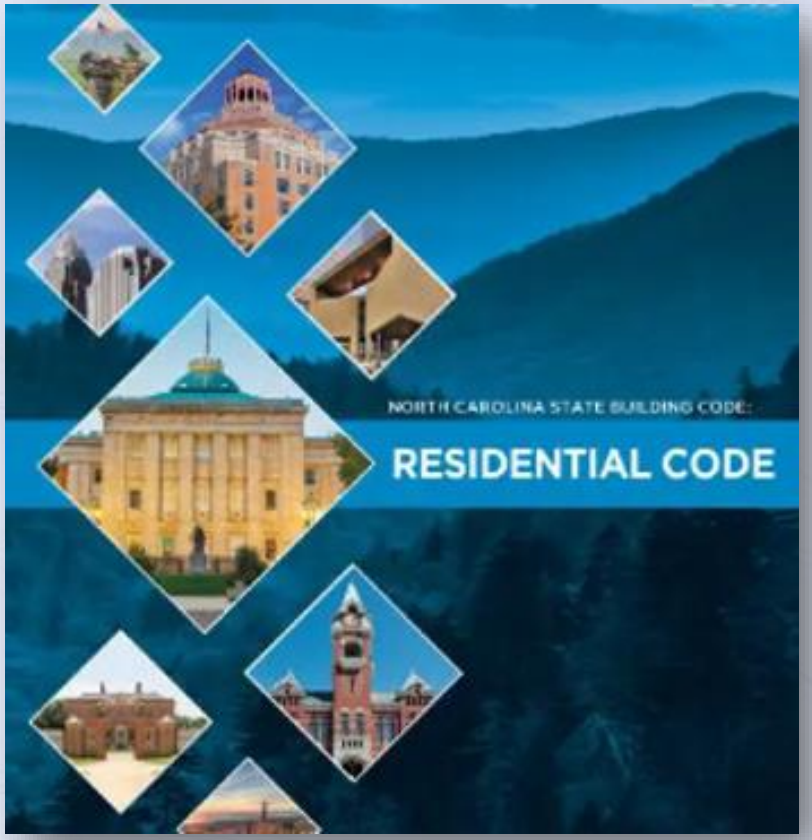
Welcome

2024 North Carolina Residential Building Code Significant Changes

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 lanuage

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)

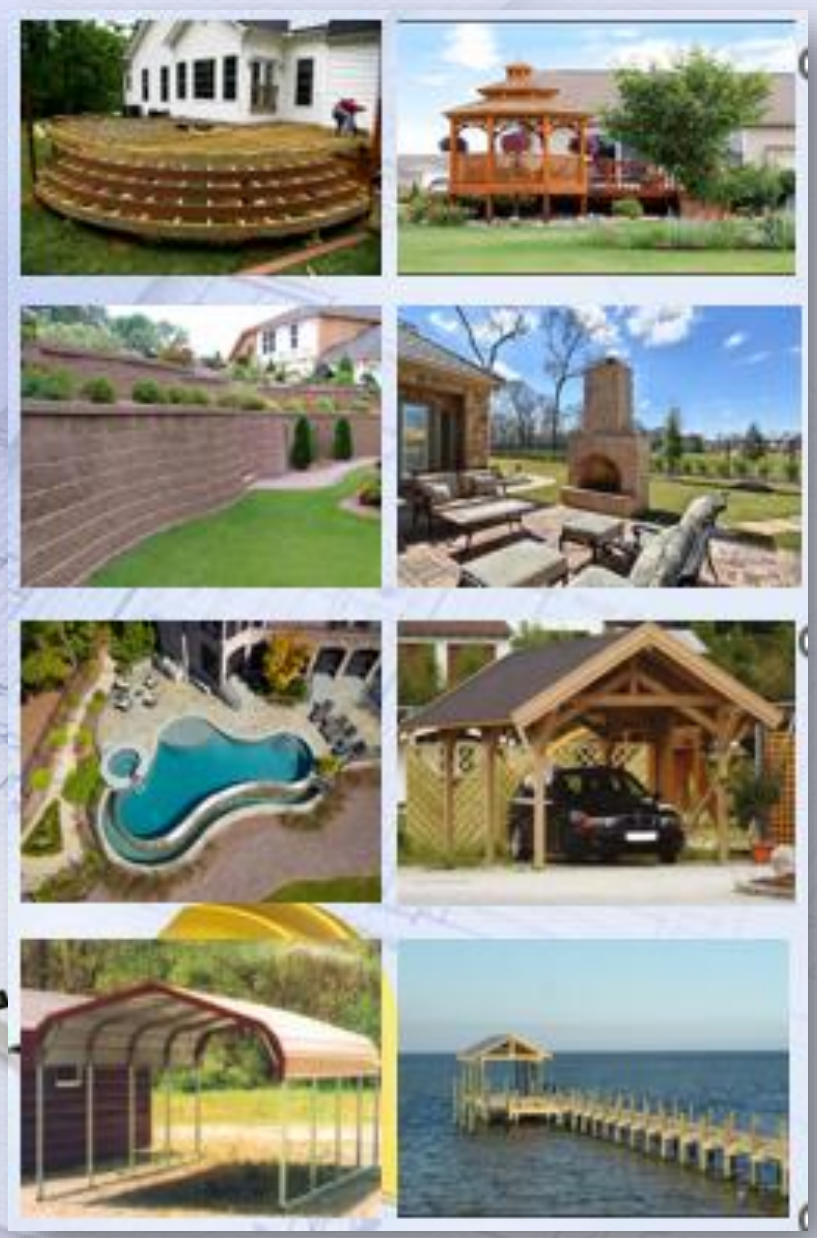
Additional items by occupant load coming over from NC Building Code

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 Structures)



- **R101.2.2 Accessory structures. Only** the following *accessory structures* shall meet the provisions of this code.
- 1. Decks, see Chapter 47,
- 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

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.

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

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

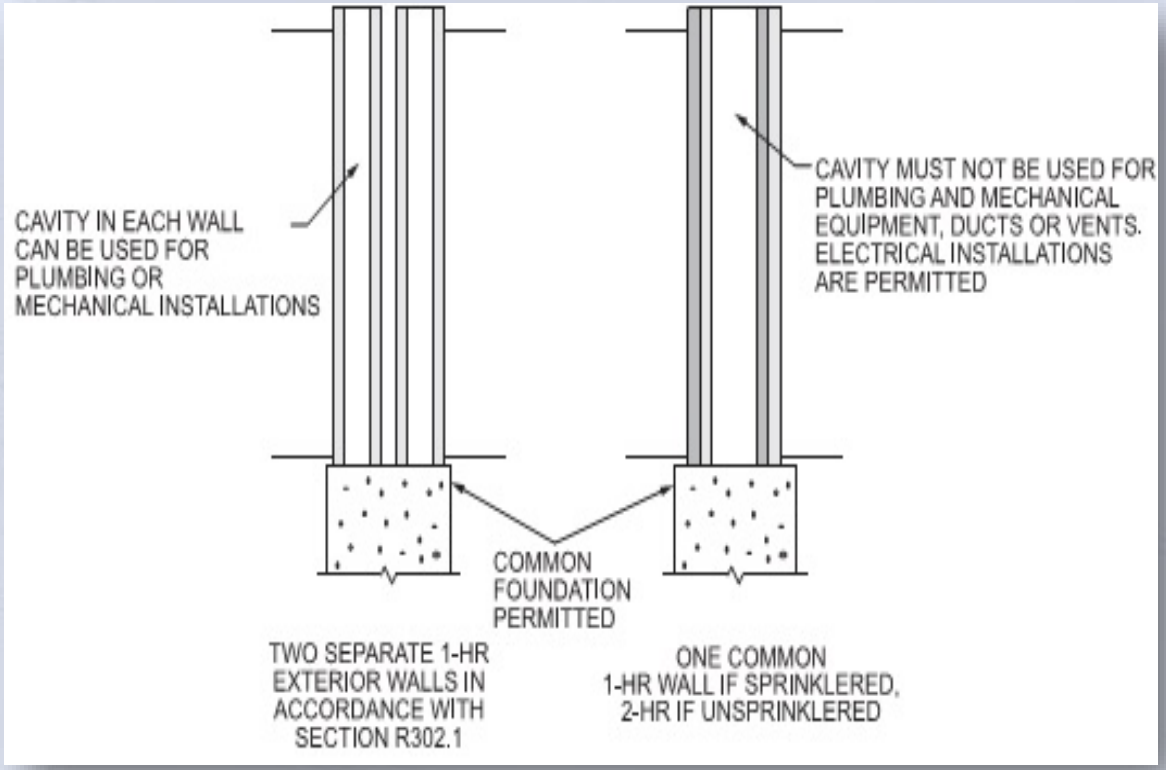
Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 or R302.2.2 and shall comply with Sections 302.2.3 through 302.2.5.

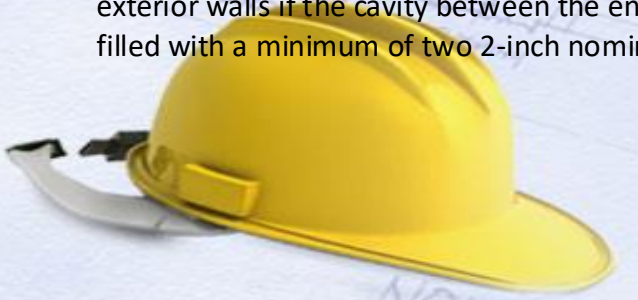
R302.2.1 Double walls. Each *townhouse unit* shall be separated from other *townhouse units* by **two 1-hour fire-resistance-rated wall assemblies** tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International 2024 North Carolina Building Code.*

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.





R311.1 Means of egress

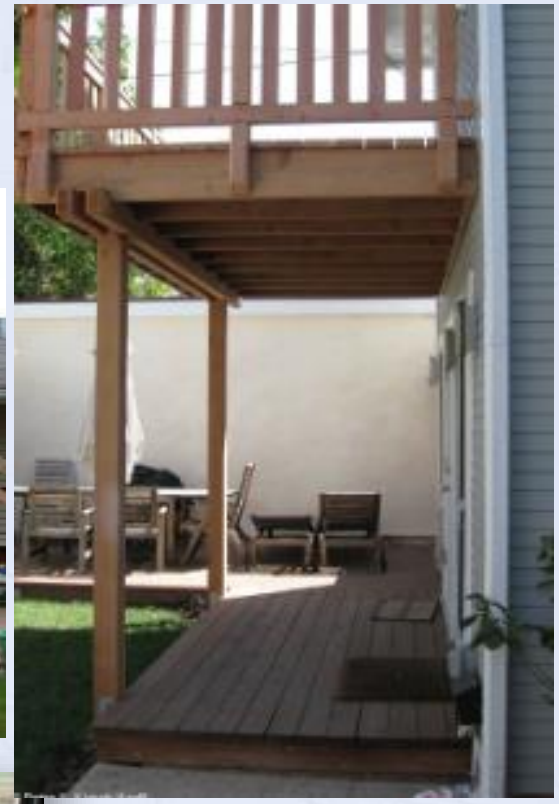
Dwellings and accessory buildings shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the ***dwelling and accessory buildings*** to the required **egress 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.

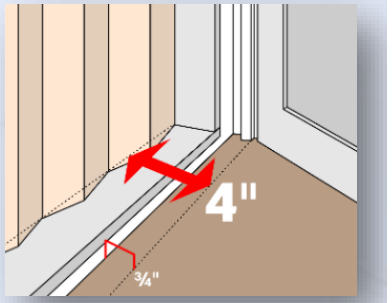
Exception: **Owner-occupied** *lodging houses* with **eight or fewer** guestrooms are not required to be accessible.

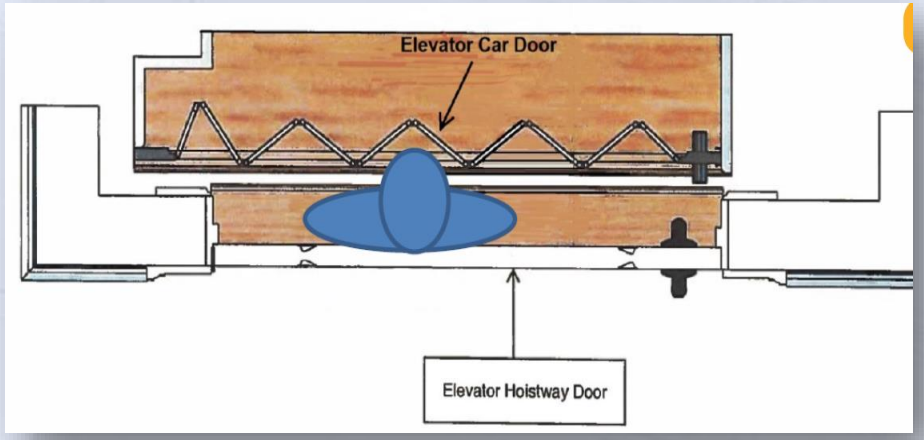
R320.2 Live/work units. In *live/work units*, the **nonresidential portion** shall be accessible in accordance with Sections 508.5.9 and 508.5.11 of the *International Building Code*. In a structure where there are **four or more** *live/work units*, the **dwelling portion** of the *live/work unit* shall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

R321.1.1 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.





R321.4 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 R324 Solar Energy Systems

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

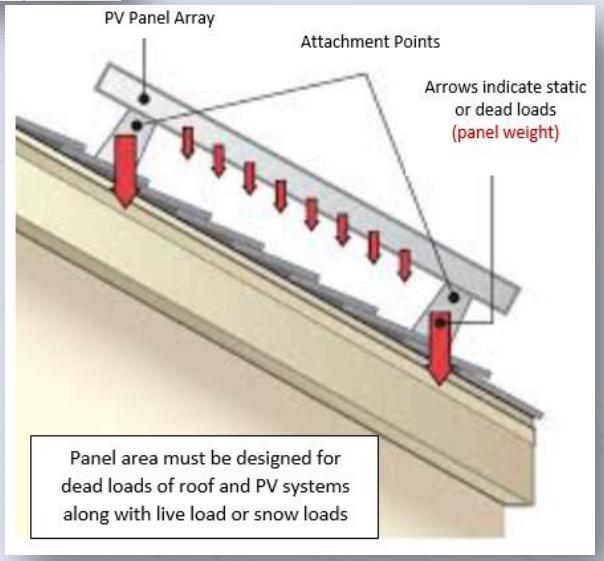
R324.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with **Chapter 23.**

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)

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**.

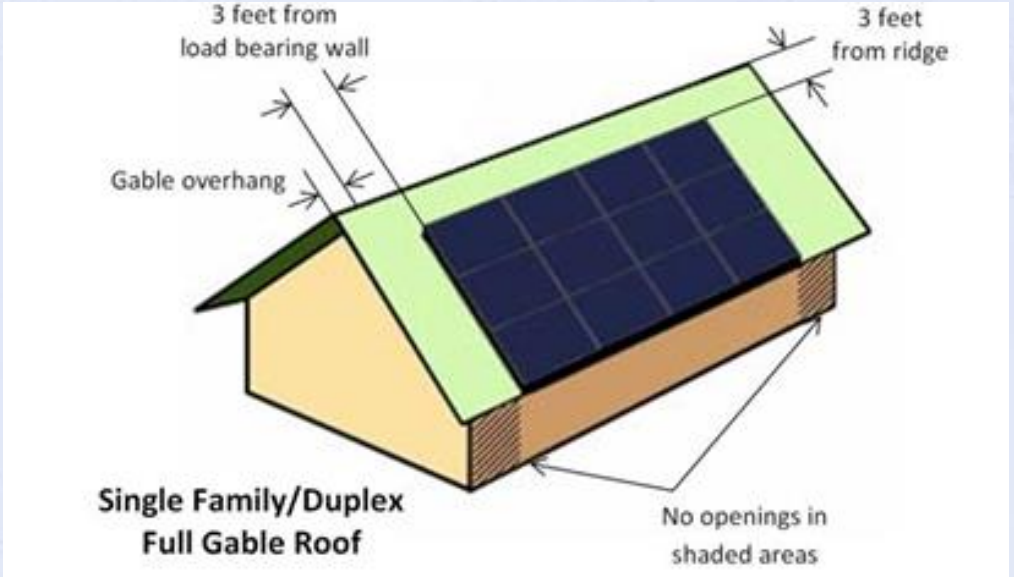
Section R324 Solar Energy Systems (continued)

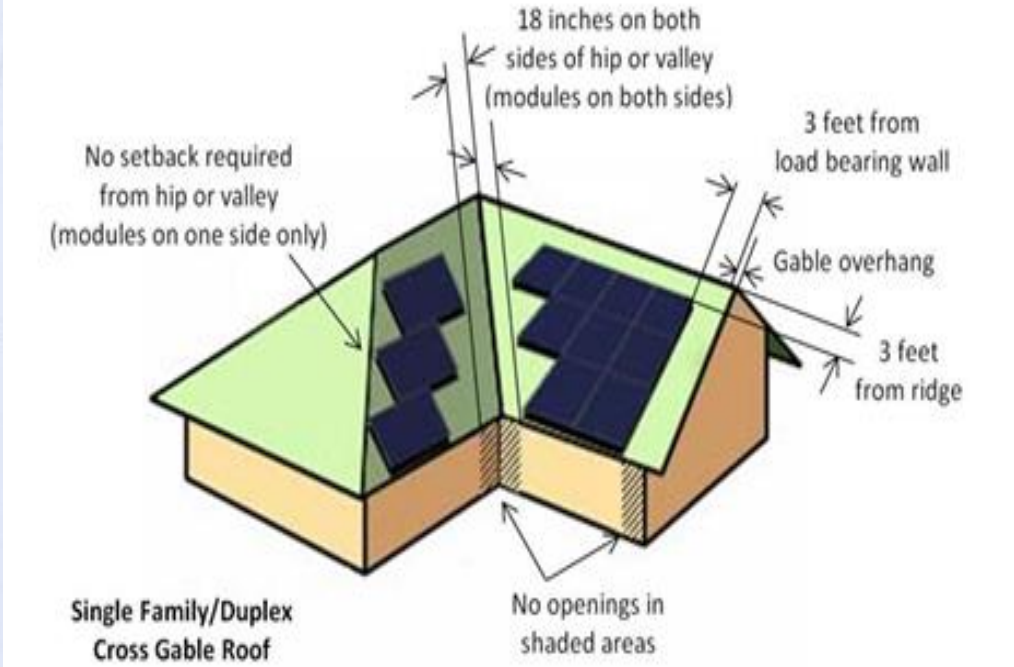
R324.6.1 Pathways. Not fewer than **two pathways, on separate roof planes from lowest roof edge to ridge and not less than 36 inches** wide, shall be provided on all buildings. Not fewer than **one pathway** shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic 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.





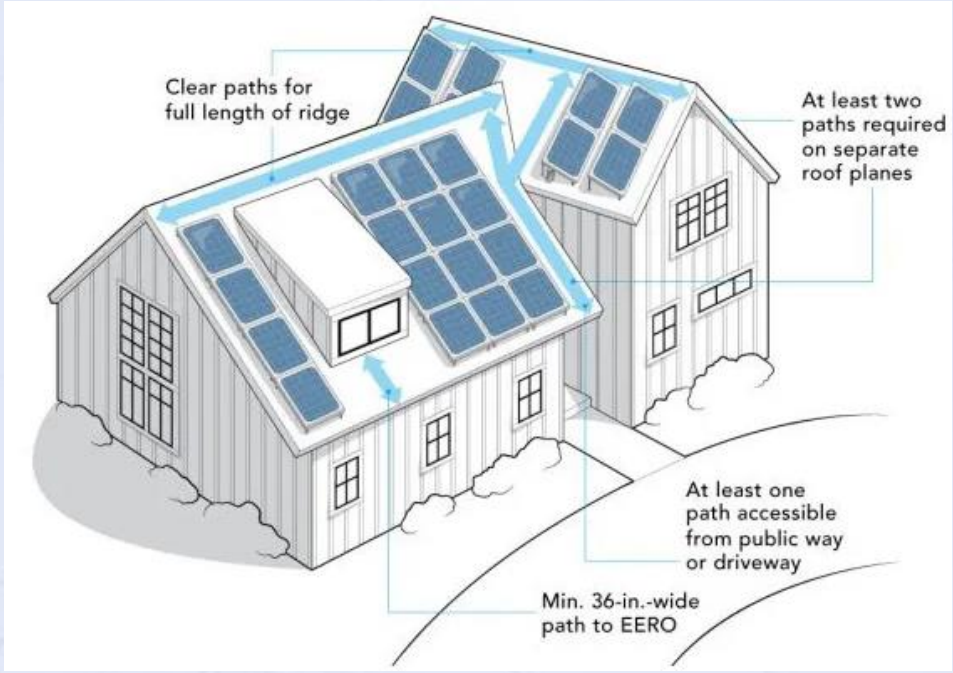
Section R324 Solar Energy Systems (continued)

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.

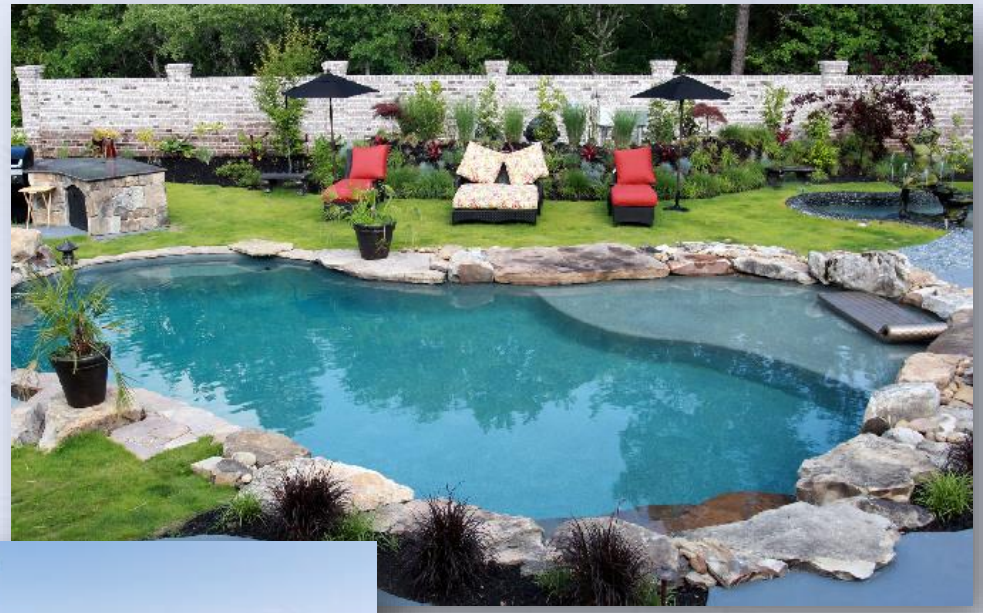
Exception: **BIPV systems** *listed* in accordance with Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.

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**.

Moved location and has changes to the barrier requirements

Section R328 Energy Storage Systems

New

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

Exceptions:

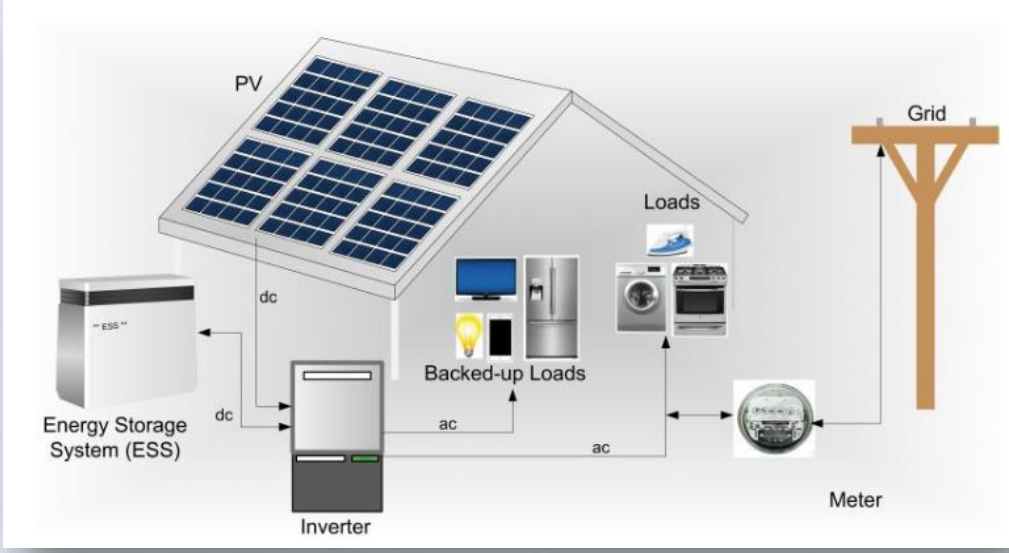
1. *ESS listed* and *labeled* in accordance with **UL 9540** and marked "For use in residential dwelling units" where installed in accordance with the manufacturer's instructions and **NFPA 70**.
2. ESS less than **1 kWh** (3.6 megajoules).

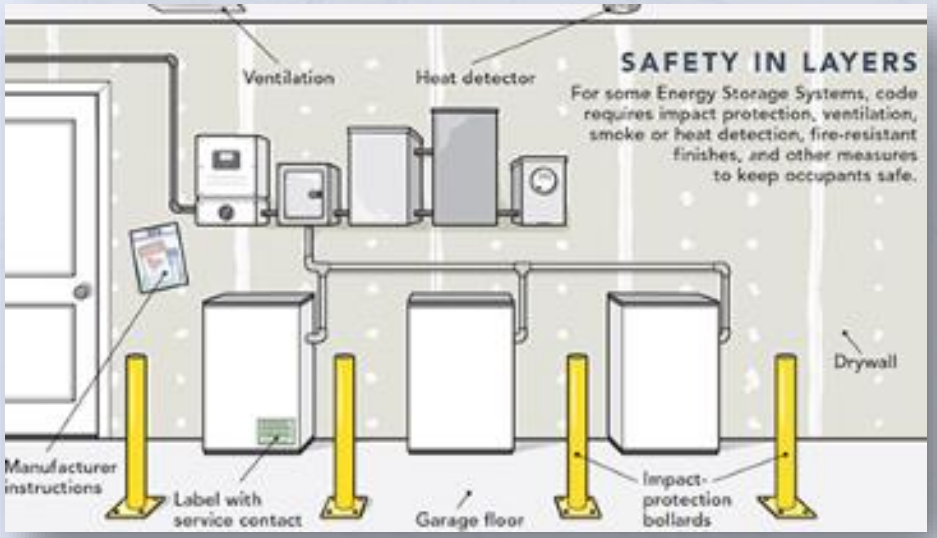
R328.2 Equipment listings. *Energy storage systems (ESS)* shall be *listed* and *labeled* in accordance with **UL 9540**.

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:

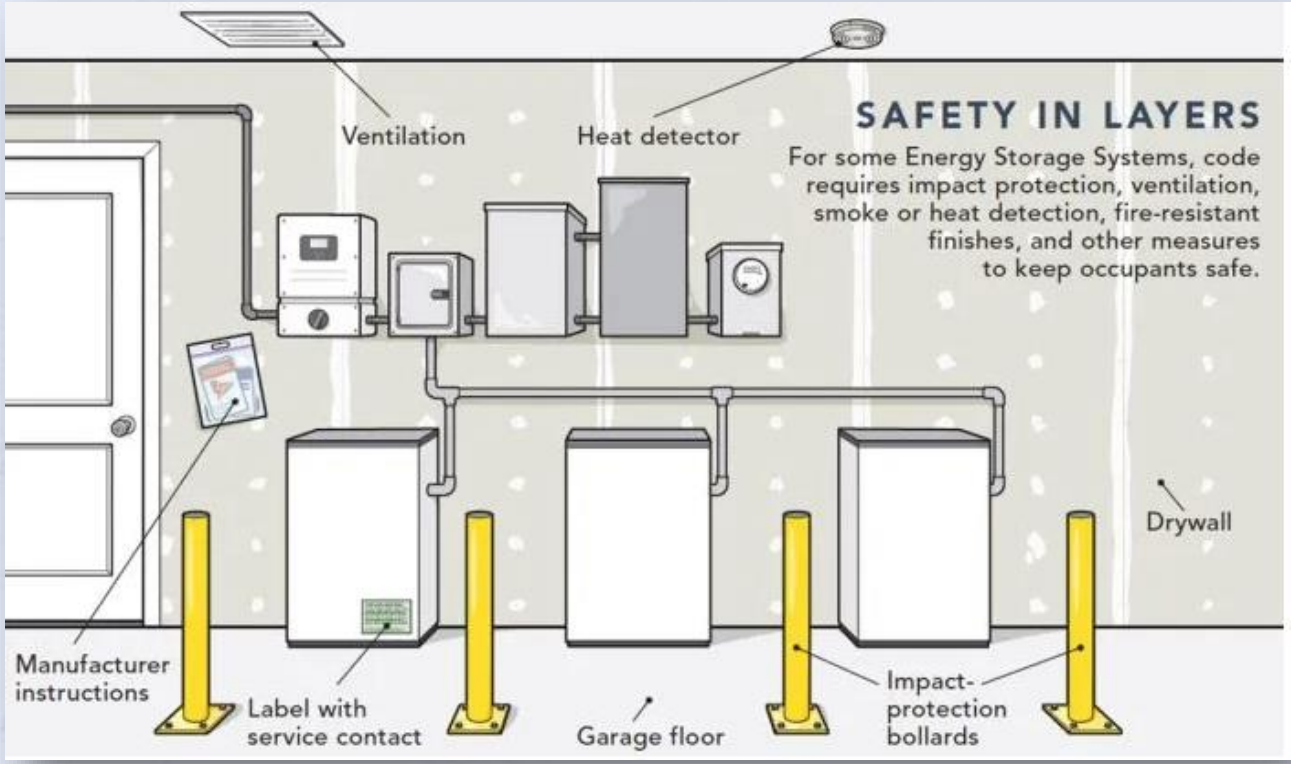
1. **40 kWh** within utility closets, basements and storage or utility spaces.
2. **80 kWh** in attached or detached garages and detached accessory structures.
3. **80 kWh** on exterior walls.
4. **80 kWh** outdoors on the ground.

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 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.

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.

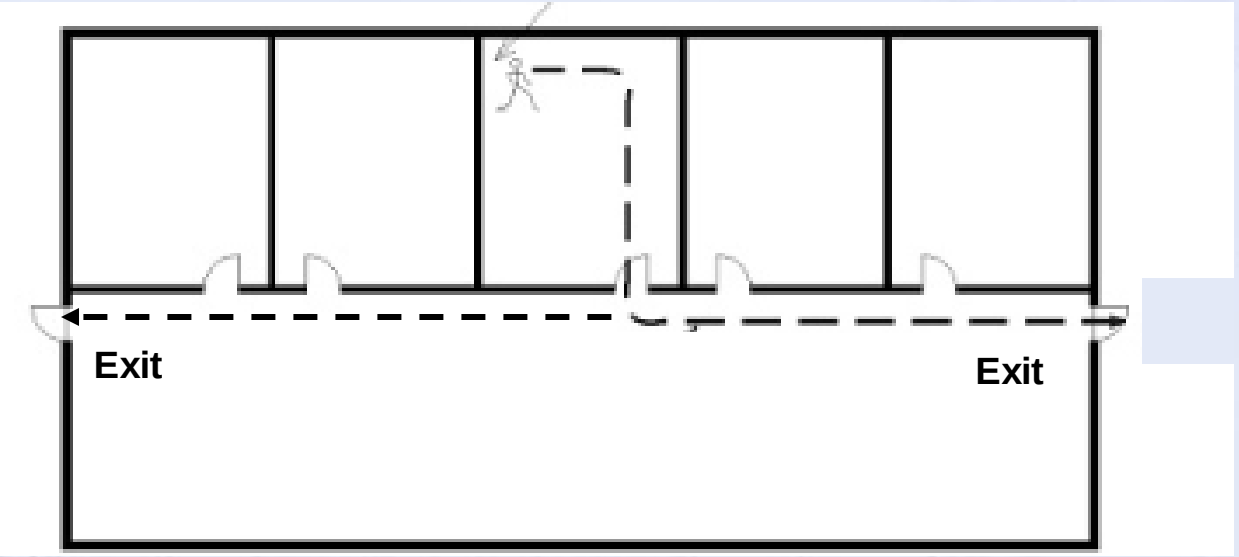
R332.3.1 Fire Resistance Construction. The building shall be of one-hour fire resistant rated construction including all walls, partitions, floors and ceilings. Bedroom doors shall be 1.75 inches solid wood core.

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

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
	8-inch grout-filled concrete masonry			
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.

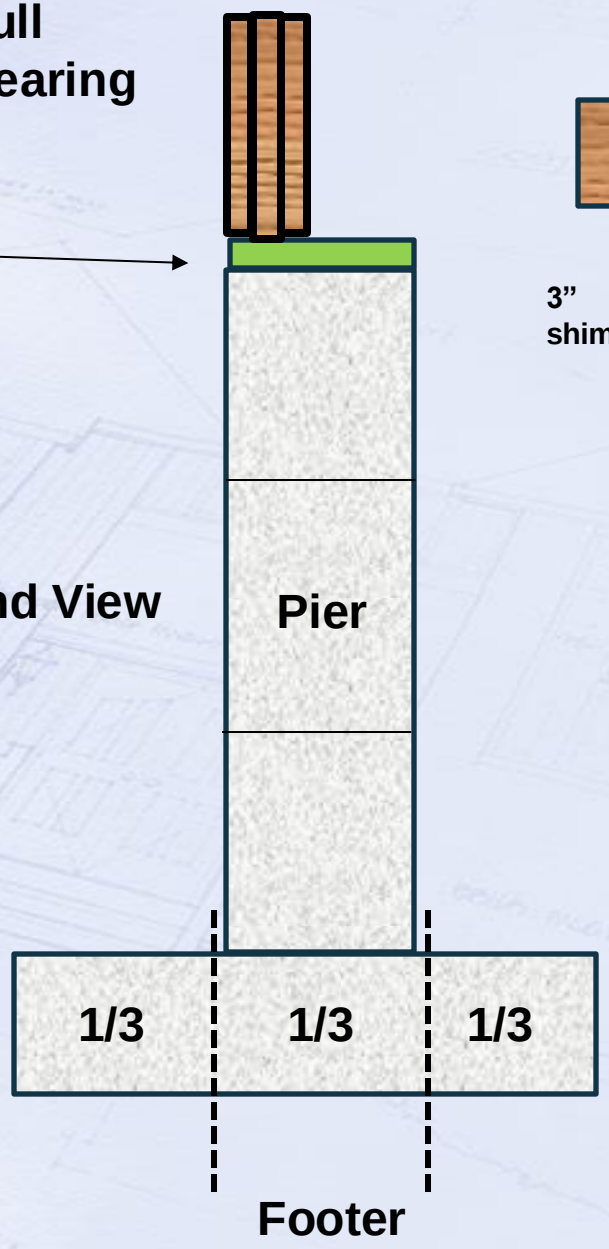
b. Footing sizes are based on 2000 psf allowable soil bearing and 2500 psi concrete. This table is based on the limitations of a tributary area using dimensional framing lumber only.

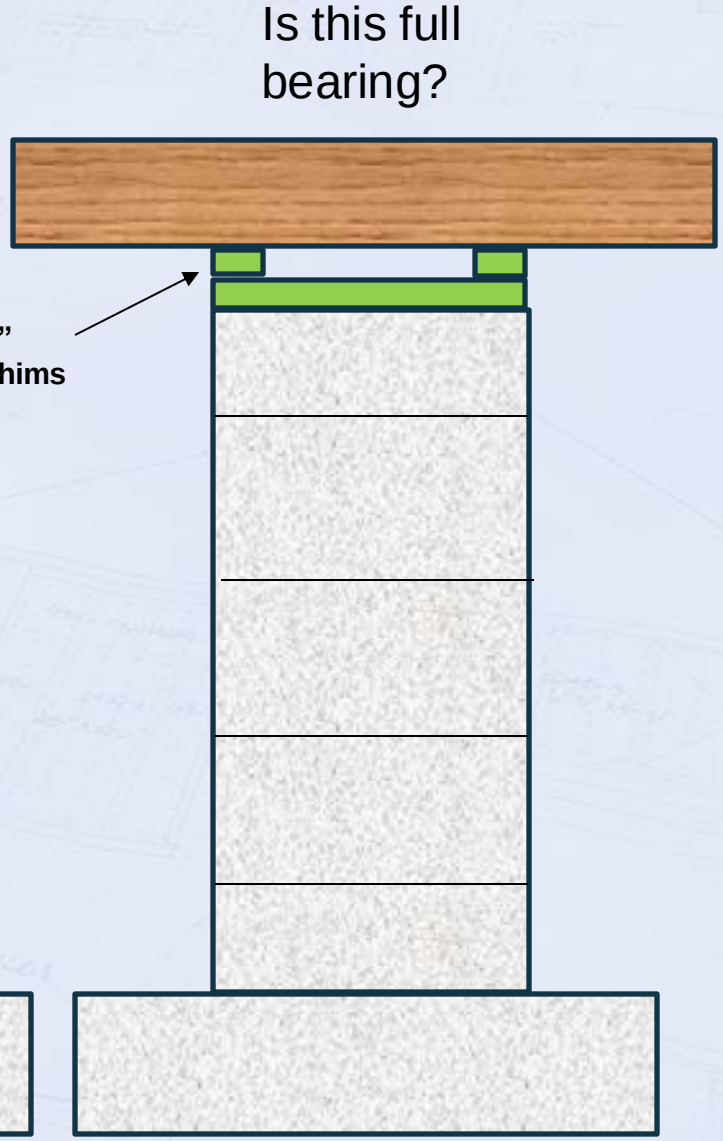
c. Centers of piers shall bear in the middle one-third of the footings. Girders must have full bearing on piers. Footings shall be full thickness over the entire area of the footing.

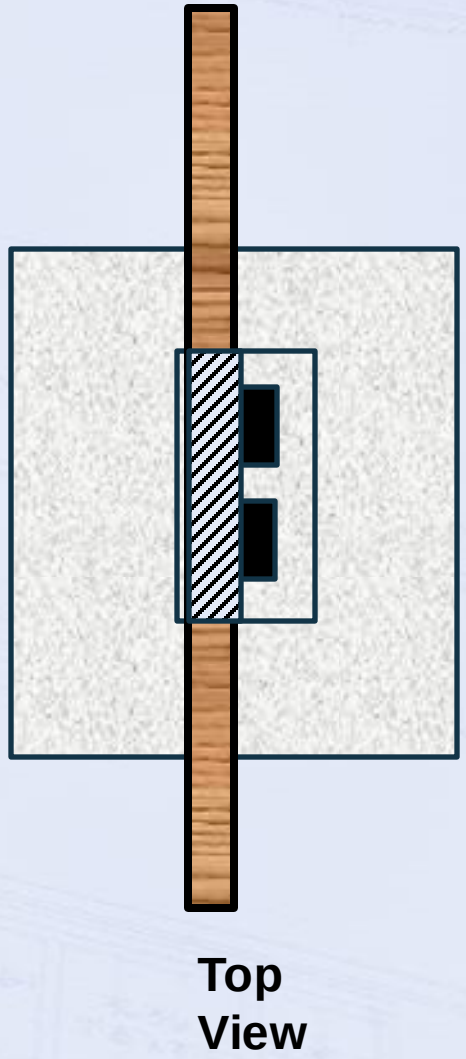
d. Pier sizes given are minimum. For height/thickness limitations see Section R606.7.

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[c]
Moderate	Minimum 12 inches	Moderate-Heavy

d) Check with local jurisdiction for frost line depth.

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.

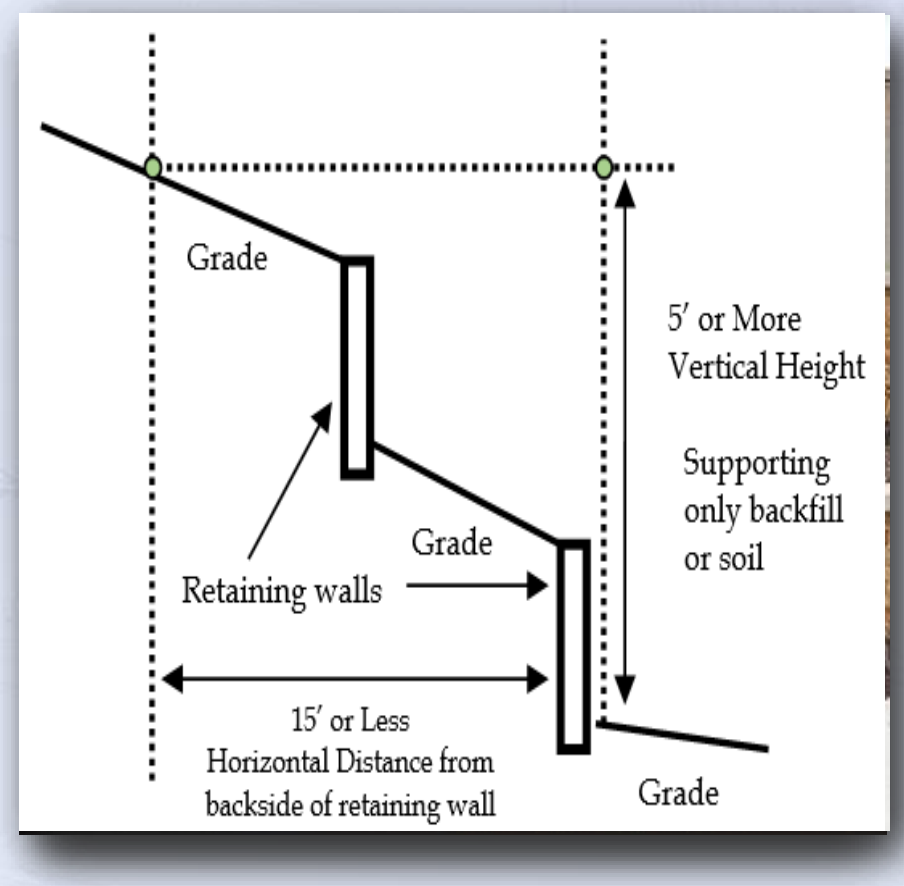
Safety factor design 1.5

Multiple walls 5' in 15' rule

Walls supporting Buildings/Structures

Single walls 5' in 15' rule

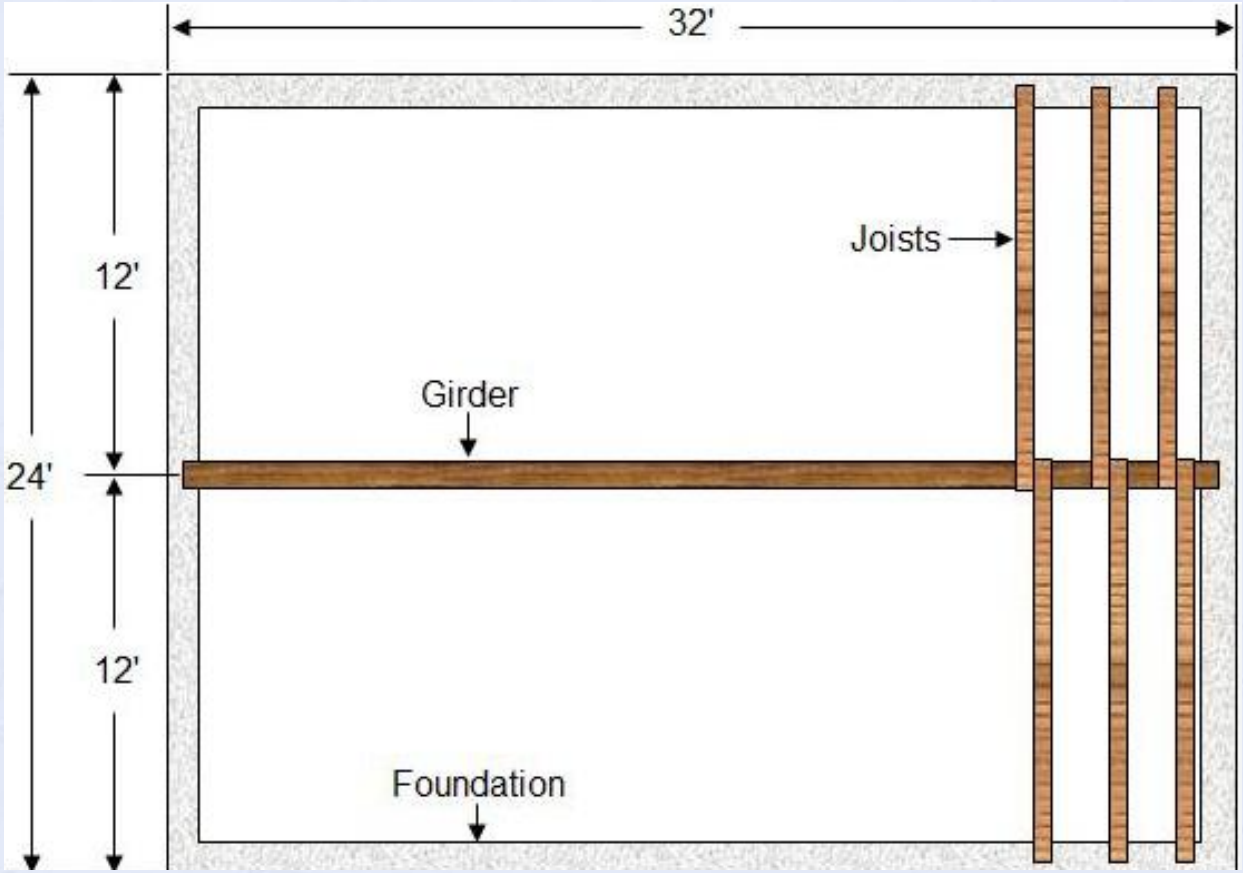
Multiple walls 5' in 15' rule



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**



Residential Code

Chapter 6 Walls

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 studs** 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

New king stud table

R602.6 Drilling and Notching of Studs

Notching of Studs

Stud in exterior wall or bearing partition

- Notch ≤ 25% of width.

Stud in non-bearing partition

- Notch ≤ 40% of its width.

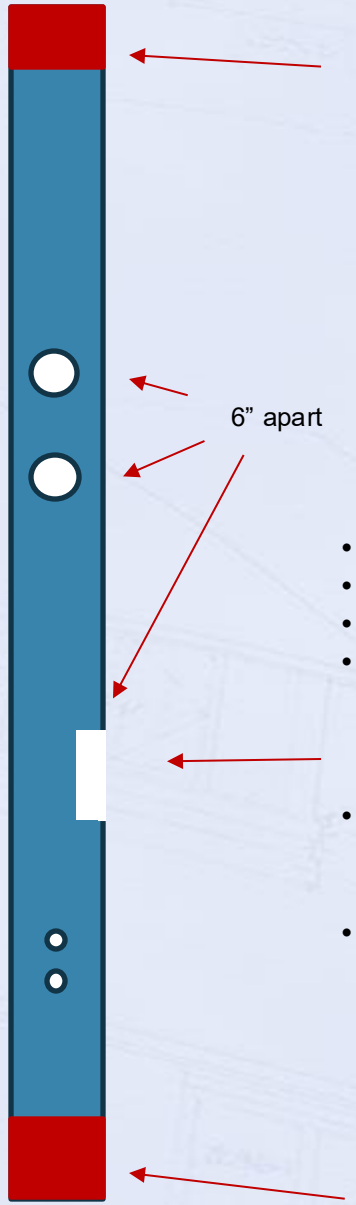
Notch can only be on one side of the stud

Drilling of holes:

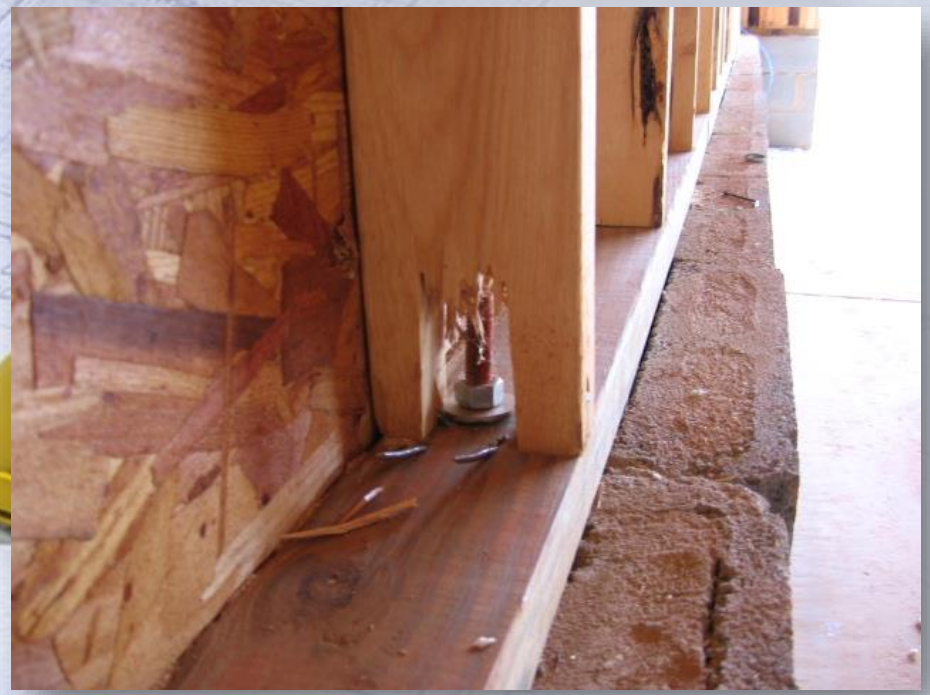
Studs in exterior walls or bearing partitions drilled 40%–60% must be doubled, with no more than two successive doubled studs bored.

Drilling

- 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




HOME



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**.

CHAPTER 7
COVERS

INTERIOR WALL COVERINGS

Section 702

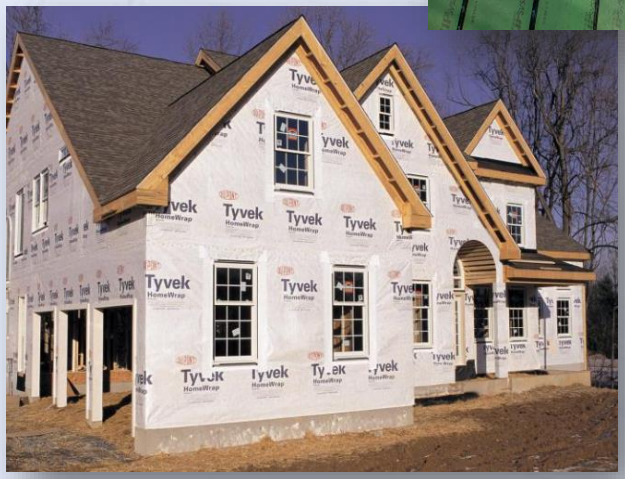
EXTERIOR WALL COVERINGS

Section 703

R703.2 Water-resistive Barrier

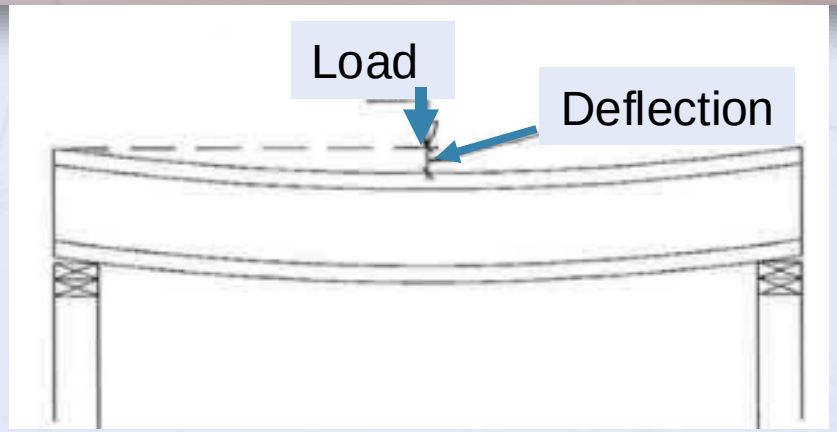
A minimum one layer of water-resistive barrier shall be applied over studs or sheathing of all exterior walls with flashing as indicated in **Section R703.4**, in such a manner as to provide a continuous water-resistive barrier **behind the exterior wall veneer**. The water-resistive barrier material 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.



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.

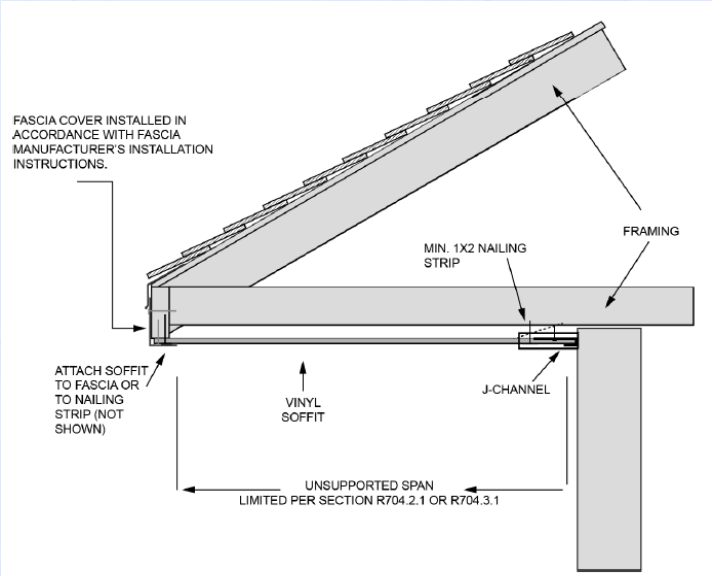


FIGURE R704.2.1(1)
TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT

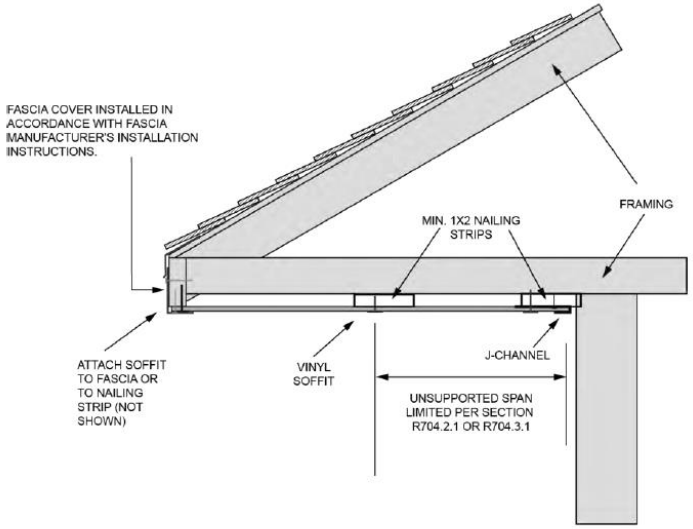


FIGURE R704.2.1(2)
TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

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.

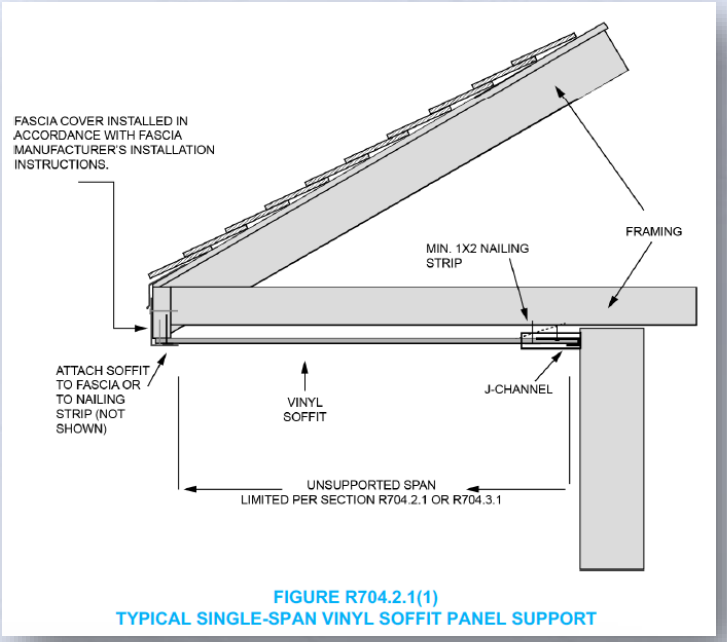


FIGURE R704.2.1(1)
TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT

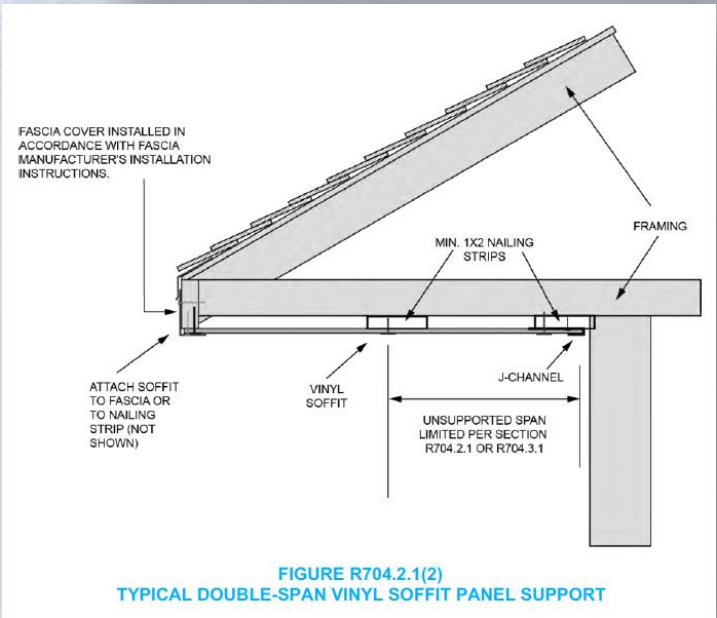


FIGURE R704.2.1(2)
TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT

Residential Code

Chapter 8
Roof and Ceiling Construction

Fire-retardant-treated wood

R802.1.5 Fire-retardant-treated wood. Fire-retardant-treated wood (FRTW) is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less. In addition, the ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the center line of the burners at any time during the test.

R802.1.5.1 Pressure process. For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (344.7 kPa).

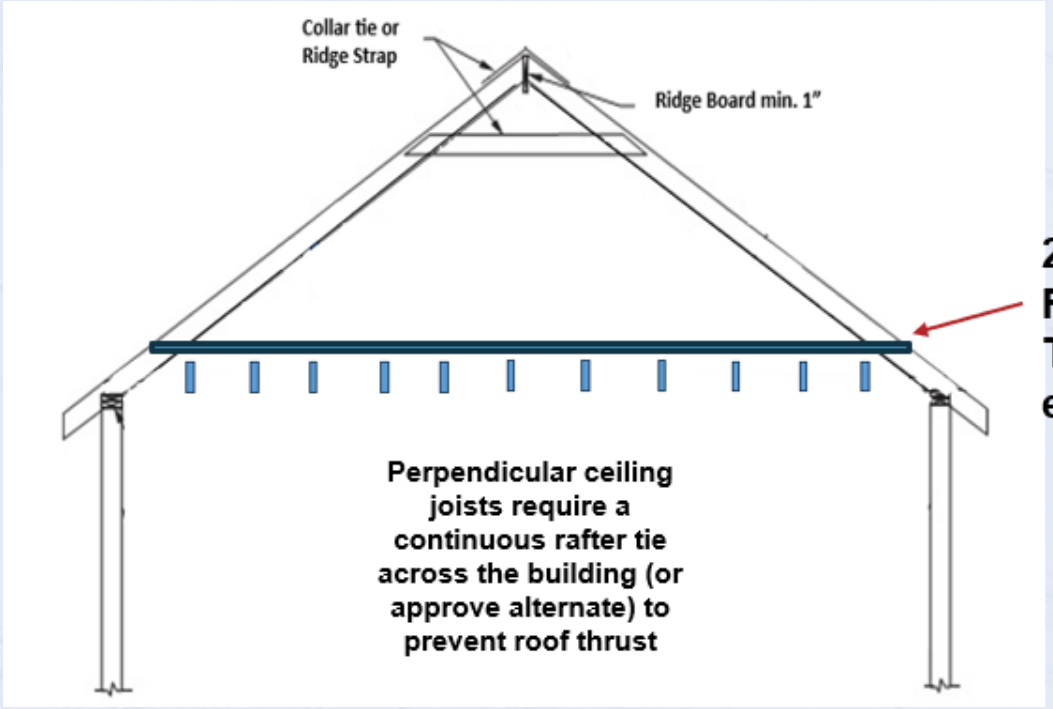
R802.1.5.2 Other means during manufacture. For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an *approved* method of protection as required by this section.

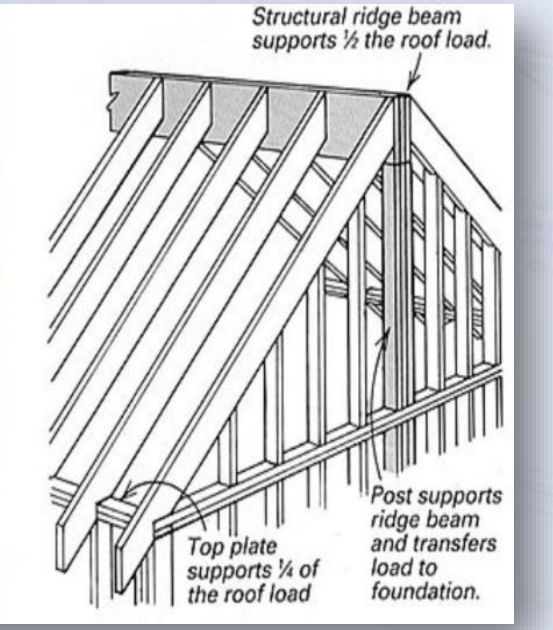
R802.1.5.3 Testing. For fire-retardant-treated wood products, the front and back faces of the wood product shall be tested in accordance with and produce the results required in Section R802.1.5.

R802.1.5.3.1 Fire testing of wood structural panels. *Wood structural panels* shall be tested with a ripped or cut longitudinal gap of 1/8 inch (3.2 mm).

R802.3 Ridge

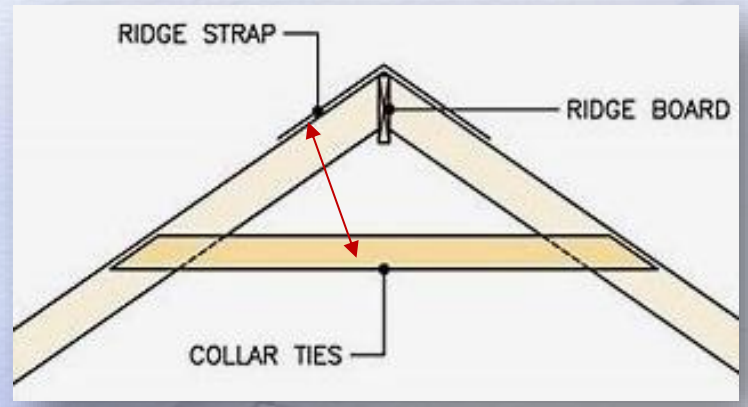
A ridge board used to connect opposing rafters shall be not less than 1-inch nominal thickness and not less in depth than the cut end of the rafter. Opposing rafters at the ridge must align within the thickness of the ridge member. Regularly spaced hip and valley rafters need not align. Where ceiling joist or rafter ties do not provide continuous ties across the structure as required by Section R802.5.2, the ridge shall be supported by a wall or ridge beam designed in accordance with accepted engineering practice and supported on each end by a wall or column.





R802.4.2 Framing details

Rafters shall be framed opposite from each other to a ridge board, shall not be offset more than 1 1/2 inches from each other and shall be connected with a collar tie or ridge strap in accordance with Section R802.4.6 or directly opposite from each other to a gusset plate in accordance with Table R602.3(1). Rafters shall be nailed to the top wall plates in accordance with Table R602.3(1) unless the *roof assembly* is required to comply with the uplift requirements of Section R802.11.



Added specific language on ridge straps and fasteners

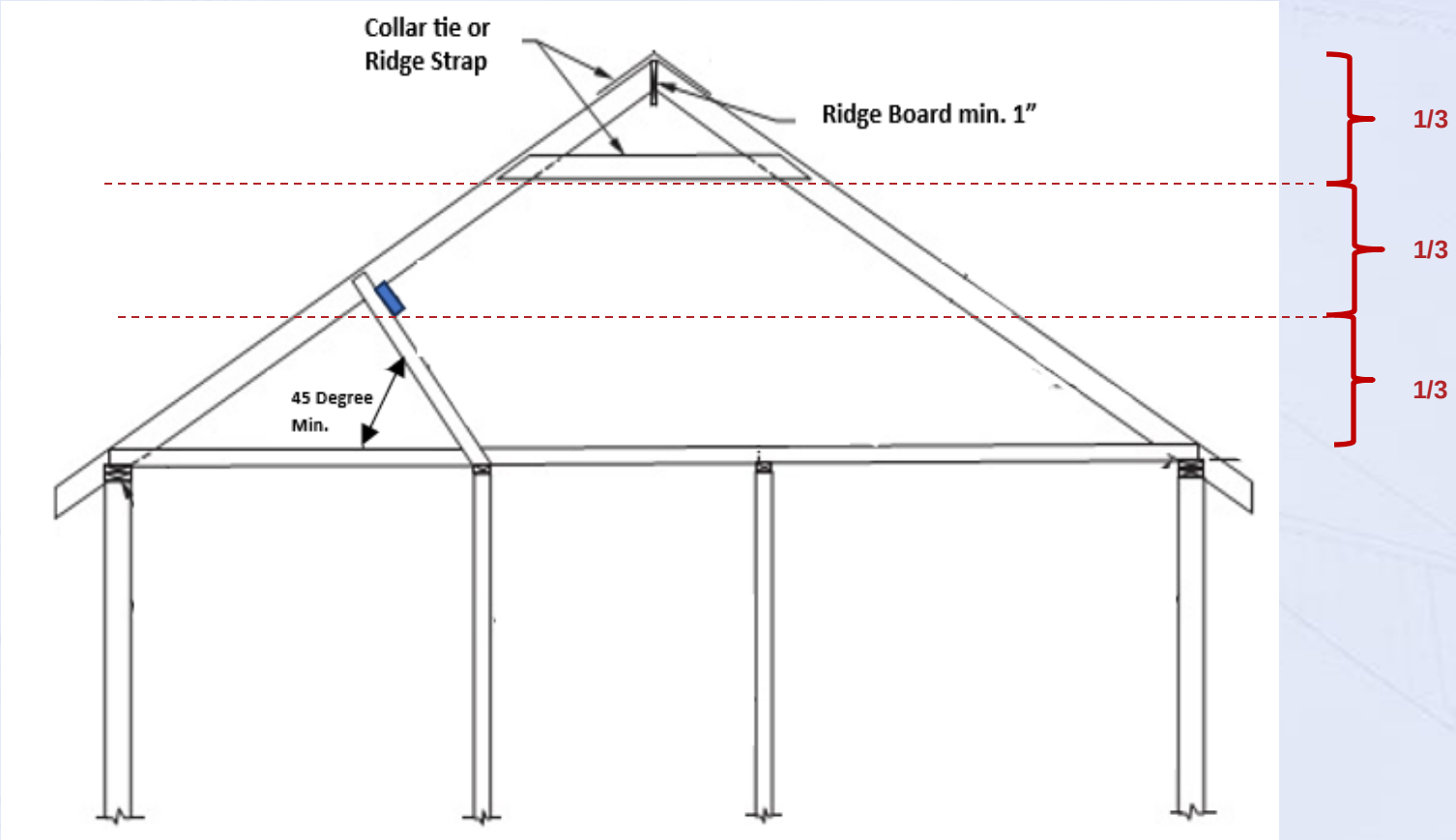
R802.4.6 Collar ties. Where collar ties are used to connect opposing rafters, they shall be located in the upper third of the attic space and fastened in accordance with Table R602.3(1). Collar ties shall be not less than 1 inch by 4 inches nominal, spaced not more than 4 feet on center. Ridge straps shall be permitted to replace collar ties. Ridge straps shall be not less than 1 1/4-inch × 20 gage and shall be nailed to the top edge of each rafter with not fewer than three 10d common (3″ × 0.148″) nails with the closest nail not closer than 23/8 inches from the end of the rafter.

Just refers you back to the fastening table

R802.5 Ceiling joists. Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance with Section R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1).

R802.5.2 Ceiling joist and rafter connections

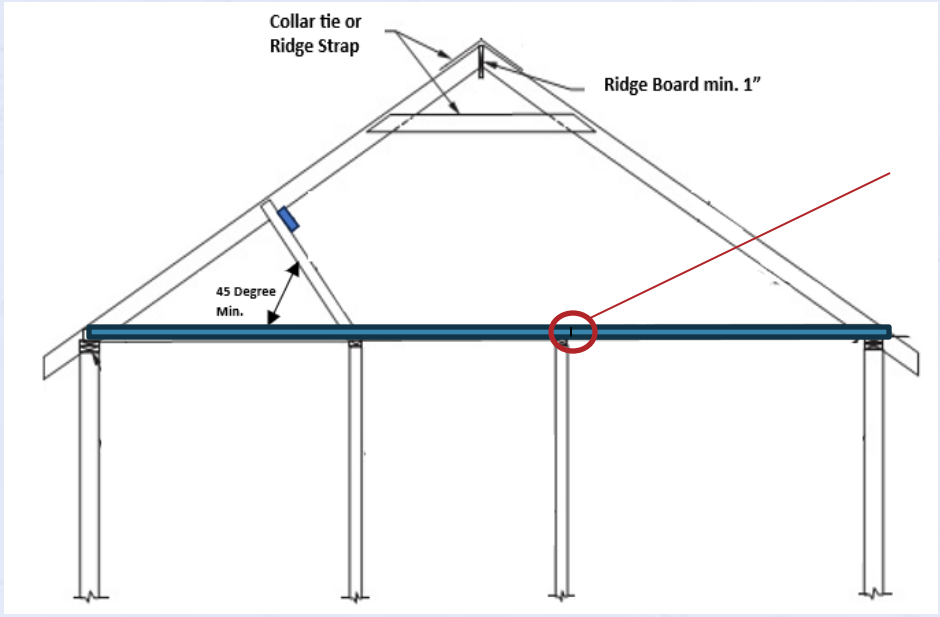
Where ceiling joists run parallel to rafters and are located in the bottom third of the rafter height, they shall be installed in accordance with Figure R802.4.5 and fastened to rafters in accordance with Table R802.5.2(1). Where the ceiling joists are installed above the bottom third of the rafter height, 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.



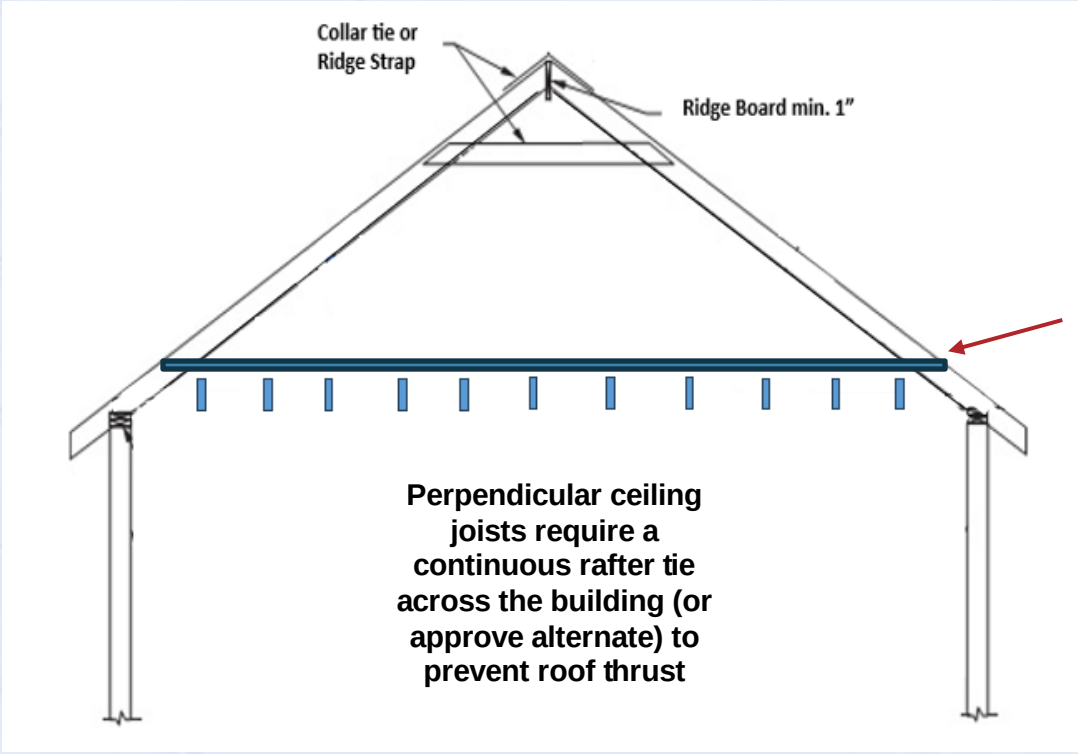
R802.5.2.1 Ceiling joists lapped

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’

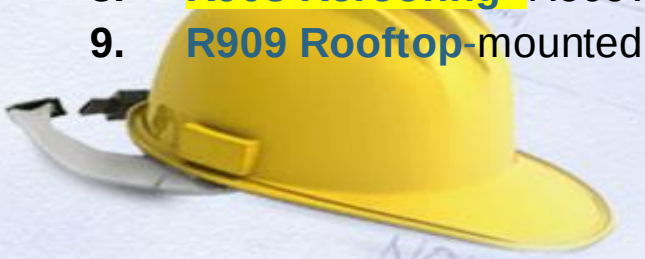
Residential Code

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*.

Built in shingle type UL 7103 and class rating if within 3' of 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*.

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

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

Residential Code

Appendix

APPENDIX AF

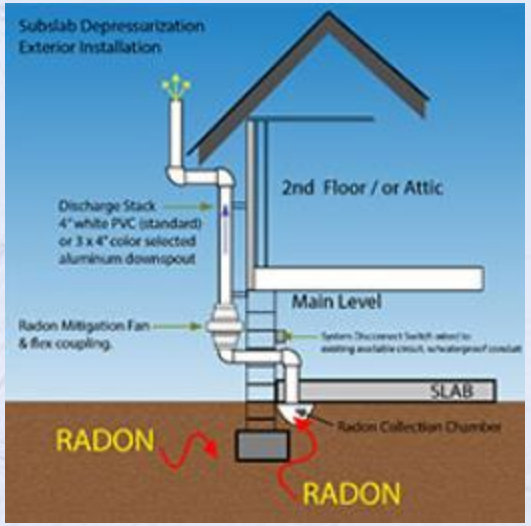
RADON CONTROL METHODS

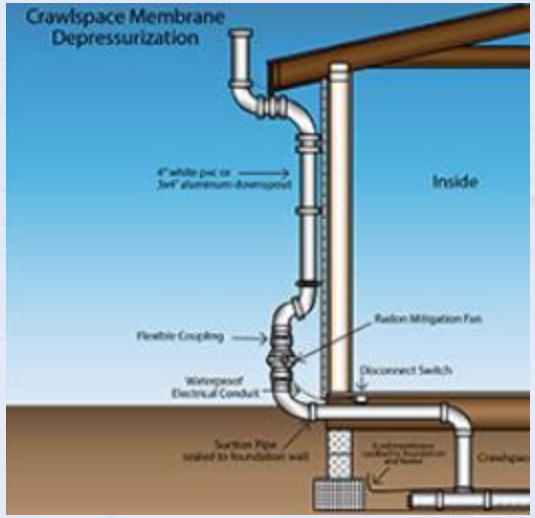
If a sub-soil exhaust system is provided, the system shall conform to the requirements of this appendix

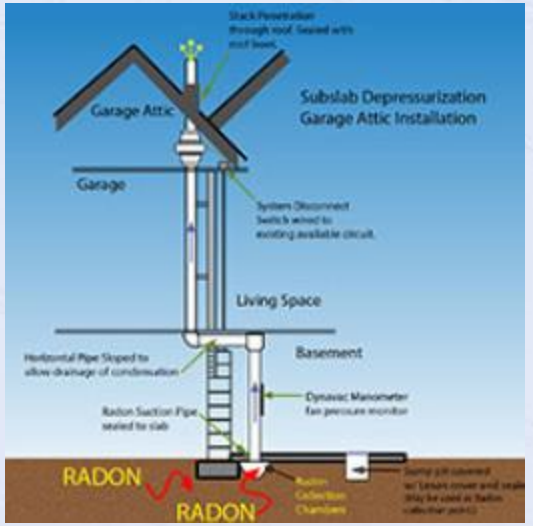
All new

4 Sections

1. AF101- Scope
2. AF102- Definitions
3. AF103- Requirements
4. AF104- Testing







APPENDIX AF
RADON CONTROL METHODS

If a sub-soil exhaust system is provided, the system shall conform to the requirements of this appendix

SECTION AF101
SCOPE

AF101.1 General. This appendix contains requirements for new construction where radon control systems are provided.

SECTION AF102
DEFINITIONS

All new

AF102.1 General. For the purpose of these requirements, the terms used shall be defined as follows:

DRAIN TILE LOOP. A continuous length of drain tile or perforated pipe extending around all or part of the internal or external perimeter of a *basement* or *crawl space* footing.

RADON GAS. A naturally occurring, chemically inert, radioactive gas that is not detectable by human senses. As a gas, it can move readily through particles of soil and rock, and can accumulate under the slabs and foundations of homes where it can easily enter into the living space through construction cracks and openings.

SOIL-GAS-RETARDER. A continuous membrane of 6-mil (0.15 mm) polyethylene or other equivalent material used to retard the flow of soil gases into a building.

SUBMEMBRANE DEPRESSURIZATION SYSTEM. A system designed to achieve lower submembrane air pressure relative to *crawl space* air pressure by use of a vent drawing air from beneath the soil-gas-retarder membrane.

SUBSLAB DEPRESSURIZATION SYSTEM (Active). A system designed to achieve lower subslab air pressure relative to indoor air pressure by use of a fan-powered vent drawing air from beneath the slab.

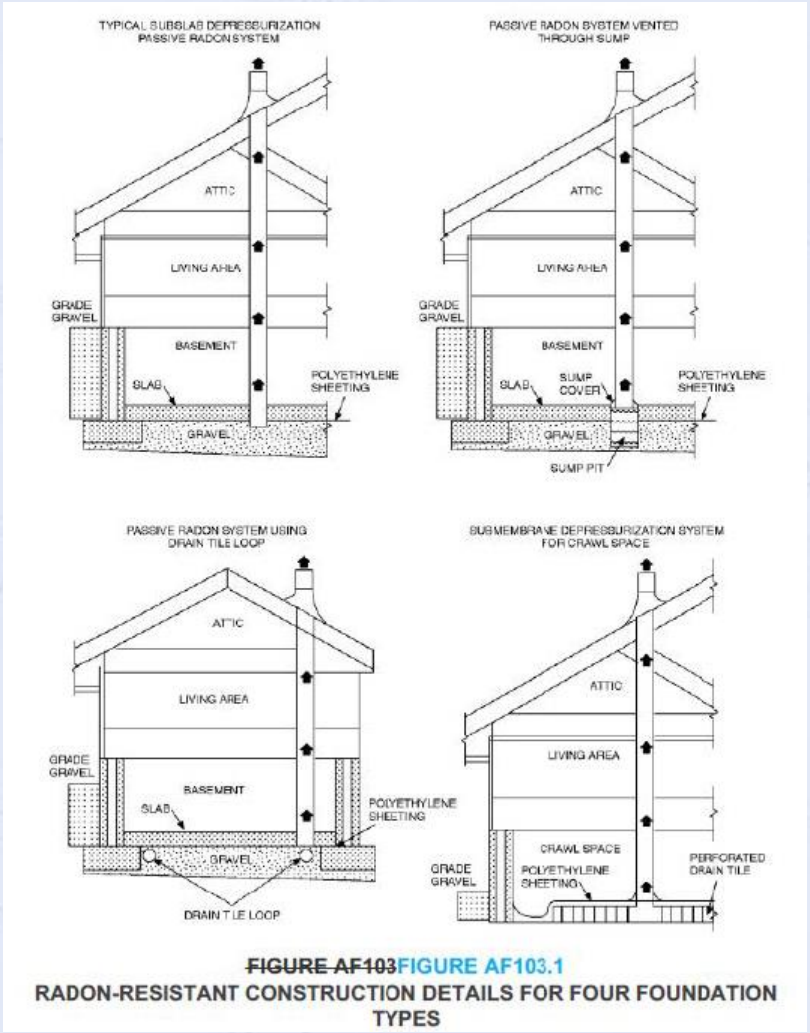
SUBSLAB DEPRESSURIZATION SYSTEM (Passive). A system designed to achieve lower subslab air pressure relative to indoor air pressure by use of a vent pipe routed through the *conditioned space* of a building and connecting the subslab area with outdoor air, thereby relying on the convective flow of air upward in the vent to draw air from beneath the slab.

APPENDIX AF RADON CONTROL METHODS

All new

SECTION AF103 REQUIREMENTS

AF103.1 General. The following construction techniques are intended to resist radon entry and prepare the building for post-construction radon mitigation.



~~FIGURE AF103~~FIGURE AF103.1
RADON-RESISTANT CONSTRUCTION DETAILS FOR FOUR FOUNDATION TYPES

APPENDIX AF RADON CONTROL METHODS

All new

AF103.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate, not less than 4 inches thick. The aggregate shall consist of material that will pass through a 2-inch sieve and be retained by a 1/4-inch sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.
3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

AF103.3 Soil-gas-retarder. A minimum 6-mil [or 3-mil (0.075 mm) cross-laminated] polyethylene or equivalent flexible sheeting material shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas-retarder by bridging any cracks that develop in the slab or floor assembly, and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting shall cover the entire floor area with separate sections of sheeting lapped not less than 12 inches (305 mm). The sheeting shall fit closely around any pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered with additional sheeting.

AF103.4 Entry routes. Potential radon entry routes shall be closed in accordance with Sections AF103.4.1 through AF103.4.10.

AF103.4.1 Floor openings. Openings around bathtubs, showers, water closets, pipes, wires or other objects that penetrate concrete slabs, or other floor assemblies, shall be filled with a polyurethane caulk or equivalent sealant applied in accordance with the manufacturer’s recommendations.

APPENDIX AF RADON CONTROL METHODS

All new

AF103.4.2 Concrete joints. Control joints, isolation joints, construction joints, and any other joints in concrete slabs or between slabs and foundation walls shall be sealed with a caulk or sealant. Gaps and joints shall be cleared of loose material and filled with polyurethane caulk or other elastomeric sealant applied in accordance with the manufacturer's recommendations.

AF103.4.3 Condensate drains. Condensate drains shall be trapped or routed through nonperforated pipe to daylight.

AF103.4.4 Sumps. Sump pits open to soil or serving as the termination point for subslab or exterior drain tile loops shall be covered with a gasketed or otherwise sealed lid. Sumps used as the suction point in a subslab depressurization system shall have a lid designed to accommodate the vent pipe. Sumps used as a floor drain shall have a lid equipped with a trapped inlet.

AF103.4.5 Foundation walls. Hollow block masonry foundation walls shall be constructed with either a continuous course of *solid masonry*, one course of masonry grouted solid, or a solid concrete beam at or above finished ground surface to prevent the passage of air from the interior of the wall into the living space. Where a brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be sealed. Joints, cracks or other openings around all penetrations of both exterior and interior surfaces of masonry block or wood foundation walls below the ground surface shall be filled with polyurethane caulk or equivalent sealant. Penetrations of concrete walls shall be filled.

AF103.4.6 Dampproofing. The exterior surfaces of portions of concrete and masonry block walls below the ground surface shall be dampproofed in accordance with Section R406.

AF103.4.7 Air-handling units. Air-handling units in crawl spaces shall be sealed to prevent air from being drawn into the unit.

Exception: Units with gasketed seams or units that are otherwise sealed by the manufacturer to prevent leakage.

AF103.4.8 Ducts. Ductwork passing through or beneath a slab shall be of seamless material unless the air-handling system is designed to maintain continuous positive pressure within such ducting. Joints in such ductwork shall be sealed to prevent air leakage. Ductwork located in crawl spaces shall have seams and joints sealed by closure systems in accordance with Section M1601.4.1.

AF103.4.9 Crawl space floors. Openings around all penetrations through floors above crawl spaces shall be caulked or otherwise filled to prevent air leakage.

AF103.4.10 Crawl space access. Access doors and other openings or penetrations between *basements* and adjoining crawl spaces shall be closed, gasketed or otherwise filled to prevent air leakage.

APPENDIX AF RADON CONTROL METHODS

All new

AF103.5 Passive submembrane depressurization system. In buildings with *crawl space* foundations, the following components of a passive submembrane depressurization system shall be installed during construction.

Exception: Buildings in which an *approved* mechanical *crawl space* ventilation system or other equivalent system is installed.

AF103.5.1 Ventilation. Crawl spaces shall be provided with vents to the exterior of the building. The minimum net area of ventilation openings shall comply with Section R408.1.

AF103.5.2 Soil-gas-retarder. The soil in crawl spaces shall be covered with a continuous layer of minimum 6-mil (0.15 mm) polyethylene soil-gas-retarder. The ground cover shall be lapped not less than 12 inches (305 mm) at joints and shall extend to all foundation walls enclosing the *crawl space* area.

AF103.5.3 Vent pipe. A plumbing tee or other *approved* connection shall be inserted horizontally beneath the sheeting and connected to a 3- or 4-inch-diameter (76 or 102 mm) fitting with a vertical vent pipe installed through the sheeting. The vent pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings.

APPENDIX AF RADON CONTROL METHODS

All new

AF103.6 Passive subslab depressurization system. In *basement* or slab-on-grade buildings, the following components of a passive subslab depressurization system shall be installed during construction.

AF103.6.1 Vent pipe. A minimum 3-inch-diameter (76 mm) ABS, PVC or equivalent gastight pipe shall be embedded vertically into the subslab aggregate or other permeable material before the slab is cast. A “T” fitting or equivalent method shall be used to ensure that the pipe opening remains within the subslab permeable material. Alternatively, the 3-inch (76 mm) pipe shall be inserted directly into an interior perimeter drain tile loop or through a sealed sump cover where the sump is exposed to the subslab aggregate or connected to it through a drainage system.

The pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the surface of the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings.

AF103.6.2 Multiple vent pipes. In buildings where interior footings or other barriers separate the subslab aggregate or other gas-permeable material, each area shall be fitted with an individual vent pipe. Vent pipes shall connect to a single vent that terminates above the roof or each individual vent pipe shall terminate separately above the roof.

APPENDIX AF RADON CONTROL METHODS

All new

AF103.7 Vent pipe drainage. Components of the radon vent pipe system shall be installed to provide positive drainage to the ground beneath the slab or soil-gas-retarder.

AF103.8 Vent pipe accessibility. Radon vent pipes shall be accessible for future fan installation through an attic or other area outside the *habitable space*.

Exception: The radon vent pipe need not be accessible in an attic space where an *approved* roof-top electrical supply is provided for future use.

AF103.9 Vent pipe identification. Exposed and visible interior radon vent pipes shall be identified with not less than one *label* on each floor and in accessible *attics*. The *label* shall read: “Radon Reduction System.”

AF103.10 Combination foundations. Combination *basement*/*crawl space* or slab-on-grade/*crawl space* foundations shall have separate radon vent pipes installed in each type of foundation area. Each radon vent pipe shall terminate above the roof or shall be connected to a single vent that terminates above the roof.

AF103.11 Building depressurization. Joints in air ducts and plenums in un*conditioned spaces* shall meet the requirements of Section M1601. Thermal envelope air infiltration requirements shall comply with the energy conservation provisions in Chapter 11. Fireblocking shall meet the requirements contained in Section R302.11.

AF103.12 Power source. To provide for future installation of an active submembrane or subslab depressurization system, an electrical circuit terminated in an *approved* box shall be installed during construction in the attic or other anticipated location of vent pipe fans. An electrical supply shall be accessible in anticipated locations of system failure alarms.

APPENDIX AF RADON CONTROL METHODS

All new

SECTION AF104 TESTING

AF104.1 Testing. Where radon-resistant construction is performed, radon testing shall be as specified in Items 1 through 11:

1. Testing shall be performed after the dwelling passes its air tightness test.
2. Testing shall be performed after the radon control system and HVAC installations are complete. The HVAC system shall be operating during the test. Where the radon system has an installed fan, the dwelling shall be tested with the radon fan operating.
3. Testing shall be performed at the lowest occupied floor level, whether or not that space is finished. Spaces that are physically separated and served by different HVAC systems shall be tested separately.
4. Testing shall not be performed in a closet, hallway, stairway, laundry room, furnace room, bathroom or kitchen.
5. Testing shall be performed with a commercially available radon test kit or testing shall be performed by an approved third party with a continuous radon monitor. Testing with test kits shall include two tests, and the test results shall be averaged. Testing shall be in accordance with this section and the testing laboratory kit manufacturer's instructions.
6. Testing shall be performed with the windows closed. Testing shall be performed with the exterior doors closed, except when being used for entrance or exit. Windows and doors shall be closed for not fewer than 12 hours prior to the testing.
7. Testing shall be performed by the builder, a registered design professional or an approved third party.
8. Testing shall be conducted over a period of not less than 48 hours or not less that the period specified by the testing device manufacturer, whichever is longer.
9. Written radon test results shall be provided by the test lab or testing party.
10. Where the radon test result is 4 pCi/L or greater, the fan for the radon vent pipe shall be installed as specified in Sections AF103.9 and AF103.12.
11. Where the radon test result is 4 pCi/L or greater, the system shall be modified and retested until the test result is less than 4 pCi/L.

Exception: Testing is not required where the occupied space is located above an unenclosed open space.

APPENDIX AW

3D-PRINTED BUILDING CONSTRUCTION

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

All new

6 Sections

1. AW101- General
2. AW102- Definitions
3. AW103 Building Design
4. AW104- Building Construction
5. AW105- Special Inspections
6. AW106 Referenced Standards

APPENDIX AW 3D-PRINTED BUILDING CONSTRUCTION

All new

SECTION AW101 GENERAL

AW101.1 Scope. Buildings, structures and building elements fabricated in whole or in part using 3D-printed construction techniques shall be designed, constructed and inspected in accordance with the provisions contained in this appendix and other applicable requirements in this code.

AW101.2 Definitions. The words and terms in Section AW102 shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

SECTION AW102 DEFINITIONS

3D-PRINTED BUILDING CONSTRUCTION. A process for fabricating buildings, structures and building elements from 3D model data using automated equipment that deposits construction material in a layer-upon-layer fashion.

ADDITIVE MANUFACTURING MATERIALS. Materials used by the 3D printer to produce the building structure or system components of the building.

FABRICATION PROCESS. Preparation of the job site and construction material, the deposition, curing, finishing, insertion of components and other methods used to construct building elements such as walls, partitions, *roof assemblies* and structural components, and the means used to connect assemblies together.

PRODUCTION EQUIPMENT. The equipment, including the 3D printer, its settings, nozzles and other accessories used in the fabrication process.

SYSTEM COMPONENTS. Devices, equipment and *appliances* that are installed in the building elements as part of the wiring, plumbing, HVAC and other systems. These include, but are not limited to, electrical outlet boxes, conduit, wiring, piping, tubing and HVAC ducts, each of which is covered by a product standard or installation code requirement.

APPENDIX AW 3D-PRINTED BUILDING CONSTRUCTION

All new

SECTION AW103 BUILDING DESIGN

AW103.1 Design organization. 3D-printed buildings, structures and building elements shall be designed by an organization certified in accordance with UL 3401 by an *approved* agency and approved by the *building official* in accordance with this section.

AW103.2 Design approval. The structural design, *construction documents* and UL 3401 report of findings shall be submitted for review and approval in accordance with Section 104.11.

SECTION AW104 BUILDING CONSTRUCTION

AW104.1 Construction. 3D-printed buildings, structures and building elements shall be constructed in accordance with this section.

AW104.2 Construction method. The building construction method, consisting of the manufacturer's production equipment and fabrication process, shall be in accordance with the UL 3401 report of findings. The unique identifier of the construction method used shall match the identifier in the UL 3401 report of findings.

AW104.3 Additive manufacturing materials. Only the *listed* additive manufacturing materials identified in the UL 3401 report of findings shall be used to fabricate the building structure or system components. Containers of the additive manufacturing materials shall be *labeled*.

AW104.4 Depositing of manufacturing materials. Manufacturing materials shall only be deposited where ambient temperature and environmental conditions at the job site are within limits specified in the UL 3401 report of findings. The maximum number of layers permitted, specified curing time and any surface preparation or finishing shall be performed as specified in the UL 3401 report of findings.

All new

SECTION AW105 SPECIAL INSPECTIONS

AW105.1 Initial inspection. An initial inspection of the production equipment, including 3D printer, and the fabrication process shall be performed after the production equipment is located on site and before building fabrication has begun. The inspection shall be conducted by representatives of the approved agency that evaluated the fabrication process for compliance with UL 3401. The inspection shall verify that the fabrication process, including production equipment, 3D-printing parameters and additive manufacturing materials, are in accordance with the UL 3401 report of findings and the proprietary information in the UL 3401 detailed report of findings.

Exception: Where *approved* by the *building official*, inspections of the production equipment, including 3D printer, and the fabrication process used in a single housing tract shall be conducted on the first building to be constructed, and on a selected number of subsequent buildings, where the same equipment, equipment operators and fabrication process are used on all buildings. The number of inspections to be performed shall be determined by the *building official*.

SECTION AW106 REFERENCED STANDARDS

AW106.1 General. See Table AW106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

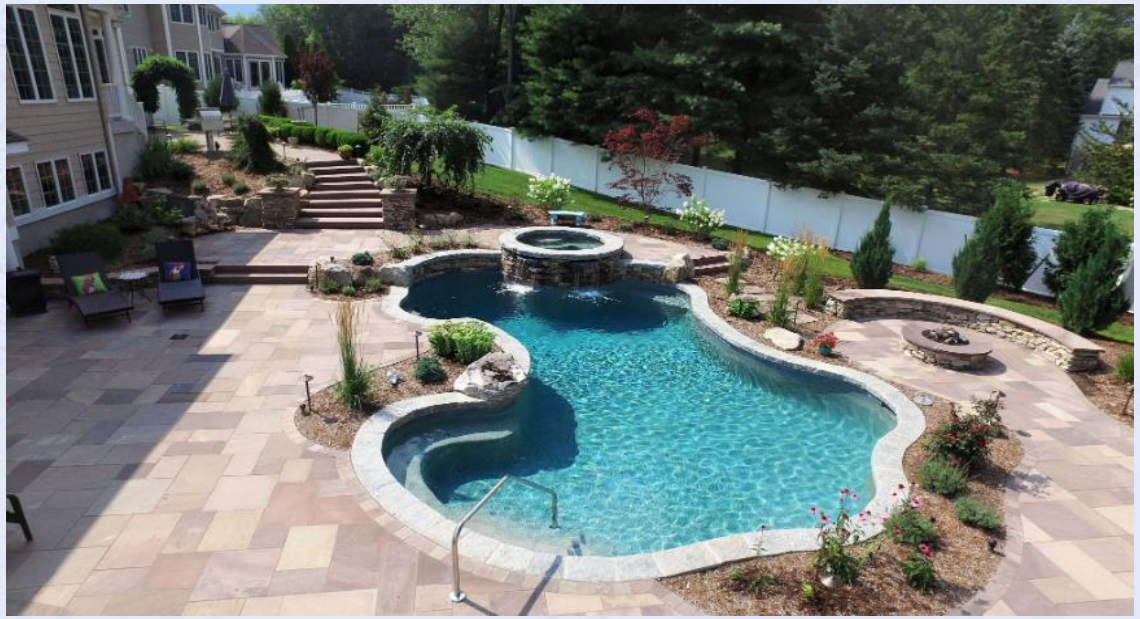
TABLE AW106.1

REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
UL 3401—19	*Outline of Investigation for 3D Printed Building Construction*	AW103.2, AW104.2, AW104.3, AW104.4, AW105.1

APPENDIX NC-A
SWIMMING POOLS, SPAS AND HOT TUBS

Restructured & Added some items to the barrier requirements



APPENDIX NC-A
SWIMMING POOLS, SPAS AND HOT TUBS

Restructured & Added some items to the barrier requirements

SECTION NCA105
BARRIER REQUIREMENTS

NCA105.1 Application. The provisions of this chapter shall control the design of barriers for residential swimming pools, spas and hot tubs. These design controls are intended to provide protection against potential drownings and near drownings by restricting access to swimming pools, spas and hot tubs.

NCA105.2 Outdoor swimming pools and spas. An outdoor swimming pool, including an in-ground, above-ground or on-ground pool, hot tub or spa shall be surrounded by a barrier that complies with **Sections NCA105.2.1** through **NCA105.7**.

NCA105.2.1 Barrier height and clearances. Barrier heights and clearances shall be in accordance with all of the following:

1. The top of the barrier shall be not less than 48 inches (1219 mm) above grade where measured on the side of the barrier that faces away from the pool or spa. Such height shall exist around the entire perimeter of the barrier and for a distance of 3 feet (914 mm) measured horizontally from the outside of the required barrier.
2. The vertical clearance between grade and the bottom of the barrier shall not exceed 2 inches (51 mm) for grade surfaces that are not solid, such as grass or gravel, where measured on the side of the barrier that faces away from the pool or spa.
3. The vertical clearance between a surface below the barrier to a solid surface, such as concrete, and the bottom of the required barrier shall not exceed 4 inches (102 mm) where measured on the side of the required barrier that faces away from the pool or spa.
4. Where the top of the pool or spa structure is above grade, the barrier shall be installed on grade or shall be mounted on top of the pool or spa structure. Where the barrier is mounted on the top of the pool or spa, the vertical clearance between the top of the pool or spa and the bottom of the barrier shall not exceed 4 inches (102 mm).

APPENDIX NC-A
SWIMMING POOLS, SPAS AND HOT TUBS

NCA105.2.2 Openings. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.

NCA105.2.3 Solid barrier surfaces. Solid barriers that do not have openings shall not contain indentations or protrusions that form handholds and footholds, except for normal construction tolerances and tooled masonry joints.

NCA105.2.4 Mesh fence as a barrier. Deleted.

NCA105.2.4.1 Setback for mesh fences. The inside of a mesh fence shall be not closer than 20 inches (508 mm) to the nearest edge of the water of a pool or spa.

NCA105.2.5 Closely spaced horizontal members. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the pool or spa side of the fence. Spacing between vertical members shall not exceed 13/4 inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 13/4 inches (44 mm) in width.

NCA105.2.6 Widely spaced horizontal members. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, the interior width of the cutouts shall not exceed 1 3/4 inches (44mm).

NCA105.2.7 Chain link dimensions. The maximum opening formed by a chain link fence shall be not more than 1 3/4 inches (44 mm). Where the fence is provided with slats fastened at the top and bottom that reduce the openings, such openings shall be not greater than 1 3/4 inches (44 mm).

APPENDIX NC-A
SWIMMING POOLS, SPAS AND HOT TUBS

NCA105.2.8 Diagonal members. Where the barrier is composed of diagonal members, the maximum opening formed by the diagonal members shall be not greater than 1 3/4 inches (44 mm). The angle of diagonal members shall be not greater than 45 degrees (0.79 rad) from vertical.

NCA105.2.9 Clear zone. Where equipment, including pool equipment such as pumps, filters and heaters, is on the same lot as a pool or spa and such equipment is located outside of the barrier protecting the pool or spa, such equipment shall be located not less than 36 inches (914 mm) from the outside of the barrier.

NCA105.3 Doors and gates. Doors and gates in barriers shall comply with the requirements of Sections NCA105.3.1 through NCA 105.3.3 and shall be equipped to accommodate a locking device. Pedestrian access doors and gates shall open outward away from the pool or spa, shall be self-closing and shall have a self-latching device.

NCA105.3.1 Utility or service doors and gates. Gates Doors and gates not intended for pedestrian use, such as utility or service doors and gates, shall remain locked when not in use.

NCA105.3.2 Double or multiple doors and gates. Double doors and gates or multiple doors and gates shall have not fewer than one leaf secured in place and the adjacent leaf shall be secured with a self latching device.

APPENDIX NC-A
SWIMMING POOLS, SPAS AND HOT TUBS

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NCA105.3.3 Latches release. For doors and gates in barrier, the door and gate latch release mechanisms shall be in accordance with the following**:**

1. Where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such mechanism shall be located above the finished floor or ground surface not less 54 inches.
2. Where door and gate latch release mechanisms are of the self-locking type such as where the lock is operated by means of a key, an electronic opener or the entry of a combination into an integral combination lock, the lock operation control and the latch release mechanism shall be located above the finished floor or ground surface not greater than 54 inches.
3. Where the only latch release mechanism of a self-latching device for a gate is located on the pool and spa side of the barrier, the release mechanism shall be located at a point that is at least 3 inches below the top of the gate.

NCA105.3.4 Barriers adjacent to latch release mechanisms. Where a latch release mechanism is located on the inside of a barrier, openings in the door, gate and barrier within 18 inches of the latch shall not be greater than 1/2 inch in any dimension**.**

APPENDIX NC-A
SWIMMING POOLS, SPAS AND HOT TUBS

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NCA105.4 Structure wall as a barrier. Where a wall of a dwelling or structure serves as part of the barrier and where doors**, gates** or windows provide direct access to the pool or spa through that wall, one of the following shall be required:

1. Operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor **,** doors and doors gates shall have an alarm that produces an audible warning when the window, door or their screens are opened. The alarm shall be listed and labeled as a water hazard entrance alarm in accordance with UL 2017.

2. The operable parts of the alarm deactivation switches shall be located **at not less than 54 inches** above the finished floor.

3. A safety cover that is listed and labeled in accordance with **ASTM F1346** is installed for the pools and spas.

4. An approved means of protection, such as self-closing doors with self-latching devices, is provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.

APPENDIX NC-A
SWIMMING POOLS, SPAS AND HOT TUBS

NA105.6 Natural barriers. In the case where the pool or spa area abuts the edge of a lake or other natural body of water, public access is not permitted or allowed along the shoreline, and required barriers extend to and beyond the water's edge not less than 18 inches, a barrier is not required between the natural body of water shoreline and the pool or spa.

NCA105.7 Natural topography. Natural topography that prevents direct access to the pool or spa area shall include but not be limited to mountains and natural rock formations. A natural barrier approved by the governing body shall be acceptable provided that the degree of protection is not less than the protection afforded by the requirements of **Sections NCA105.2** through **NCA105.5**.

NCA105.8 Indoor swimming pool. Walls surrounding an indoor swimming pool shall comply with Section NCA105.2, Item 9.

NCA105.9 Prohibited locations. Barriers shall be located to prohibit permanent structures, equipment or similar objects from being used to climb them.

NCA105.10 Barrier exceptions. Spas or hot tubs with a safety cover that complies with ASTM F1346, as listed in Section NCA107, shall be exempt from the provisions of this appendix.

All new

APPENDIX AQ

TINY HOUSES

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

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8 Sections

1. AQ101 General
2. AQ102 Definitions
3. AQ103-Ceiling Heights
4. AQ104 Lofts
5. AQ105- Emergency escape and Rescue Openings
6. AQ106- Energy Conservation
7. AQ107- Smoke Detectors
8. AQ108- Foundation

Are these Tiny Homes per Appendix AQ?

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All new

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.

All new

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.

Questions

Thank You!