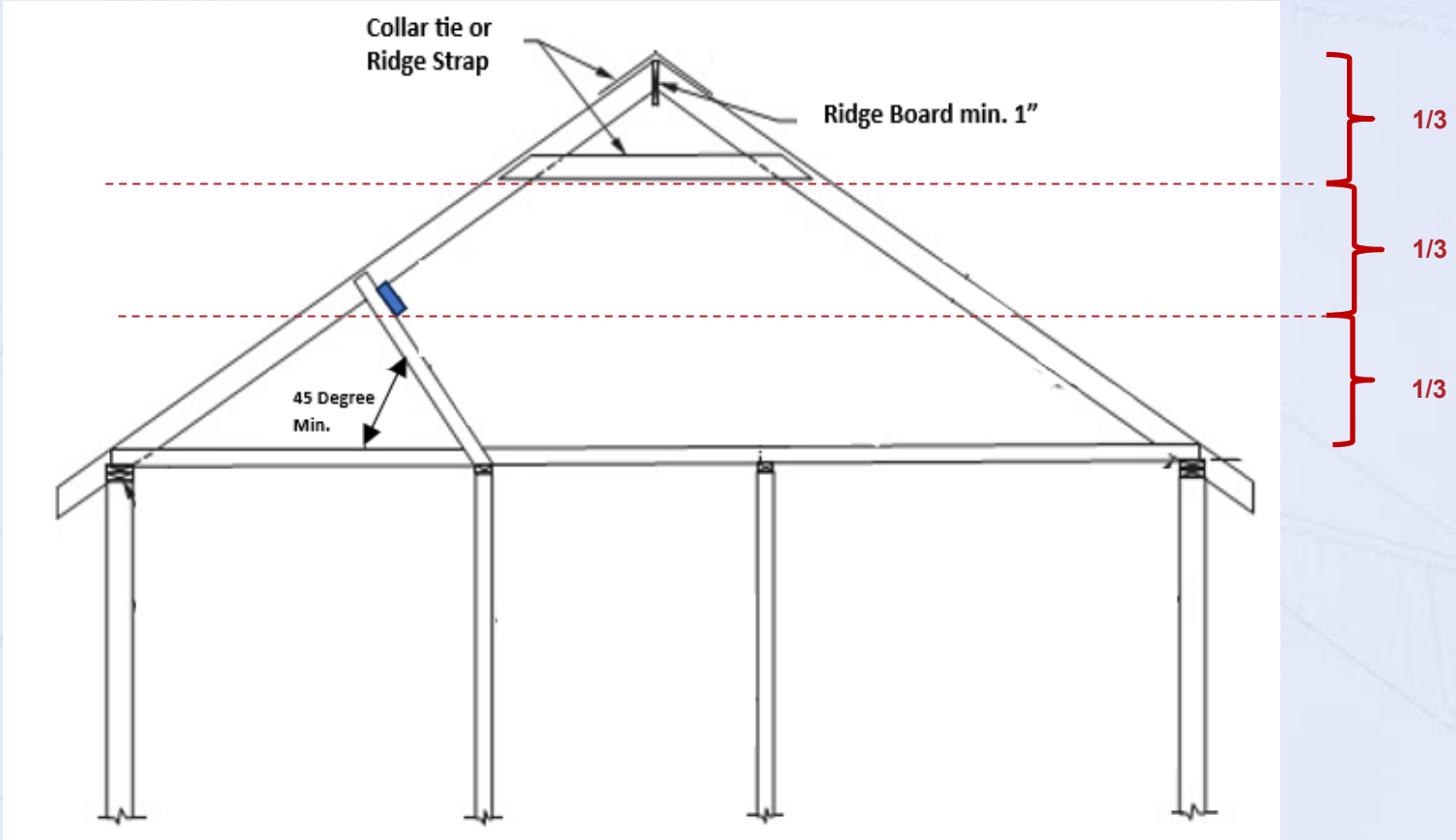
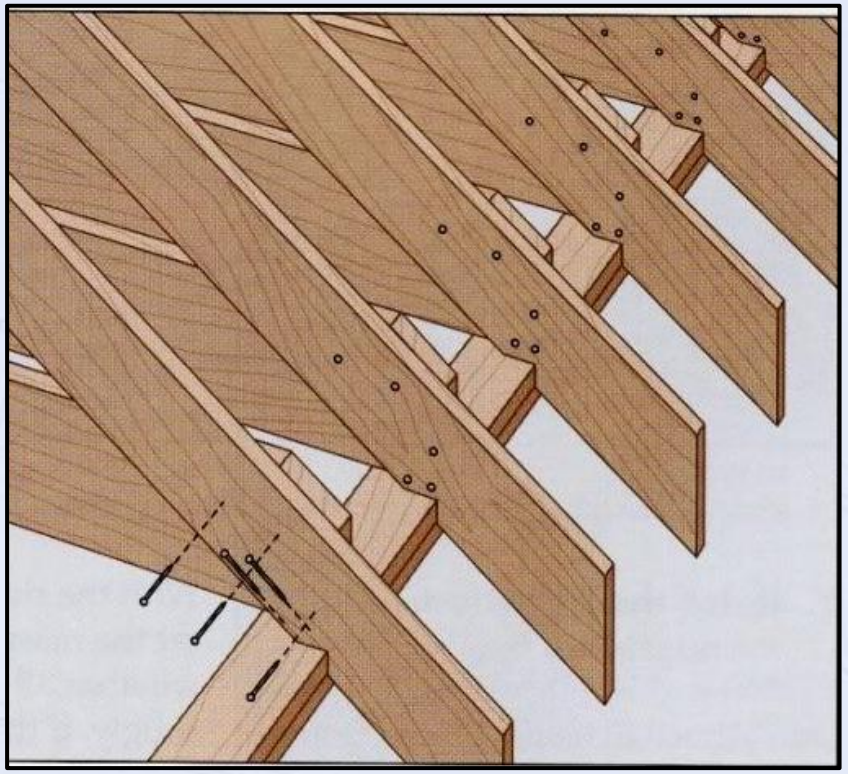


TABLE R802.5.2(1)

RAFTER/CEILING JOIST HEEL JOINT CONNECTIONS[g]

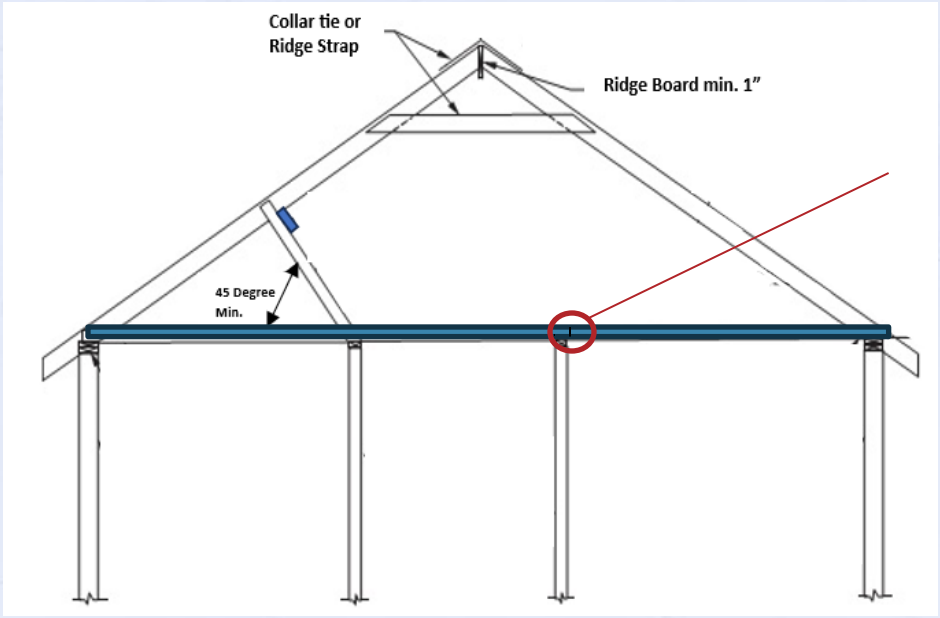
RAFTER SLOPE	RAFTER SPACING (inches)	GROUND SNOW LOAD (psf)											
		20[e]			30			50			70		
		Roof span (feet)											
		12	24	36	12	24	36	12	24	36	12	24	36
		Required number of 16d common nails per heel joint splices [a, b, c, d, f]											
3:12	12	3	5	8	3	6	9	5	9	13	6	12	17
	16	4	7	10	4	8	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



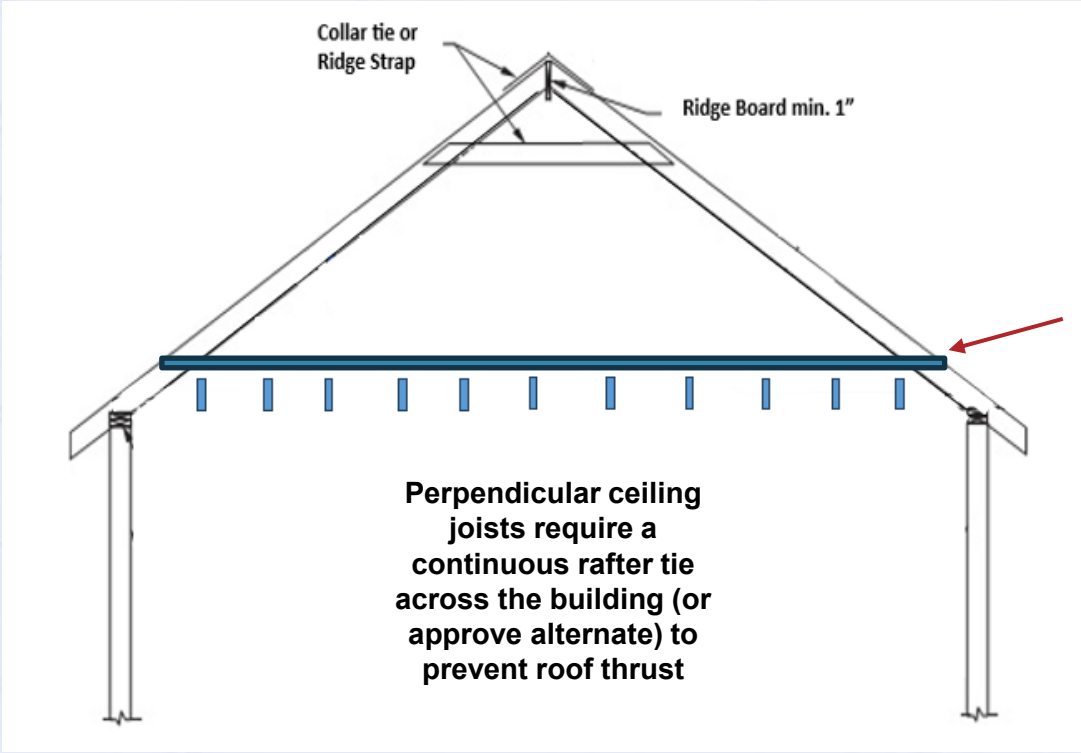
R802.5.2.1 Ceiling joists lapped

Ends of ceiling joists shall be **lapped not less than 3 inches** or butted overbearing partitions or beams and toenailed to the bearing member. Where ceiling joists are used to provide the continuous tie across the building, lapped joists shall be nailed together in accordance with **Table R802.5.2(1)** and butted joists shall be tied together with a connection of equivalent capacity. Laps in joists that do not provide the continuous tie across the building shall be permitted to be nailed in accordance with Table R602.3(1).

R802.5.2.2 Rafter ties. Wood **rafter ties** shall be not less than **2 inches by 4 inches** installed in accordance with Table R802.5.2(1) at a maximum of **48 inches** on center. Other *approved* rafter tie methods shall be permitted.



Ceiling joist lap 3”



2x4 Rafter Tie every 4’

R802.7 Cutting, drilling and notching

Structural roof members shall not be cut, bored or notched in excess of the limitations specified in this section.

R802.7.1 Sawn lumber. **Cuts, notches and holes** in solid lumber joists, rafters, blocking and beams **shall comply with the provisions of Section R502.8.1 except that cantilevered portions** of rafters shall be permitted in accordance with Section R802.7.1.1.

R802.7.1.1 Cantilevered portions of rafters. Notches on cantilevered portions of rafters are permitted provided the dimension of the remaining portion of the rafter is not less than **3 1/2 inches** and the length of the cantilever does not exceed **24 inches** in accordance with Figure R802.7.1.1.

Same allowances as floor joists

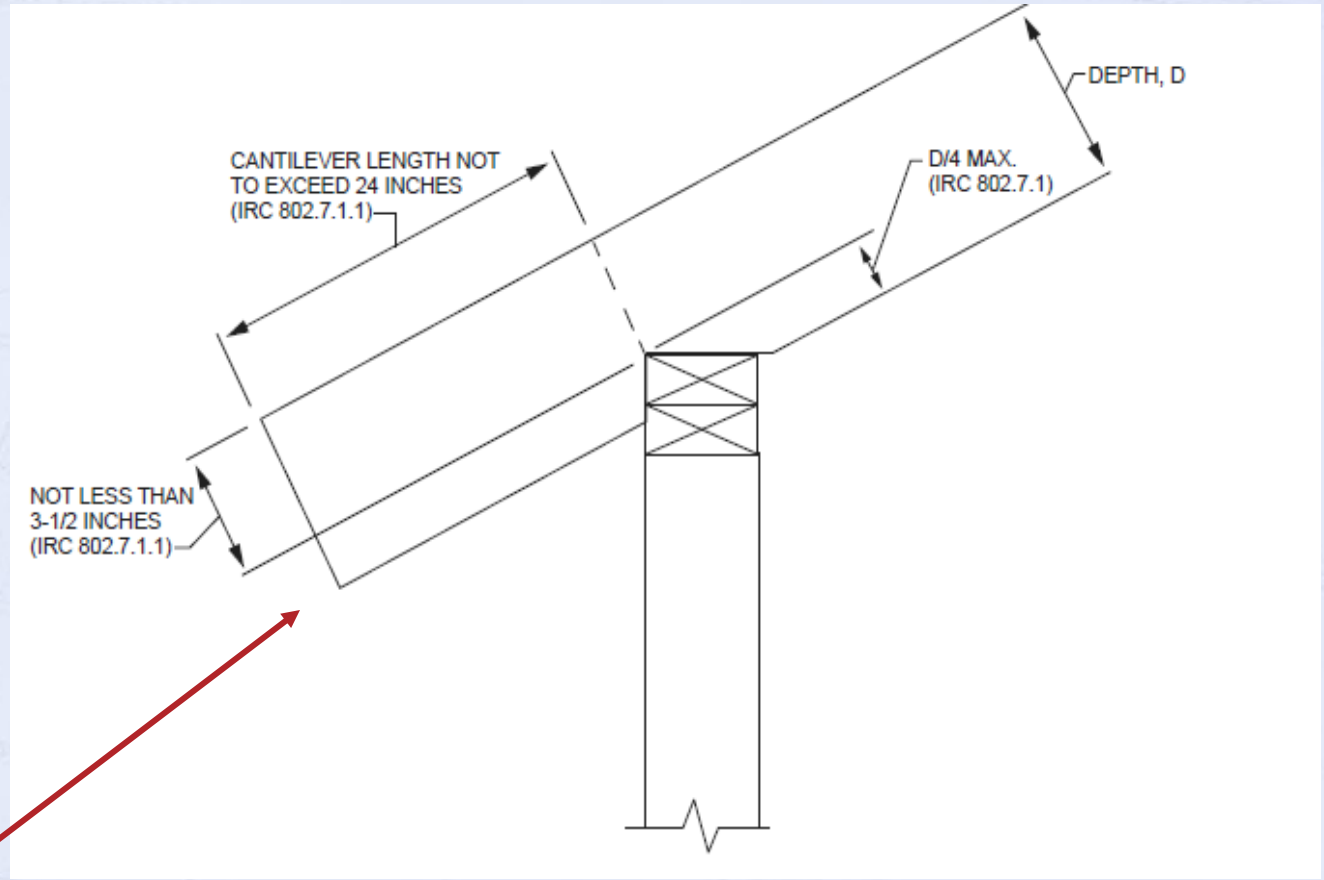


Figure R802.7.1.1

Applies to Rafter overhangs

R802.7 Cutting, drilling and notching (continued)

R802.7.1.2 Ceiling joist taper cut. **Taper cuts** at the ends of the **ceiling joist** shall not exceed **one-fourth the depth** of the member in accordance with Figure R802.7.1.2.

R802.7.2 Engineered wood products. Cuts, notches and holes bored in trusses, *structural composite lumber*, structural glue-laminated members, cross-laminated timber members or I-joists **are prohibited except** where **permitted by the manufacturer's** recommendations or where the effects of such alterations are specifically considered in the design of the member by a ***registered design professional***.

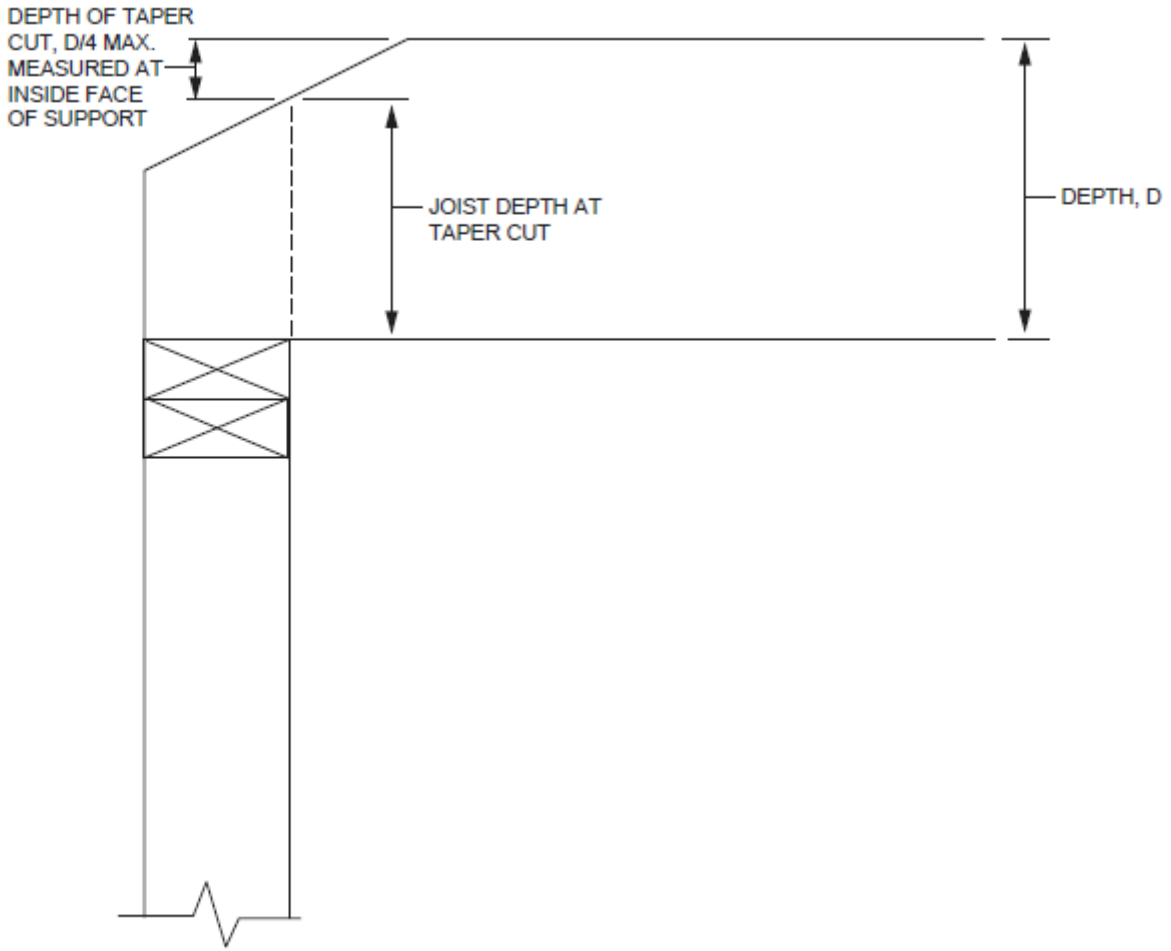


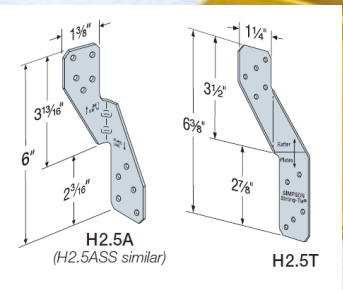
FIGURE R802.7.1.2
CEILING JOIST TAPER CUT

R802.11 Roof tie uplift resistance

Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1 and R802.11.2.

Exceptions: **Rafters or trusses** shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1) where either of the following occur:

1. Where the uplift force per rafter or truss does not exceed **200 pounds as determined by Table R802.11**.
2. Where the basic wind speed **does not exceed 115** miles per hour, the wind **exposure category is B**, the roof pitch is **5 units vertical in 12** units horizontal (42-percent slope) or greater, the roof span is **32 feet** or less, and rafters and trusses are spaced not more than **24 inches** on center.



Example
H2.5T Per mfg. testing will hold **565lbs** of uplift force

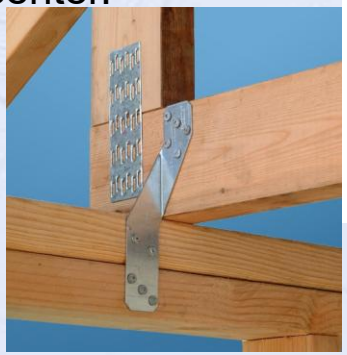


TABLE R802.11
RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (ASD) (POUNDS PER CONNECTION)[a, b, c, d, e, f, g, h]

RAFTER OR TRUSS SPACING	ROOF SPAN (feet)	EXPOSURE B									
		Ultimate Design Wind Speed V_{ULT} (mph)									
		110		115		120		130		140	
		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch		Roof Pitch	
		< 5:12	≥ 5:12	< 5:12	≥ 5:12	< 5:12	≥ 5:12	< 5:12	≥ 5:12	< 5:12	≥ 5:12
12″ o.c.	12	48	43	59	53	70	64	95	88	122	113
	18	59	52	74	66	89	81	122	112	157	146
	24	71	62	89	79	108	98	149	137	192	178
	28	79	69	99	88	121	109	167	153	216	200
	32	86	75	109	97	134	120	185	170	240	222
	36	94	82	120	106	146	132	203	186	264	244
	42	106	92	135	120	166	149	230	211	300	278
	48	118	102	151	134	185	166	258	236	336	311
16″ o.c.	12	64	57	78	70	93	85	126	117	162	150
	18	78	69	98	88	118	108	162	149	209	194
	24	94	82	118	105	144	130	198	182	255	237
	28	105	92	132	117	161	145	222	203	287	266
	32	114	100	145	129	178	160	246	226	319	295
	36	125	109	160	141	194	176	270	247	351	325
	42	141	122	180	160	221	198	306	281	399	370
	48	157	136	201	178	246	221	343	314	447	414
24″ o.c.	12	96	86	118	106	140	128	190	176	244	226
	18	118	104	148	132	178	162	244	224	314	292
	24	142	124	178	158	216	196	298	274	384	356
	28	158	138	198	176	242	218	334	306	432	400
	32	172	150	218	194	268	240	370	340	480	444
	36	188	164	240	212	292	264	406	372	528	488
	42	212	184	270	240	332	298	460	422	600	556
	48	236	204	302	268	370	332	516	472	672	622

Table applies to rafter or trusses

R802.11 Roof tie uplift resistance

(continued)

R802.11.1 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the ***truss design drawings*** for the ultimate design wind speed as determined by Figure R301.2(2) Table R301.2(4) and listed in Table R301.2 or as shown on the *construction documents*. Uplift forces **shall be permitted** to be determined as specified by Table R802.11, if applicable, or as determined by **accepted engineering practice.**

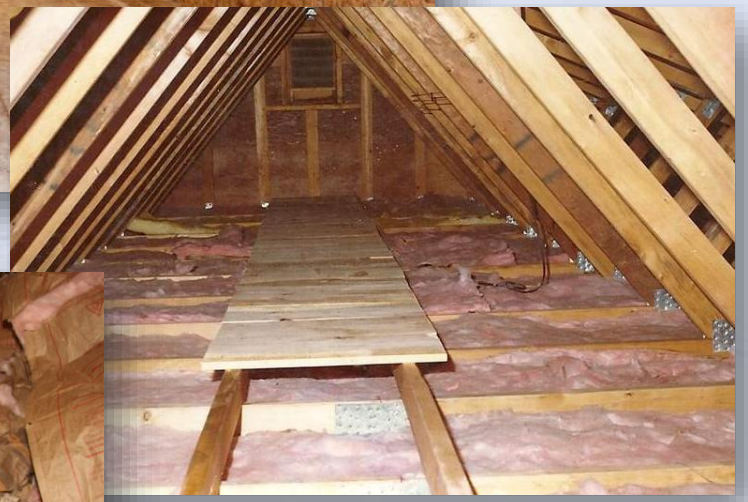
R802.11.2 Rafter uplift resistance. Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces **as determined by Table R802.11 or** as determined by **accepted engineering practice.** Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice.

R807.1 Attic access

An attic access opening shall be provided to attic areas that **exceed 400 square feet** **and** have a vertical height of **60 inches or greater**. The net clear opening shall not be less than **20 inches by 30 inches** and shall be located in a hallway or other readily accessible location. A **30-inch minimum unobstructed headroom** in the attic space shall be provided at some point above the access opening. See **Section M1305.1.2** for access requirements where mechanical equipment is located in attics.

Exceptions:

1. *Concealed areas* not located over the main structure including **porches, areas behind knee walls, dormers, bay windows**, etc. are not required to have access.
2. **Pull down stair treads, stringers, handrails**, and hardware **may protrude** into the net clear opening.



Residential Code

Chapter 9 Roof Assemblies

Chapter Outline

Chapter 9 contains 9 sections dealing with roof coverings. The most significant requirements found in R905 & R908

1. **R901 General-** Scope covering design & materials
2. **R902 Fire Classification-** Buildings within 3' of a property line.
3. **R903 Weather Protection-** Flashing, Crickets/Saddles, coping & drainage.
4. **R904 Materials-** Code + Manufacturer's instructions.
5. **R905 Requirements for Roof Coverings-** Underlayment, Valleys, slope, etc specific to 15 different covering materials listed in the code.
6. **R906 Roof Insulation-** Above roof deck insulation requirements
7. **R907 Rooftop**-Mounted PV Systems- Deleted.
8. **R908 Reroofing-** Recovering or replacement requirements
9. **R909 Rooftop**-mounted PV Panel Systems-Deleted.

R902 Fire Classification

R902.1 Roof Covering Materials- This section addresses the installation of Class A, B or C roofing when the edge of the roof is less than 3 feet from a property line. Class A, B and C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E108.

- Class A – effective against severe fire test exposures.
- Class B – affords a moderate degree of fire protection.
- Class C – effective against light fire text exposures.

Exceptions:

1. Class A roof assemblies those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate on noncombustible decks.
3. Class A roof assemblies include a minimum of 16 ounces per square foot copper sheets installed over combustible decks.
4. Class roof assemblies include slate installed over underlayment over combustible decks.

Typically applies to houses close to a property or townhouses

R902 Fire Classification

R902.3 Building-integrated photovoltaic product. *Building-integrated photovoltaic (BIPV) products* installed as the roof covering shall be tested, *listed* and *labeled* for fire classification in accordance with **UL 7103**. Class A, B or C BIPV products shall be installed where the edge of the roof is less than **3 feet** from a *lot line*.

R902.4 Rooftop-mounted photovoltaic panel systems. Rooftop-mounted *photovoltaic panel systems* installed on or above the roof covering shall be tested, *listed* and identified with a fire classification in accordance with **UL 2703**. Class A, B or C *photovoltaic panel systems* and modules shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof is less than **3 feet** from a *lot line*.

Built in shingle type UL 7103 and class rating if within 3' of lot line

Panel installed on rooftop mounted frame UL 2703 and class rating if within 3' of lot line

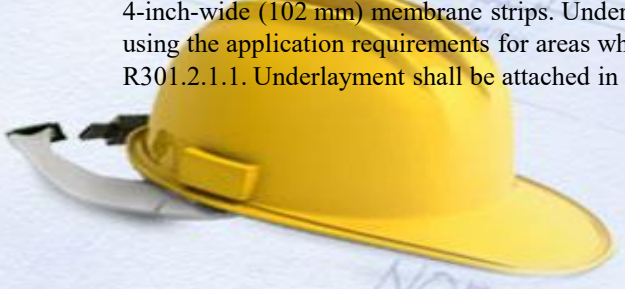
R905 Requirements for Roof Coverings

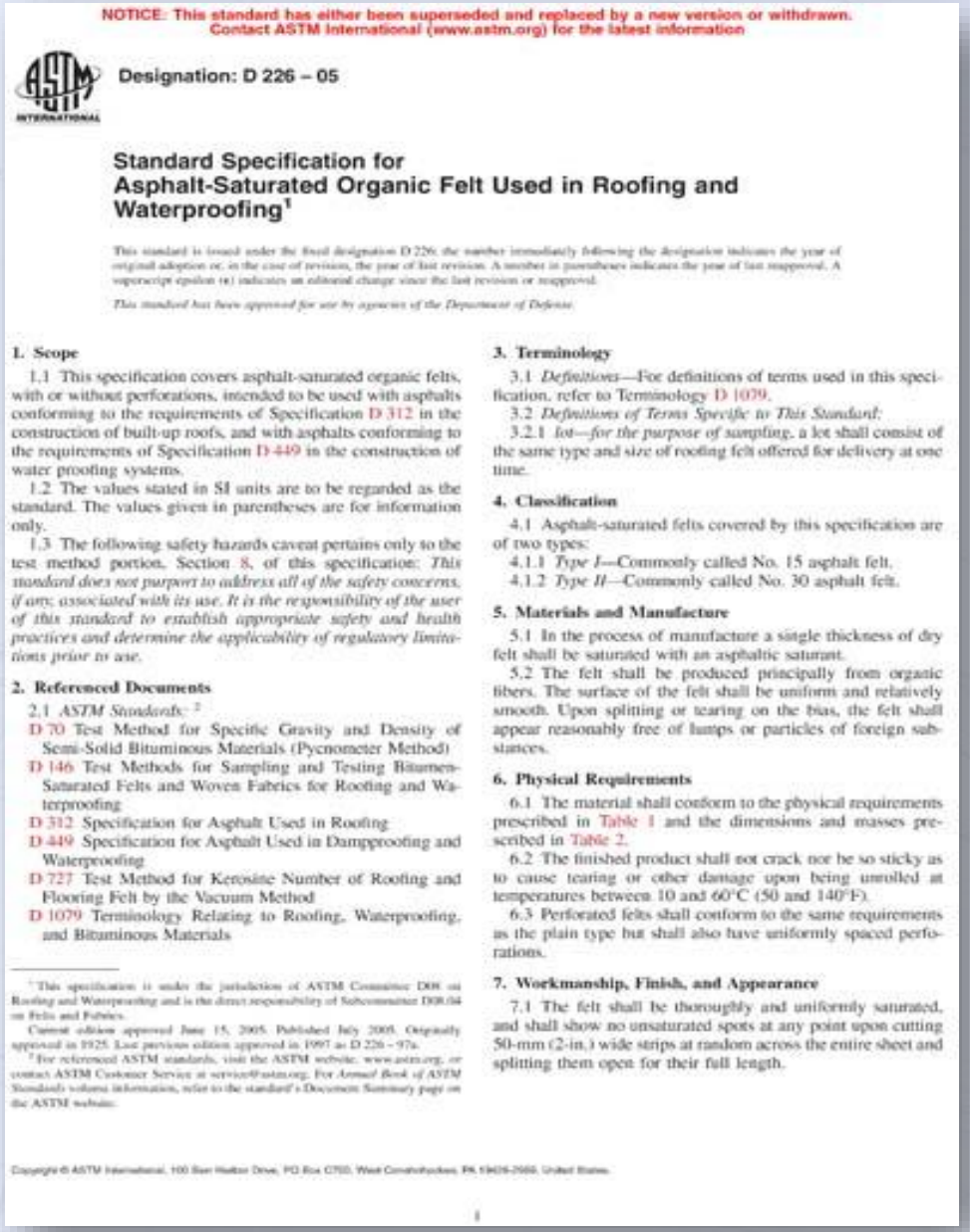
R905.1 Roof covering application. Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2).

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with **ASTM D226, D1970, D4869 and D6757 shall bear a *label*** indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with **Table R905.1.1(2).** *Underlayment* shall be attached in accordance with **Table R905.1.1(3).**

Exceptions:

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970
2. As an alternative, a minimum **4-inch-wide** strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with **ASTM D1970**, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be **applied over all joints in the roof decking**. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering for areas where wind design is not required in accordance with Figure R301.2.1.1 shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas where wind design is not required in accordance with Figure R301.2.1.1. Underlayment shall be attached in accordance with Table R905.1.1(3)





NOTICE: This standard has either been superseded and replaced by a new version or withdrawn.
Contact ASTM International (www.astm.org) for the latest information

Designation: D 226 – 05

Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing[1]

This standard is issued under the fixed designation D 226; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers asphalt-saturated organic felts, with or without perforations, intended to be used with asphalts conforming to the requirements of Specification D 312 in the construction of built-up roofs, and with asphalts conforming to the requirements of Specification D 449 in the construction of water proofing systems.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 The following safety hazards caveat pertains only to the test method portion, Section 8, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 70 Test Method for Specific Gravity and Density of Semi-Solid Bituminous Materials (Pycnometer Method)

D 146 Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing

D 312 Specification for Asphalt Used in Roofing

D 449 Specification for Asphalt Used in Dampproofing and Waterproofing

D 727 Test Method for Kerosine Number of Roofing and Flooring Felt by the Vacuum Method

D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology D 1079.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *lot—for the purpose of sampling*, a lot shall consist of the same type and size of roofing felt offered for delivery at one time.

4. Classification

4.1 Asphalt-saturated felts covered by this specification are of two types:

4.1.1 *Type I*—Commonly called No. 15 asphalt felt.

4.1.2 *Type II*—Commonly called No. 30 asphalt felt.

5. Materials and Manufacture

5.1 In the process of manufacture a single thickness of dry felt shall be saturated with an asphaltic saturant.

5.2 The felt shall be produced principally from organic fibers. The surface of the felt shall be uniform and relatively smooth. Upon splitting or tearing on the bias, the felt shall appear reasonably free of lumps or particles of foreign substances.

6. Physical Requirements

6.1 The material shall conform to the physical requirements prescribed in Table 1 and the dimensions and masses prescribed in Table 2.

6.2 The finished product shall not crack nor be so sticky as to cause tearing or other damage upon being unrolled at temperatures between 10 and 60°C (50 and 140°F).

6.3 Perforated felts shall conform to the same requirements as the plain type but shall also have uniformly spaced perforations.

7. Workmanship, Finish, and Appearance

7.1 The felt shall be thoroughly and uniformly saturated, and shall show no unsaturated spots at any point upon cutting 50-mm (2-in.) wide strips at random across the entire sheet and splitting them open for their full length.

[1] This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.04 on Felts and Fabrics.

Current edition approved June 15, 2005. Published July 2005. Originally approved in 1925. Last previous edition approved in 1997 as D 226 – 97a.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

R905 Requirements for Roof Coverings

R905.1.1 Underlayment. *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in **Table R905.1.1(1).** *Underlayment* shall be applied in accordance with **Table R905.1.1(2)**. *Underlayment* shall be attached in accordance with **Table R905.1.1(3).**

Exceptions:

1. As an alternative, **self-adhering polymer-modified bitumen underlayment** bearing a label indicating compliance with **ASTM D1970**
2. As an alternative, a minimum 4-inch-wide strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the deck material, shall be applied over all joints in the roof decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering for areas where wind design is not required in accordance with Figure R301.2.1.1 shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas where wind design is not required in accordance with Figure R301.2.1.1. Underlayment shall be attached in accordance with Table R905.1.1(3).

TABLE R905.1.1(1) UNDERLAYMENT TYPES

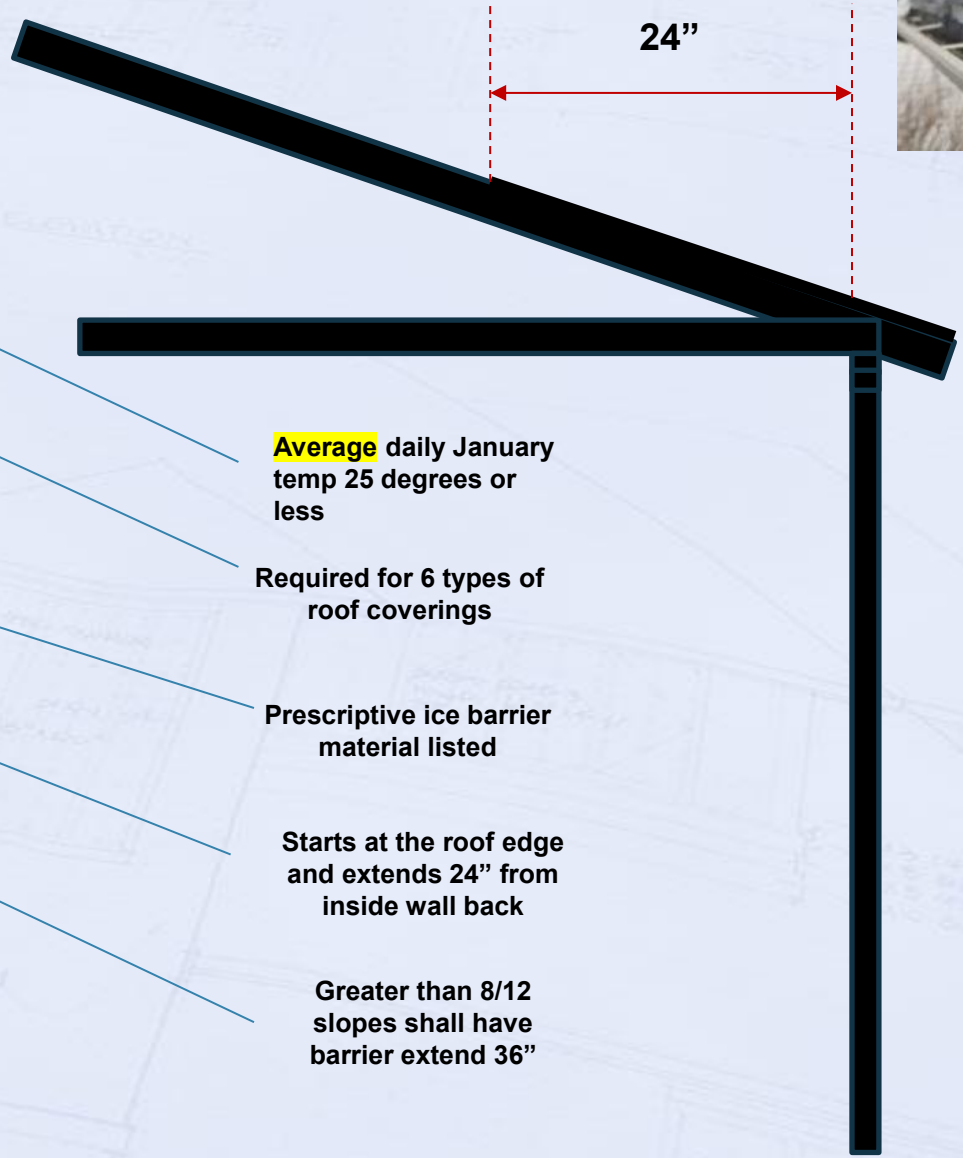
ROOF COVERING	SECTION	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult < 130 MPH
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D48696 Type I, II, III or IV ASTM D6757
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D2626 Type I ASTM D6380 Class M mineral-surfaced roll roofing
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D4869 Type I, II, III or IV
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV
Wood shakes	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV
Metal panels	R905.10	Manufacturer's instructions
Photovoltaic shingles	R905.16	ASTM D4869 Type I, II, III or IV ASTM D6757

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	MAXIMUM ULTIMATE DESIGN WIND SPEED, Vult < 130 MPH
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Clay and concrete tile	R905.3	For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.

R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in **Table R301.2, the average daily temperature in January is 25°F (-4° C) or less or when Table R301.2(1) criteria so designates**, an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier **shall consist of not fewer than two layers of *underlayment* cemented together, or a self-adhering polymer-modified bitumen sheet** shall be used in place of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than **24 inches** inside the exterior wall line of the building. On roofs with slope equal to or greater than **8 units vertical in 12 units** horizontal (67-percent slope), the ice barrier shall also be applied not less than **36 inches** measured along the roof slope from the eave edge of the building.

Exception: Detached *accessory structures* not containing conditioned floor area.



SECTION R908 REROOFING

R908.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 9.

Exceptions:

1. *Reroofing* shall not be required to meet the minimum design slope requirement of **one-quarter unit vertical in 12 units horizontal** (2-percent slope) in Section R905 for roofs that provide ***positive roof drainage.***
2. For roofs that provide positive drainage, recovering or replacing an existing roof covering shall **not require the secondary (emergency overflow) drains or *scuppers*** of Section R903.4.1 to be added to an existing roof.

R908.2 Structural and construction loads. The structural roof components **shall be capable of supporting** the roof covering system and the material and equipment loads that will be encountered during installation of the roof covering system.

R908.3 Roof replacement. *Roof replacement* shall include the removal of existing layers of roof coverings down to the *roof deck*. and replacement of up to 15% of the total existing roof deck. Replacement of up to 15% of the total roof deck shall not be considered structural work.

Exception: Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck*, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.

R908.3.1 Roof recover

The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. Where the **new roof covering** is installed in accordance with the roof covering **manufacturer's approved instructions**
2. **Complete and separate roofing systems**, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
3. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be **installed over existing wood shake roofs where applied in accordance with Section R908.4**.
4. The application of a **new protective *roof coating*** over an existing protective *roof coating*, *metal roof panel*, *metal roof shingle*, mineral surfaced roll roofing, built-up roof, modified bitumen roofing, thermoset and thermoplastic single-ply roofing and spray polyurethane foam roofing system shall be permitted **without tear-off of existing roof coverings**.

R908.3.1.1 Roof recover not allowed

A *roof recover* shall not be permitted where any of the following conditions occur:

1. Where the existing roof or roof covering is **water soaked or has deteriorated** to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is **slate, clay, cement or asbestos-cement tile**.
3. Where the existing roof has **two or more** applications of any type of roof covering.

R908.4 Roof recovering. Where the application of a new roof covering over wood shingle or shake roofs creates a **combustible concealed space**, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other *approved* materials securely fastened in place

Residential Code

Chapter 11 Energy Efficiency

No changes yet- New Residential BCC

APPENDIX AQ
TINY HOUSES

The provisions contained in this appendix are adopted as part of this code.

SECTION AQ101 GENERAL

AQ101.1 Scope. This appendix shall be applicable to *tiny houses* used as single *dwelling units*. *Tiny houses* shall comply with this code except as otherwise stated in this appendix.

SECTION AQ102 DEFINITIONS

AQ102.1 General. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

EGRESS ROOF ACCESS WINDOW. A *skylight* or roof window designed and installed to satisfy the emergency escape and rescue opening requirements of Section R310.2.

LANDING PLATFORM. A landing provided as the top step of a stairway accessing a *loft*.

LOFT. A floor level located more than 30 inches (762 mm) above the main floor, open to the main floor on one or more sides with a ceiling height of less than 6 feet 8 inches (2032 mm) and used as a living or sleeping space.

TINY HOUSE. A *dwelling* that is 400 square feet (37 m2) or less in floor area excluding *lofts*.

SECTION AQ103 CEILING HEIGHT

AQ103.1 Minimum ceiling height. *Habitable space* and hallways in *tiny houses* shall have a ceiling height of not less than 6 feet 8 inches (2032 mm). Bathrooms, toilet rooms and kitchens shall have a ceiling height of not less than 6 feet 4 inches (1930 mm). Obstructions including, but not limited to, beams, girders, ducts and lighting, shall not extend below these minimum ceiling heights.

Exception: Ceiling heights in *lofts* are permitted to be less than 6 feet 8 inches (2032 mm).

SECTION AQ104 LOFTS

AQ104.1 Minimum loft area and dimensions. *Lofts* used as a sleeping or living space shall meet the minimum area and dimension requirements of Sections AQ104.1.1 through AQ104.1.3.

AQ104.1.1 Minimum area. *Lofts* shall have a floor area of not less than 35 square feet (3.25 m2).

AQ104.1.2 Minimum horizontal dimensions. *Lofts* shall be not less than 5 feet (1524 mm) in any horizontal dimension.

AQ104.1.3 Height effect on loft area. Portions of a *loft* with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the loft. See Figure AQ104.1.3.

Exception: Under gable roofs with a minimum slope of 6 units vertical in 12 units horizontal (50-percent slope), portions of a *loft* with a sloped ceiling measuring less than 16 inches (406 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the *loft*.

AQ104.2 Loft access and egress. The access to and primary egress from *lofts* shall be of any type described in Sections AQ104.2.1 through AQ104.2.5. The loft access and egress element along its required minimum width shall meet the loft where its ceiling height is not less than 3 feet (914 mm).

AQ104.2.1 Stairways. Stairways accessing *lofts* shall comply with this code or with Sections AQ104.2.1.1 through AQ104.2.1.7.

AQ104.2.1.1 Width. Stairways accessing a *loft* shall not be less than 17 inches (432 mm) in clear width at or above the *handrail*. The width below the *handrail* shall be not less than 20 inches (508 mm).

AQ104.2.1.2 Headroom. The headroom above stairways accessing a *loft* shall be not less than 6 feet 2 inches (1880 mm), as measured vertically, from a sloped line connecting the tread, landing or landing platform *nosings* in the center of their width and vertically from the landing platform along the center of its width.

AQ104.2.1.3 Treads and risers. *Risers* for stairs accessing a *loft* shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

AQ104.2.1.4 Landings. Intermediate landings and landings at the bottom of stairways shall comply with Section R311.7.6, except that the depth in the direction of travel shall be not less than 24 inches.

AQ104.2.1.5 Landing platforms. The top tread and *riser* of stairways accessing *lofts* shall be constructed as a *landing platform* where the *loft* ceiling height is less than 6 feet 2 inches where the stairway meets the *loft*. The *landing platform* shall be not less than 20 inches in width and in depth measured horizontally from and perpendicular to the *nosing* of the landing platform. The landing platform riser height to the loft floor shall be not less than 16 inches (406 mm) and not greater than 18 inches.

AQ104.2.1.6 Handrails. *Handrails* shall comply with Section R311.7.8.

AQ104.2.1.7 Stairway guards. Guards at open sides of stairways, landings and landing platforms shall comply with Section R312.1.

AQ104.2.2 Ladders. Ladders accessing *lofts* shall comply with Sections AQ104.2.1 and AQ104.2.2.2.

AQ104.2.2.1 Size and capacity. Ladders accessing *lofts* shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

AQ104.2.2.2 Incline. Ladders shall be installed at 70 to 80 degrees from horizontal.

AQ104.2.3 Alternating tread devices. Alternating tread devices accessing *lofts* shall comply with Sections R311.7.11.1 and R311.7.11.2. The clear width at and below the *handrails* shall be not less than 20 inches (508 mm).

AQ104.2.4 Ship's ladders. Ship's ladders accessing *lofts* shall comply with Sections R311.7.12.1 and R311.7.12.2. The clear width at and below *handrails* shall be not less than 20 inches (508 mm).

AQ104.2.5 Loft guards. *Loft* guards shall be located along the open sides of *lofts*. *Loft* guards shall be not less than 36 inches (914 mm) in height or one-half of the clear height to the ceiling, whichever is less. Loft guards shall comply with Section R312.1.3 and Table R301.5 for their components.

APPENDIX AQ
TINY HOUSES

The provisions contained in this appendix are adopted as part of this code.

SECTION AQ105 EMERGENCY ESCAPE AND RESCUE OPENINGS

AQ105.1 General. *Tiny houses* shall meet the requirements of Section R310 for emergency escape and rescue openings.

Exception: *Egress roof access windows* in *lofts* used as sleeping rooms shall be deemed to meet the requirements of Section R310 where installed such that the bottom of the opening is not more than 44 inches (1118 mm) above the *loft* floor, provided the egress roof access window complies with the minimum opening area requirements of Section R310.2.1.

SECTION AQ106 ENERGY CONSERVATION

AQ106.1 Air leakage testing. The air leakage rate for *tiny houses* shall not exceed 0.30 cubic feet per minute at 50 Pascals of pressure per square foot of the *dwelling unit* enclosure area. The air leakage testing shall be in accordance with the testing methods required in Section N1102.4.1.2. The *dwelling unit* enclosure area shall be the sum of the areas of ceilings, floors and walls that separate the conditioned space of a *dwelling unit* from the exterior, its adjacent unconditioned spaces and adjacent *dwelling units*.

AQ106.1.1 Whole-house mechanical ventilation. Where the air leakage rate is in accordance with Section AQ106.1, the *tiny house* shall be provided with whole-house mechanical ventilation in accordance with Section M1505.4.

AQ106.2 Alternative compliance. *Tiny houses* shall be deemed to be in compliance with Chapter 11 of this code and Chapter R4 of the *International Energy Conservation Code*, provided that the following conditions are met:

1. The insulation and fenestration meet the requirements of Table N1102.1.2.
2. The thermal envelope meets the requirements of Section N1102.4.1.1 and Table N1102.4.1.1.
3. Solar, wind or other renewable energy source supplies not less than 90 percent of the energy use for the structure.
4. Solar, wind or other renewable energy source supplies not less than 90 percent of the energy for service water heating.
5. Permanently installed lighting is in accordance with Section N1104.
6. Mechanical ventilation is provided in accordance with Section M1505 and operable fenestration is not used to meet ventilation requirements.

SECTION AQ107

SMOKE AND CARBON MONOXIDE DETECTORS

AQ107.1 Smoke and Carbon monoxide detectors. Smoke and carbon monoxide detectors shall be installed as required in Sections R314 and R315 and just below the highest point of any *loft*.

SECTION AQ108 FOUNDATION

AQ108.1 Foundation options. *Tiny Houses* are permitted to be constructed without a masonry or concrete foundation per Section AQ108.1.1 and AQ108.1.2, except in *coastal high hazard, ocean hazard* and *flood hazard areas.*

AQ108.1.1 Wood Foundation. The building shall be supported on a wood foundation of minimum 4-inch by 4-inch or 6-inch by 6-inch mudsill or runner of approved wood in accordance with Section R317. Structural floor systems that include joists and subfloor material shall also comply with Section R317.1, item #1.

AQ108.1.2. Anchorage. *Tiny houses* with wood foundations per AQ108.1.1 shall be designed and anchored to resist overturning and sliding.

Exception: *Tiny houses* with no more than 12’ vertical mean roof height shall be anchored to resist overturning and sliding by installing a minimum of one ground anchor at each corner of the building. The total resisting force of the anchors shall be equal to 20psf (958 Pa) times the plan area of the building.

Knowledge Check

Q: The Tiny home provisions apply to homes up to _____ square footage?

A: 400.

Q: A collar tie is located in the _____ 1/3 of a roof.

A: Upper

Q: The maximum cantilever of a rafter at the eaves is _____ inches.

A: 24

Questions

Thank You!