

2021 IRC Complete Based on Washington Residential Code



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Instructor: Bill Clayton, CBO



- Over 33 years of Code Administration and enforcement experience
- Instructor, Consultant, Inspector, Plans Examiner, RCBO
- ICC/IBC General Committee 3 years
- ICC/IEBC Committee 9 years
- Instructor with CCC & Shums Coda 12+ years
- Co-Author of 2024 ICC resource book "Fire Stopping, Joint Systems, and Dampers"

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What are we going to talk about?

- High-level overview of the 2021 Washington Residential Code
- Basic introduction to the provisions of the code
- Chapters 3-9



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Washington State Residential Code

Scope

- Detached One Family Dwellings
- Detached Two Family Dwellings
- Townhouses



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WSRC Format

- Part I – Administrative
- Part II – Definitions
- Part III – Building Planning and Construction
- Part IV – Energy Conservation
- Part V - Mechanical
- Part VI – Fuel Gas
- Part VII – Plumbing
- Part VIII – Electrical
- Part IX – Referenced Standards
- Based on the 2021 IRC but chapters 11, and 25 through 43 are not adopted. Appendix chapters AF, AQ, AWU are included in the adoption of the IRC

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Part III Building Planning & Construction

- Ch. 3 – Building Planning
- Ch. 4 – Foundations
- Ch. 5 – Floors
- Ch. 6 – Wall Construction
- Ch. 7 – Wall Covering
- Ch. 8 - Roof-Ceiling Construction
- Ch. 9 – Roof Assemblies
- Ch. 10 – Chimneys & Fireplaces

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R101.2 Scope

The provisions of the WSRC shall apply to:

- | | |
|--------------|------------------------|
| Construction | Repair |
| Alteration | Equipment |
| Movement | Use and Occupancy |
| Enlargement | Location |
| Replacement | Removal and Demolition |

of detached one and two family dwellings, **Adult family homes**, and townhouses not more than 3 stories in height AGP with a separate means of egress and *their accessory structures* not more than 3 stories AGP in height.

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Scope—Exceptions:

1. Live work units complying with 508.5 of the IBC shall be permitted to be constructed in accordance with the IRC.
2. Owner occupied lodging houses with **one or two guestrooms** shall be permitted to be constructed in accordance with the IRC
3. **Owner-occupied lodging homes with 3 to 5 guestrooms shall be permitted to be constructed in accordance with the IRC where equipped with an automatic fire sprinkler system in accordance with appendix AWU.**
4. A care facility with five or fewer persons receiving **custodial care** within a dwelling unit shall be permitted to be constructed in accordance with the International Residential Code for One- and Two-Family Dwellings where equipped with an automatic fire sprinkler system in accordance with Appendix AWU.

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Scope-- Exceptions:

5. A care facility with five or fewer persons receiving **medical care** within a dwelling-unit shall be permitted to be constructed in accordance with the International Residential Code for One- and Two-Family Dwellings where equipped with an automatic fire sprinkler system in accordance with appendix AWU.
6. A care facility with five or fewer persons receiving care that are within a single-family dwelling shall be permitted to be constructed in accordance with the *International Residential Code for One- and Two-Family Dwellings* where equipped with an automatic fire sprinkler system in accordance with Appendix AWU.

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WSRC additional scoping

- WSRC sections
- 102.5 appendices
- 102.7.1 Additions, alterations, change of use, repairs or relocations
- 102.7.2 Moved buildings
- What is the difference between "Relocations" and "Moved"? Neither term is defined in the definitions section of the code. Up to the AHJ to make the determination.

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Definitions-R202

- **Adult Family Home**
- A *dwelling*, licensed by the State of Washington Department of Social and Health Services, in which a person or persons provide personal care, special care, room and board to more than one but not more than six adults who are not related by blood or marriage to the person or persons providing the services. An existing *adult family home* may provide services to up to eight adults upon approval from the Department of Social and Health Services in accordance with RCW 70.128.066.

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Definitions--R202

CHILD CARE, FAMILY HOME. A child care facility, licensed by Washington state, located in the dwelling of the person or persons under whose direct care and supervision the child is placed, for the care of twelve or fewer children, including children who reside at the home.

CHILD DAY CARE, shall, for the purposes of these regulations, mean the care of children during any period of a 24-hour day.

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Definitions - R202

Dwelling Unit

- A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.
- Different definition for energy provisions



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Definitions- R202

Dwelling units may also include the following uses:

1. *Adult family homes, foster family care homes and family day care homes* licensed by the Washington State Department of Social and Health Services.
2. Offices, mercantile, food preparation for off-site consumption, personal care salons or similar uses which are conducted primarily by the occupants of the *dwelling unit* and are secondary to the use of the unit for dwelling purposes, and which do not exceed 500 square feet (46.4 m²).

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Definitions- R202

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](#).



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Definitions- R202

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



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202 Definition

- **TOWNHOUSE**
- A building that contains three or more attached townhouse units.



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202 Definitions



- **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 that extends at least 50 percent of the length of each of these two sides.

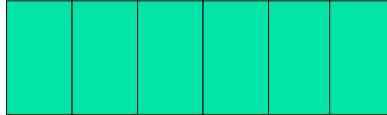
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Townhouse Definition

- Originally based on the Boston Row House



Plan View

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R301.1 Application

- Buildings and structures, and all parts thereof, shall be constructed to safely support all loads, including dead loads, live loads, roof loads, flood loads, snow loads, wind loads and seismic loads as prescribed by this code.



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R301.1 Application

- The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements to the foundation.



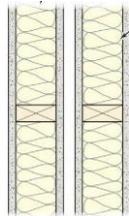
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R302.2.1 Double walls

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 Building Code.

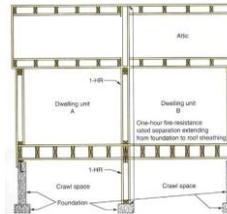


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R302.2.2 Townhouses (2015/2018)

- 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.

- 1. Sprinklers = 1-hour
- 2. No Sprinklers = 2 hours



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Townhouse Separation Wall

GA FILE NO. ASIW 0800	PROPRIETARY*	2 HOUR FIRE	65 to 69 STC SOUND
GYPSUM PANEL PRODUCTS, STEEL H STUDS Two layers 1" x 24" proprietary type X gypsum panels inserted between 2" floor and ceiling runners with 2" steel H studs between adjacent pairs of gypsum panels. (NLB) A 1/2" minimum air space must be maintained between steel components and adjacent framing (indicated by dashed lines in sketch). As an alternate, the steel components may be covered with 6" wide battens or full sheets of 1/2" type X gypsum wallboard. Sound tested with 2 x 4 stud wall faced with 1/2" proprietary gypsum panel product each side of system and 3 1/2" glass fiber insulation in stud space.			
PROPRIETARY GYPSUM PANEL PRODUCTS National Gypsum Company			
- 1" Gold Bond® Brand FIRE-SHIELD® Shaftliner - 1/2" Gold Bond® Brand SoundShield® Gypsum Board			
		Thickness: 2 1/2" (Fire)	1 1/2" (Sound)
		Approx. Weight: 9 pcf	
		Fire Test: UL R3501, USHC26782, 4-13-06, UL Design U517	
		Sound Test: NRC 0.3451.1, 10-6-06	

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Continuity R302.2.3



- The fire-resistance-rated wall or assembly separating townhouse units shall be continuous from the foundation to the underside of the roof sheathing, deck or slab.
- The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures.

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Townhouse continuity- R302.2.3

- Where a story extends beyond the exterior wall of a story below:
1. The fire-resistance-rated wall or assembly shall extend to the outside edge of the upper story; or
 2. The underside of the exposed floor-ceiling assembly shall be protected as required for projections in Section R302.

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Parapet R302.2.4

- 1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches above the roof surfaces.



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Parapet R302.2.4



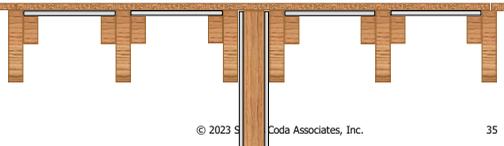
- 2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches above the lower roof, the parapet shall extend not less than 30 inches above the lower roof surface.

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Parapet R302.2.4 (Exception)



- A parapet is not required in previous two situations
 - Roof is covered with a minimum class C roof covering
 - Roof sheathing is noncombustible materials or approved fire-retardant-treated wood for a distance of 4 feet on each side of the wall or walls,
 - or one layer of 5/8-inch Type X gypsum board is installed directly beneath the roof sheathing for a distance of 4 feet on each side of the wall or walls and any openings or penetrations in the roof are not within 4 feet of the common walls.

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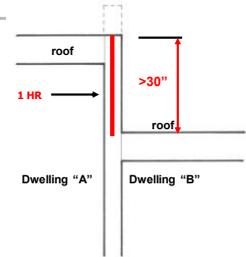
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Parapet R302.2.4

A parapet is not required:

- Different elevations and the higher roof is more than 30 inches above the lower roof.
- Common wall construction from the lower roof to the underside of the higher roof deck shall not have less than a 1-hour fire-resistive rating.



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Structural Independence R302.2.6

- Each townhouse unit shall be structurally independent
- Exceptions:
 - foundations
 - roof & wall sheathing may fasten to common wall
 - nonstructural wall coverings
 - flashing
 - common wall separation
 - Sprinklered units



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Two-Family dwellings R302.3

- One-hour fire-resistive wall and/or floor assembly
- Regardless of whether a lot line exists between the two dwelling units or not.
- Extend to and against exterior wall and to underside of roof sheathing



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Two Family dwelling unit exception:

One accessory dwelling unit constructed within an existing dwelling unit need not be considered a separated dwelling unit in a two-family dwelling where all required smoke alarms, in the accessory dwelling unit and the primary dwelling unit, are interconnected in such a manner that the actuation of one alarm will activate all alarms in both the primary dwelling unit and the accessory dwelling unit.

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Two Family dwelling units

- WSRC has several changes to the base IRC related to two-family dwelling units. See Section R302.3.1 through R302.3.5

TABLE R302.1 DOWELLING-SHARED ACCESSORY ROOM SEPARATION

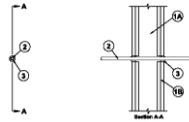
SEPARATION	MATERIAL
From the dwelling units and offices	Not less than 1/2-inch gypsum board or equivalent applied to the accessory room side wall.
From habitable rooms above or below the shared accessory room	Not less than 1/2-inch Type X gypsum board or equivalent.
Structures supporting horizontal assemblies used for separation required by this section	Not less than 1/2-inch gypsum board or equivalent.

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Rated Penetrations R302.4



System No. 98-L3009
 October 20, 2004
 F Rating = 1 1/2 hr. (See Item 1)
 T Rating = 1 1/2 hr. (See Item 2)
 C Rating = 1 1/2 hr. (See Item 3)
 D Rating = 1 1/2 hr. (See Item 4)
 E Rating = 1 1/2 hr. (See Item 5)
 F Rating = 1 1/2 hr. (See Item 6)

- Through penetrations of fire-resistance-rated assemblies
 - approved penetration fire stop system
 - F rating equal to separation rating
- Membrane penetrations
 - approved penetration fire stop system

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Membrane Penetrations R302.4.2



- recessed light fixtures to be installed so fire resistance not reduced
- Exceptions:
 - steel electrical boxes - total area not to exceed 100 sq. in. in 100 sq. ft.
 - separated from other boxes
 - 24" horizontally
 - Depth of wall cavity with insulation
 - Listed putty pads
 - Other listed materials & methods
 - rated nonmetallic boxes with above separations
 - sprinkler penetration with escutcheon

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Garages & Carports R302.5



- No openings into sleeping room
- Other openings
 - solid wood door 1 3/8"
 - honeycomb core steel door 1 3/8"
 - 20-minute fire-rated
 - Self-closing or automatic closing
 - Self-latching
- Ducts
 - 26 gauge or other approved material

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Separation Required Table R302.6

TABLE R302.6 DWELLING-GARAGE SEPARATION

SEPARATION	MATERIAL
From the residence and attic	Not less than 1/2-inch gypsum board or equivalent applied to the garage side
From habitable rooms above the garage	Not less than 1/2-inch Type X gypsum board or equivalent
Structures supporting floor/ceiling assemblies used for separation required by this section	Not less than 1/2-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area



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Table R302.6 Dwelling/Garage Separation

Garages located less than 3 feet from a dwelling unit on the same lot	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area
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Under Stair Protection R302.7

- Enclosed space under stairs that is accessed by a door or access panel shall have walls, under-stair surface and any soffits protected on the enclosed side with 1/2-inch gypsum board



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Insulation R302.10

- Flame-spread index not to exceed 25 with an accompanying smoke-developed index not to exceed 450
- Exceptions:
 - facings in substantial contact with unexposed surface of ceiling, floor, or wall finish
 - Cellulose loose-fill (not spray applied) per Section R302.10.3
 - SD = 450 only
 - Foam Plastic – R316



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Fire Blocking R302.11

- In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs; as follows:
 - Vertically at the ceiling and floor levels.
 - Horizontally at intervals not exceeding 10 feet



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Fire Blocking R302.11

- 2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.



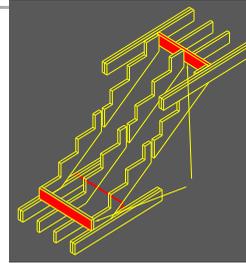
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Fire Blocking R302.11

- 3. In concealed spaces between stair stringers at the top and bottom of the run.



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Fire Blocking R302.11

- 4. At openings around vents, pipes, and ducts at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion.



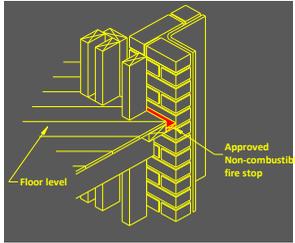
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Fire Blocking R302.11

- 5. For the fire blocking of chimneys and fireplaces, see Section R1001.16.



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Fire Blocking R302.11

- 6. Fire blocking of cornices of a two-family dwelling is required at the line of dwelling unit separation.



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Fire Block Material R302.11.1

- 2" nominal lumber or two 1" 23/32" structural panel backed
- 3/4" particle board backed
- 1/2" gypsum board
- 1/4" cement based millboard
- Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place.
- Cellulose insulation installed as tested for the specific application.



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R302.11.1.1 - Batts or blankets of mineral or glass fiber

- Batts or blankets of mineral or glass fiber or other approved nonrigid materials shall be permitted for compliance with the 10-foot horizontal fireblocking in walls constructed using parallel rows of studs or staggered studs.



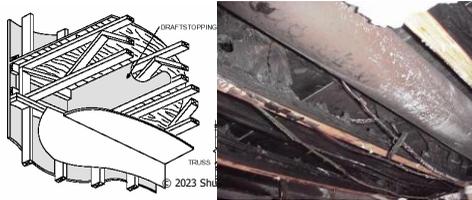
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Draftstopping Required R302.12

- Usable space above & below
- Suspended ceiling, open-web trusses
- No concealed area exceeds 1,000 s.f., divided equally



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R302.13 Fire Protection of Floors

- Non FR floor assemblies:
- ...shall be provided with
 - 1/2" Gypsum Board
 - 5/8" Wood Structural Panel
 - Or equivalent...
- ...on the underside of the floor framing member



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R302.13 Fire Protection of Floors

- Penetrations or openings for ducts, vents, electrical outlets, lighting devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted (in ceiling membrane).



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R302.13 – Fire Protection of Floors



- Exception 1
- Floor assemblies located directly over a space protected by fire sprinklers
 - P2904
 - NFPA 13d

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R302.13 – Fire Protection of Floors



- Exception 2
- Floor assemblies located directly over a crawl space not intended for storage or fuel-fired equipment or electric-powered heating appliance.

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R302.13 – Fire Protection of Floors



- Exception 3
- Permits unprotected floor assemblies when:
 - 80sf area or less per story in aggregate
 - Fire blocking is provided in the cavity between the protected and unprotected portions
- Intended to address mechanical areas with piping, ducts or other penetration issues.

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R302.13 – Fire Protection of Floors



- Exception 4
- Wood floor assemblies using 2x10 or greater dimension solid or composite lumber.
- Also permits testing for equivalency to these materials.

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Natural light & ventilation R303.1

- Habitable Rooms
 - Aggregate glazing area of 8 percent of floor area of room
 - Exception: the glazed areas need not be installed in rooms where artificial light is provided at 6 footcandles
 - Natural ventilation via openings to the outdoor air shall be 4 percent of the floor area.



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R303.7

Interior stairway illumination

- Interior stairways shall be provided with an artificial light source to illuminate the landings and treads. The light source shall be capable of illuminating treads and landings to levels of not less than 1 foot-candle as measured at the center of treads and landings.
- Stairway illumination shall receive primary power from the building wiring.
- There shall be a wall switch at each floor level to control the light source where the stairway has six or more risers.



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R303.8

Exterior stairway illumination

- Exterior stairways shall be provided with an artificial light source located at the top landing of the stairway.
- Power shall be from building wiring
- Exterior stairways providing access to a basement from the outdoor grade level shall be provided with an artificial light source located at the bottom landing of the stairway.



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R303.9

Required Glazed Openings

- Open directly on Yard, Court, Street, or Alley
 - Roofed porch 65% open, 7' minimum ceiling
 - Eaves are NOT obstructions
 - Under deck, balcony, bay, or floor cantilever with 36" height



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Required Heating R303.10

- Where winter design temperature is below 60° F, dwelling shall be provided with heating facilities to maintain 68° F at a point 3 Ft. above floor and 2 Ft. from exterior wall
- WSRC Exception for Yurts**
 - portable space heaters not permitted to be used for required heating



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Minimum Room Areas R304

- Habitable rooms minimum 70 square feet
 - Except kitchens
- Minimum 7 feet horizontal dimension
 - Except kitchens



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Minimum ceiling height R305.1

- Habitable space, hallways and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet.
- Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches
 - Exceptions



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Sanitation R306

- Toilet Facilities
 - water closet, tub or shower, lavatory
- Kitchen
 - kitchen sink
- Connected to sanitary sewer
- Water to fixtures
 - hot & cold water to sinks, lavatories, tubs, showers, bidets, laundry tubs and washing machine boxes

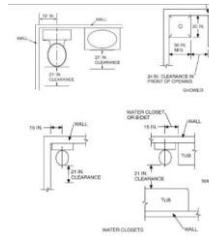


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Figure R307.1 Minimum Fixture Clearances

- Bathtub and shower floors and walls above bathtubs with installed shower heads and in shower compartments shall be finished with a nonabsorbent surface.
 - 6 feet above the floor.



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R308 Labeling Safety Glazing

- Glazing label:
 - CPSC 16 CFR 1201
 - ANSI Z97.1
 Used where CPSC does not preempt



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R308.3.1

- ANSI Z97.1 not permitted for:
 - Stairway Glazing
 - Pool Wall and Fence Glazing
 - Bathtub, Hot Tub, Sauna Glazing



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R308.4.1 Glazing in doors

- Glazing in all fixed and operable panels of swinging, sliding and bifold doors shall be considered a hazardous location.
 - Exceptions:
 1. Glazed openings of a size through which a 3-inch-diameter sphere is unable to pass.
 2. Decorative glazing.



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R308.4.2 Glazing adjacent to doors

- Glazing in an individual fixed or operable panel adjacent to a door shall be considered to be a hazardous location where the bottom exposed edge of the glazing is less than 60 inches above the floor or walking surface and it meets either of the following conditions:



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R308.4.2 Glazing adjacent to doors

- 1. Where the glazing is within 24 inches of either side of the door in the plane of the door in a closed position.



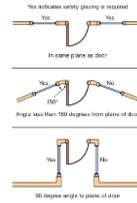
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R308.4.2 Glazing adjacent to doors (2015/2018)

- 2. Where the glazing is on a wall **is less than 180° from the plane of the door in a closed position and within 24 inches of the hinge side of an in-swinging door.**



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R308.4.2 Glazing adjacent to doors

- Exceptions
 - 1. Decorative glazing.
 - 2. When there is an intervening wall or other permanent barrier between the door and the glazing.
 - 3. Where access through the door is to a closet or storage area 3 feet or less in depth. Glazing in this application shall comply with section R308.4.3.
 - 4. Glazing that is adjacent to the fixed panel of patio doors.



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Glazing in windows R308.4.3

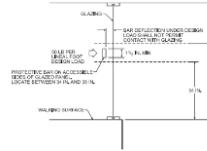
- Considered hazardous location if Fixed or operable panel if meets all the following conditions:
 - > 9 square feet
 - < 18 inches above floor
 - top edge > 36 inches above floor
 - walking surface within 36 inches
 - 3 Exceptions



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Glazing in windows R308.4.3

- Exceptions
 - 1. Decorative glazing.
 - 2. Horizontal rail installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. Capable of withstanding a horizontal load of 50 pounds per linear foot without contacting the glass and be a minimum of 1 1/2 inches in cross sectional height.
 - 3. Outboard panes in multiple glazed panels when the bottom edge of the glass is 25 feet or more above grade, a roof, walking surfaces or other horizontal (within 45 degrees of horizontal) surface adjacent to the glass exterior.



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R308.4.4.1 Structural glass baluster panels

Guards with structural glass baluster panels shall be installed with an attached top rail or handrail.

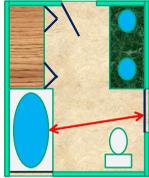
The top rail or handrail shall be supported by not less than three glass baluster panels, or shall be otherwise supported to remain in place should one glass baluster panel fail.

Exception: An attached top rail or handrail is not required where the glass baluster panels are laminated glass with two or more glass plies of equal thickness and of the same glass type.



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R308.4.5 – Glazing and Wet Surfaces



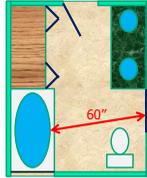
- Glazing in walls, enclosures, or fences containing or adjacent to:
 - Bathtubs
 - Showers
 - Whirlpools, saunas, steam rooms, indoor and outdoor pools
- Shall be safety glazing is less than 60" AFF

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R308.4.5 – Glazing and Wet Surfaces



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

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R308.4.6 – Glazing Adjacent to Stairs and Ramps



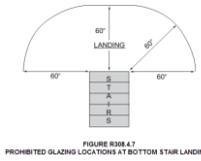
- Glazing where the bottom exposed edge of the glazing is less than 36 inches above the plane of the adjacent walking surface of stairways, landings between flights of stairs and ramps shall be considered to be a hazardous location.
- Exceptions:
 - Where glazing is adjacent to a walking surface and a horizontal rail is installed at 34 to 38 inches above the walking surface.
 - Glazing 36 inches or more measured horizontally from the walking surface.

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R308.4.7 Glazing Adj. to Bottom Stair Landing



- Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches above the landing and within 60 inches horizontally of the bottom tread nosing.
 - Exception: Glazing protected by a guard complying with Section R312 and the plane of the glass is more than 18 inches from the guard.

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Electric Vehicle charging- R309.6

- Applies to new dwelling units with attached private garage or carport
- Exception for locations with no public utilities
- Dedicated 40 ampere circuit installed for each dwelling unit.



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R310.1 Emergency Escape/Rescue

- Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening.
- Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room.
 - Exceptions



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R310.1 - Emergency escape and rescue opening required



- Emergency escape and rescue openings shall open directly into a public way, or to a yard or court having a minimum width of 36 inches that opens to a public way.

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R310.1.1 - Operational constraints and opening control devices



- Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge.
- Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening and shall be not more than 70 inches above the finished floor.

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R310.2 - Emergency escape and rescue openings

- Emergency escape and rescue openings shall have minimum dimensions in accordance with Sections R310.2.1 through R310.2.4.
- Section reformatted



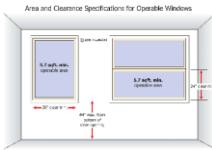
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R310.2.1 EERO Minimum size

- Emergency escape and rescue openings shall have a net clear opening of not less than 5.7 square feet.
 - Exception: The minimum net clear opening for grade-floor emergency escape and rescue openings shall be 5 square feet



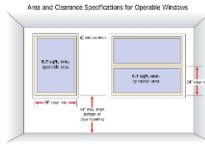
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R310.2.2 Minimum dimensions

- The minimum net clear opening height dimension shall be 24 inches.
- The minimum net clear opening width dimension shall be 20 inches.
- The net clear opening dimensions shall be the result of normal operation of the opening.



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R310.2.3 Maximum height from floor

- Emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44 inches above the floor.



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R310.2.4 - Emergency escape and rescue openings under decks, porches and cantilevers



- Emergency escape and rescue openings installed under decks, porches and cantilevers shall be fully openable and provide a path not less than 36 inches in height and 36 inches in width to a yard or court.

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R310.4 Area wells

- An emergency escape and rescue opening where the bottom of the clear opening is below the adjacent grade shall be provided with an area well in accordance with Sections R310.4.1 through R310.4.4.



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R310.4.1 Minimum size



- The horizontal area of the area well shall be not less than 9 square feet, with a horizontal projection and width of not less than 36 inches.
- The size of the area well shall allow the emergency escape and rescue opening to be fully opened.
 - Exception: The ladder or steps required by Section R310.4.2 shall be permitted to encroach not more than 6 inches into the required dimensions of the area well.

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R310.4.2 Ladder and steps

- Area wells with a vertical depth greater than 44 inches shall be equipped with an approved, permanently affixed ladder or steps.
- The ladder or steps shall not be obstructed by the emergency escape and rescue opening where the window or door is in the open position.
- Ladders or steps required by this section shall not be required to comply with Section R311.7.



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R310.4.2.1 Ladders

- Ladders and rungs shall have an inside width of not less than 12 inches, shall project not less than 3 inches from the wall and shall be spaced not more than 18 inches on center vertically for the full height of the area well.



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R310.4.2.2 Steps

- Steps shall have an inside width of not less than 12 inches, a minimum tread depth of 5 inches and a maximum riser height of 18 inches for the full height of the area well.



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R310.4.3 Drainage



- Area wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R405.1.
 - Exception: A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, as detailed in Table R405.1.

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R310.4.4 - Bars, grilles, covers and screens



- Where bars, grilles, covers, screens or similar devices are placed over emergency escape and rescue openings, bulkhead enclosures or area wells that serve such openings, the minimum net clear opening size shall comply with Sections R310.2 through R310.2.2 and R310.4.1.
 - Such devices shall be releasable or removable from the inside without the use of a key or tool or force greater than that required for the normal operation of the escape and rescue opening.

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R311.1 Means of Egress



- Dwelling units shall be provided with a means of egress.
 - Must provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the dwelling to the exterior of the dwelling at the required egress door without traveling 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.

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Exit Door Required R311.2

- Not less than one egress door shall be provided for each dwelling unit.
- The egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches where measured between the face of the door and the stop, with the door open 90 degrees



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Door Type and Size R311.2

- The clear height of the door opening shall be not less than 78 inches in height measured from the top of the threshold to the bottom of the stop.
- Other doors shall not be required to comply with these minimum dimensions.
- Door must be readily openable from inside the dwelling without the use of a key or special knowledge or effort.



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Floors and Landings at EXTERIOR Doors - R311.3

- There shall be a floor or landing on each side of each exterior door.



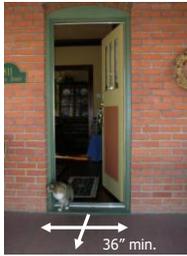
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Floors and Landings at EXTERIOR Doors - R311.3

- The width of each landing shall not be less than the door served.
- Every landing shall have a minimum dimension of 36 inches measured in the direction of travel.
- Maximum slope 1/4:12



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R311.3.1 Floor Elevation at REQUIRED EGRESS Doors

- Landings or finished floors at the required egress door shall not be more than 1 1/2 inches lower than the top of the threshold.



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R311.3.1 Floor Elevation at REQUIRED EGRESS Doors

- Exception: The landing or floor on the exterior side shall not be more than 7 3/4 inches below the top of the threshold provided the door does not swing over the landing or floor.



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R311.3.1 Floor Elevation at REQUIRED EGRESS Doors

- Where exterior landings or floors serving the required egress door are not at grade, they shall be provided with access to grade by means of a ramp or a stairway.



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Floor Elevations for OTHER Exterior Doors - R311.3.2

- Doors other than the required egress door shall be provided with landings or floors not more than 7 3/4 inches below the top of the threshold.



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Floor Elevations for OTHER Exterior Doors - R311.3.2

Exception:
A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.



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Hallways R311.6

- The minimum width of a hallway shall be not less than 3 feet.



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R311.7 Stairways



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- 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 nonhabitable attics.
 - 3. Stairways leading to crawl spaces.

Stairway Width R311.7.1



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- 36 inches minimum width
 - above handrail
 - below headroom height
 - handrails permitted to project 4 1/2 inches on either side
- 31.5 inches minimum width
 - below one handrail
- 27 inches minimum width
 - below two handrails

Stairway Headroom R311.7.2

- Minimum 6' 8" headroom measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform



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Vertical Rise 311.7.3

- A flight of stairs shall not have a vertical rise greater than 12 feet 7 inches between floor levels or landings.



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R311.7.5 Stair treads and risers

- For the purposes of this section all dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.



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R311.7.5.1 Risers

- The riser height shall be not more than 7¾ inches.
- The riser shall be measured vertically between leading edges of the adjacent treads.
- The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch



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R311.7.5.1 Risers

- Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees from the vertical.
- Open risers are permitted provided that the openings located more than 30 inches, as measured vertically, to the floor or grade below do not permit the passage of a 4-inch-diameter sphere.



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R311.7.5.2 Treads

- Minimum tread 10"
- leading edges of the foremost projection of adjacent tread's leading edge
- greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch.



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R311.7.5.2.1 Winder treads

- Minimum tread depth of 10 inches measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline (12" from the side where the winders are narrower).
- Minimum tread depth of 6 inches at any point within the clear width of the stair.



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Landings for Stairways R311.7.6

- Top and bottom of stairs
 - except interior where door does not swing over
- As wide as stair
- Minimum of 36" in direction of travel



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Handrails R311.7.8

- Not less than one side of each flight of stairs with four or more risers
- 34" - 38" above tread
- Continuous full length of stairs from top riser to bottom riser in the same flight
 - newel posts permitted
- Ends returned or terminate at newel post or safety rail
 - use of volute, turnout or starting easing allowed at lowest tread
- 1.5 inch space at wall



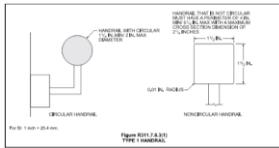
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R311.7.8.3 Grip-size

- Type I.
- Circular cross section shall have an outside diameter of at least 1 1/4 inches and not greater than 2 inches.
- If not circular, must have a perimeter dimension of at least 4 inches and not greater than 6 1/4 inches with a maximum cross section of dimension of 2 1/4 inches.
- Edges - minimum radius of 0.01 inch



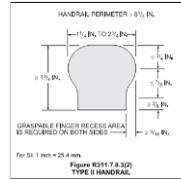
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R311.7.8.3 Grip-size

- Type II.
- Perimeter greater than 6 1/4 inches shall have a graspable finger recess area on both sides of the profile.
- The finger recess shall begin within a distance of 3/4 inch measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch within 7/8 inch below the widest portion of the profile.
- This required depth shall continue for at least 3/8 inch to a level that is not less than 1 1/4 inches below the tallest portion of the profile.
- The minimum width of the handrail above the recess shall be 1 1/4 inches to a maximum of 2 1/4 inches.
- Edges - minimum radius of 0.01 inch.



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R311.8.1 Ramps Maximum slope

- Ramps serving the egress door required by Section R311.2 shall have a slope of not more than 1 unit vertical in 12 units horizontal.
- All other ramps shall have a maximum slope of 1 unit vertical in 8 units horizontal.



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R311.8.2 Landings required

- A minimum 3-foot-by-3-foot landing shall be provided:
 - 1. At the top and bottom of ramps.
 - 2. Where doors open onto ramps.
 - 3. Where ramps change direction.



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R311.8.3 Handrails required

- Required on at least one side of all ramps exceeding a slope of one unit vertical in 12 units horizontal.
- 34" – 38" above the finished surface of the ramp slope
- Must comply with Section R311.7.8.3 (Grip size).
- Must be continuous for the full length of the ramp.
- Handrail ends must be returned or terminate in newel posts or safety terminals.
- 1 ½ inches between the wall and the handrails.



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R312 Guards

- Guards shall be provided for those portions of open-sided walking surfaces, including floors, stairs, ramps and landings, that are located more than 30 inches measured vertically to the floor or grade below at any point within 36 inches horizontally to the edge of the open side.
- Insect screening shall not be considered as a guard.



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R312.1.2 Height



- 36 inches high measured vertically above the adjacent walking surface or the line connecting the nosings.
 - Exceptions:
 - 34" along the side of stairs.
 - Serving as a handrail can be 34-38 inches along stairs.
 - 33" at lofts WSRC

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Opening Limitations R312.1.3



- Intermediate rails or ornamental closures cannot allow passage of a sphere 4 inches in diameter.
 - Exceptions:
 - 6 inch sphere permitted at riser/tread triangle
 - 4 3/8" on sides of stair treads

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R312.2.1 Window sills

- In dwelling units, where the bottom of the clear opening of an operable window opening is located less than 24 inches above the finished floor and greater than 72 inches above the finished grade or other surface below on the exterior of the building, the operable window shall comply with one of the following:
 - 6 inch sphere permitted at riser/tread triangle
 - 4 3/8" on sides of stair treads



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R312.2.1 Window sills

- 1. Operable windows with openings that will not allow a 4-inch-diameter sphere to pass through the opening where the opening is in its largest opened position.



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R312.2.1 Window sills

- 2. Operable windows that are provided with window fall prevention devices that comply with ASTM F 2090.



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R312.2.2 Window opening control devices

- Where an operable window serves as an emergency escape and rescue opening, a window opening control device or fall prevention device, after operation to release the control device or fall prevention device allowing the window to fully open, shall not reduce the net clear opening area of the window unit to less than the area required by Sections R310.2.1 and R310.2.2.



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R313.1 - Townhouse automatic fire sprinkler systems

- An automatic sprinkler system shall be installed in a townhouse unit.
- Not require in alterations or additions when unit was not originally fire sprinkled
- Not required in townhouse building with no more than 4 townhouse units
- Designed and installed in accordance with Section P2904 or NFPA 13D.



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R314 Smoke Alarm & Heat Detection

- Smoke alarms shall be provided in dwelling units.
- Heat detector or Heat alarm shall be installed in new attached garages



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Location R314.3

- Smoke alarms required:
 - Each sleeping room
 - Outside of each separate sleeping area
 - Each additional story including basements & habitable attics but not including crawl spaces and uninhabitable attics



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R314.3

Smoke alarm location

- 4. Smoke alarms shall be installed not less than 3 feet horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by Section R314.3.



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Smoke alarm location

- WSRC: In napping areas in a family home child care.

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R314.3

Smoke alarm location

- 6. In the hallway and in the room open to the hallway in dwelling units where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches or more.



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Smoke alarm location

- **WSRC:**
- 7. Within the room to which a loft is open, in the immediate vicinity of the loft.



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R314.3.1 Installation near cooking appliances

- 1. Ionization not less than 20 feet.
- 2. Ionization with an alarm-silencing switch shall not be installed less than 10 feet.
- 3. Photoelectric not be installed less than 6 feet.



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R314.3.1 - Installation near cooking appliances

- 4. Smoke alarms listed and marked "helps reduce cooking nuisance alarms" shall not be installed less than 6 feet horizontally from a permanently installed cooking appliance.



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R314.4 Interconnection

- Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit.
- Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.



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Smoke alarm or Heat alarm interconnection:

- WSRC:**
 - Where an accessory dwelling unit is created within an existing dwelling unit all required smoke alarms, in the accessory dwelling unit and the primary dwelling unit, shall be interconnected in such a manner that the actuation of one alarm will activate all alarms in both the primary dwelling unit and the accessory dwelling unit.
- Heat detectors and heat alarms shall be connected to an alarm or a smoke alarm that is installed in the dwelling. Alarms and smoke alarms that are installed for this purpose shall be located in a hallway, room, or other location that will provide occupant notification.

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R314.5 Combination alarms

- Combination smoke and carbon monoxide alarms shall be permitted to be used in lieu of smoke alarms.



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Power Source R314.6



- New Construction
 - building wiring
 - battery backup
 - battery operated when commercial power not provided
- Alterations, repairs, additions not required to be hard wired & buildings w/o commercial power
 - battery operated permitted

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R315 Carbon monoxide alarms

- R315.2 Where required. Carbon monoxide alarms shall be provided in accordance with Sections R315.2.1 and R315.2.2.



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R315.2.1 New construction

- For new construction, carbon monoxide alarms shall be provided in dwelling units where either or both of the following conditions exist.
 1. The dwelling unit contains a fuel-fired appliance.
 2. The dwelling unit has an attached garage with an opening that communicates with the dwelling unit.



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Carbon Monoxide alarms

- Existing dwellings shall be equipped with carbon monoxide alarms in accordance with Section R315.2.1. An inspection will occur where alterations, repairs, or additions requiring a permit occur, or where one or more sleeping rooms are added or created
- WSRC exception:
 - #3 Owner-occupied single-family residences legally occupied before July 26, 2009. RCW 19.27.530 (2)(b).

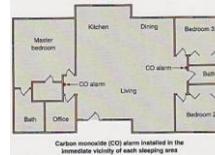
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R315.3 Location

- Carbon monoxide alarms in dwelling units shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms.
- Where a fuel-burning appliance is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.



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R316.3 – Foam Plastic Surface burning characteristics

- Unless otherwise allowed in Section R316.5 or R316.6, all foam plastic or foam plastic cores used as a component in manufactured assemblies shall have a flame spread index of not more than 75 and shall have a smoke-developed index of not more than 450 when tested in the maximum thickness intended for use in accordance with ASTM E 84 or UL 723.
- Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and smoke-developed index.



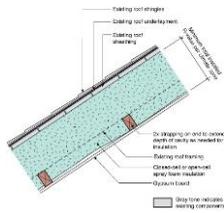
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R316.4 Thermal barrier

- Unless otherwise allowed in Section R316.5, foam plastic shall be separated from the interior of a building by an approved thermal barrier of not less than 1/2-inch gypsum wallboard, 23/32-inch wood structural panel or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.



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R316.5.3 Attics

- The thermal barrier is not required where all of the following apply:
 - Attic access is required by Section R807.1.
 - The space is entered only for purposes of repairs or maintenance.
 - The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
 - 3.1. 1/2-inch-thick mineral fiber insulation;
 - 3.2. 1/2-inch-thick wood structural panels;
 - 3.3. 3/8-inch particleboard;
 - 3.4. 1/4-inch hardboard;
 - 3.5. 3/8-inch gypsum board; or
 - 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch;
 - 3.7. 1/2-inch-thick cellulose insulation;
 - 3.8. 1/4-inch fiber-cement panel, soffit or baffle board.
- The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.



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R316.5.4 Crawl spaces

- The thermal barrier is not required where all of the following apply:
 - Crawlspace access is required by Section R408.4.
 - Entry is made only for purposes of repairs or maintenance.
 - The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
 - 3.1. 1/2-inch-thick mineral fiber insulation;
 - 3.2. 1/2-inch-thick wood structural panels;
 - 3.3. 3/8-inch particleboard;
 - 3.4. 1/4-inch hardboard;
 - 3.5. 3/8-inch gypsum board; or
 - 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch;
 - 3.8. 1/4-inch fiber-cement panel, soffit or baffle board.
- The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.



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Protection Against Decay R317.1



- Protection of wood and wood-based products from decay shall be provided in the following locations by the use of naturally durable wood or wood that is preservative-treated in accordance with AWPA U1.

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R317 Protection Against Decay



- Approved species of wood or treated lumber required if:
 - Joists <18" to ground
 - Beams <12" to ground
 - Columns <8" to ground
 - Wood framing members resting directly on concrete/masonry exterior walls within 8" of exposed ground
 - Girders entering masonry or concrete <1/2" air space
 - Members supporting moisture permeable floors
 - Furring strips on concrete without vapor barrier

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R317.1 Locations for Decay Protection

- Wood siding, sheathing and wall framing:
 - 6" from the ground
 - 2" from concrete steps and slabs and "similar horizontal surfaces"



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R317 - Protection of wood and wood-based products against decay



- Portions of wood structural members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that would prevent moisture or water accumulation on the surface or at joints between members.

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R317 - Protection of wood and wood-based products against decay



- Exception:
- Sawn lumber used in buildings located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use naturally durable or preservative-treated wood where the structure is exposed to the weather.

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R317 - protection of wood and wood-based products against decay

- Wood columns in contact with basement floor slabs unless supported by concrete piers or metal pedestals projecting not less than 1 inch above the concrete floor and separated from the concrete pier by an impervious moisture barrier.



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Ground Contact R317.1.2

- All wood in contact with
 - the ground,
 - embedded in concrete in direct contact with the ground
 - or embedded in concrete exposed to the weather that supports permanent structures intended for human occupancy shall be approved pressure-preservative-treated wood suitable for ground contact use



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R318.1 - Subterranean termite control methods

- In areas subject to damage from termites as indicated by Table R301.2, protection shall be by one, or a combination, of the following methods:
 1. Chemical termiticide treatment.
 2. Termite-baiting system installed and maintained in accordance with the label.
 3. Pressure-preservative-treated wood.
 4. Naturally durable termite-resistant wood.
 5. Physical barriers.
 6. Cold-formed steel framing.



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R319.1 Address Numbers

- 4" Height
- 1/2" Stroke
- Contrasting background



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R320 Accessibility

- 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.



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IBC Scoping for Residential

- IBC Section 1107 for residential
 - Type B if 4 or more unit in a building
- Section 1104 of accessible routes
- Section 1106 for parking issues
- 508.5.9 for Live work units



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Flood Resistant Construction R322



- Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1), and substantial improvement and repair of substantial damage of buildings and structures in flood hazard areas shall be designed and constructed in accordance with the provisions contained in this section.
- Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

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FOUNDATIONS CHAPTER 4



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R401.3 Surface Drainage



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- 6" within 10 feet
- If you can't get the 6" drains or swales with 2% slope required.

Soils Tests R401.4

- Where quantifiable data created by accepted soil science methodologies indicate expansive soils, compressible soils, shifting soils or other questionable soil characteristics are likely to be present, the building official shall determine whether to require a soil test to determine the soil's characteristics at a particular location.
- This test shall be done by an approved agency using an approved method.



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Presumptive Load Bearing Values Table R401.4.1

- In lieu of test, Table R401.4.1 Load Bearing Values shall be assumed

CLASS OF MATERIAL	LOAD-BEARING PRESSURE (pounds per square foot)
Crystalline bedrock	12,000
Sedimentary and related rock	4,000
Sandy gravel and/or gravel (GV and GP)	3,000
Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000
Clay, sandy silty clay, clayey silt, silt and sandy silty clay (CL, ML, MH and CH)	1,500 ^b

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Concrete R402.2

- Concrete
 - Based on Weathering Probability Map – Figure 301.2(1)
 - Minimum compressive strength per table R402.2



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Materials R402.2

- Concrete
 - Minimum compressive strength per table R402.2

TYPE OR LOCATIONS OF CONCRETE CONSTRUCTION	MINIMUM SPECIFIED COMPRESSIVE STRENGTH ^a (f' _c)		
	Negligible	Moderate	Severe
Basement walls, foundations and other concrete not exposed to the weather	2,500	2,500	2,500 ^b
Basement slabs and interior slabs on grade, except garage floor slabs	2,500	2,500	2,500 ^b
Basement walls, foundation walls, exterior walls and other vertical concrete work exposed to the weather	2,500	3,000 ^b	3,000 ^b
Porch, airport slabs and steps exposed to the weather, and garage floor slabs	2,500	3,000 ^b	3,500 ^b

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Footings R403

- All exterior walls shall be supported on continuous solid or fully grouted masonry or concrete footings, wood foundations, or other approved structural systems
- Sufficient design to accommodate all loads and to transmit the resulting loads to the soil
- Footings shall be supported on undisturbed natural soils or engineered fill.



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R403.1.1 Minimum size

- The minimum width, W, and thickness, T, for concrete footings shall be in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable, but not less than 6" X 12".
- The footing width shall be based on the load-bearing value of the soil in accordance with Table R401.4.1.



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Table R403.1(1)

		TABLE R403.1(1) MINIMUM WIDTH AND THICKNESS FOR CONCRETE FOOTINGS FOR LIGHT-FRAME CONSTRUCTION (inches) ^{a, b, c, d, e}						
GROUND SNOW LOAD OR ROOF LIVE LOAD	STORY AND TYPE OF STRUCTURE WITH LIGHT FRAME	LOAD-BEARING VALUE OF SOIL (psf)						
		1500	2000	2500	3000	3500	4000	
30 psf roof live load or 25 psf ground snow load	1 story—slab-on-grade	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	1 story—with crawl space	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	1 story—plus basement	16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	2 story—slab-on-grade	13 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	2 story—with crawl space	15 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	2 story—plus basement	19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	3 story—slab-on-grade	16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	3 story—with crawl space	18 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
	3 story—plus basement	22 x 7	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6	
	50 psf	1 story—slab-on-grade	12 x 6					
		1 story—with crawl space	13 x 6	12 x 6				
		1 story—plus basement	16 x 6	12 x 6				
2 story—slab-on-grade		13 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
2 story—with crawl space		16 x 6	12 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
2 story—plus basement		19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
3 story—slab-on-grade		16 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
3 story—with crawl space		19 x 6	14 x 6	12 x 6	12 x 6	12 x 6	12 x 6	
3 story—plus basement		22 x 7	16 x 6	13 x 6	12 x 6	12 x 6	12 x 6	

Tables R403.1 (2 & 3) similarly revised

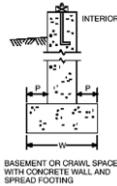
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R403.1.1 Minimum size

- Footing projections, P, shall be not less than 2 inches and shall not exceed the thickness of the footing.
- Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2.
- The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1.



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R403.1.3.3 Slabs-on-ground with turned-down footings

- In Seismic Design Categories D0, D1 and D2, slabs on ground cast monolithically with turned-down footings shall have a minimum of one No. 4 bar at the top and the bottom of the footing or one No. 5 bar or two No. 4 bars in the middle third of the footing depth.
- Where the slab is not cast monolithically with the footing, No. 3 or larger vertical dowels with standard hooks on each end shall be installed at not more than 4 feet on center in accordance with Figure R403.1.3, Detail 2. Standard hooks shall comply with Section R608.5.4.5.



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R403.1.3.5 Reinforcement

- Footing and stem wall reinforcement shall comply with Sections R403.1.3.5.1 through R403.1.3.5.4.
 - ASTM A 615, A706, or A996
 - 40,000 psi (Grade 40)



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R403.1.3.5.2 - Location of reinforcement in wall



- The center of vertical reinforcement in stem walls shall be located at the centerline of the wall.
- Horizontal and vertical reinforcement shall be located in footings and stem walls to provide the minimum cover required by Section R403.1.3.5.3.

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R403.1.3.5.3 Support and cover



- Reinforcement shall be secured in the proper location in the forms with tie wire or other bar support system to prevent displacement during the concrete placement operation.
- Concrete cast against the earth
 - minimum cover of 3 inches.
- Concrete cast in removable forms that will be exposed to the earth or weather
 - 1½ inches for No. 5 bars and smaller
 - 2 inches for No. 6 bars and larger.
- Concrete cast in removable forms that will not be exposed to the earth or weather, and for concrete cast in stay-in-place forms
 - minimum cover shall be 3/4 inch.

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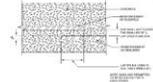
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R403.1.3.5.4 Lap splices

TABLE R608.5.4(1)
LAP SPLICE AND TENSION DEVELOPMENT LENGTHS

Bar Size	TENSION DEVELOPMENT LENGTH, l_d (inches)		LAP SPLICE LENGTH, l_s (inches)
	Cast in concrete	Cast in fresh concrete	
No. 3	12	12	12
No. 4	16	16	16
No. 5	20	20	20
No. 6	24	24	24
No. 7	28	28	28
No. 8	32	32	32
No. 9	36	36	36
No. 10	40	40	40
No. 11	44	44	44
No. 12	48	48	48



- Vertical and horizontal reinforcement shall be the longest lengths practical.
- Where splices are necessary in reinforcement, the length of lap splice shall be in accordance with Table R608.5.4(1) and Figure R608.5.4(1).
- The maximum gap between noncontact parallel bars at lap splice shall not exceed the smaller of one-fifth the required lap length and 6 inches [see Figure R608.5.4(1)].

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Footing Minimum Depth R403.1.4

- Must extend below frost line or minimum of 12 inches below the undisturbed ground.
- Deck footings per Section R507.3



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Frost Protection R403.1.4.1

- Except where otherwise protected from frost, foundation walls, piers and other permanent supports of buildings and structures shall be protected from frost by one or more of the following methods:
 - Extend below the frost line
 - Frost Protected Shallow Foundations
 - Constructing per ASCE 32
 - Erected on solid rock



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R 403.1.4.1 Frost Protection

- Exceptions:
 - 600 sq.ft. light framed construction freestanding accessory structure, 10 feet eave height
 - 400 sq.ft. other than light framed, free standing accessory structure, 10 feet eave height



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Footing Slope R403.1.5



- The top surface of footings shall be level.
- The bottom surface of footings shall not have a slope exceeding one unit vertical in 10 units horizontal (10% slope).

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R403.1.6 Foundation anchorage

- Wood sill plates and wood walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.



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Foundation Anchorage R403.1.6

- Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet on center.
- Bolts shall be at least 1/2 inch in diameter and shall extend a minimum of 7 inches into concrete or grouted cells of concrete masonry units.
- A nut and washer shall be tightened on each anchor bolt.



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Foundation Anchorage R403.1.6

- There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches or less than seven bolt diameters from each end of the plate section.



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R404.1.1 Foundation Wall Design required

- Concrete or masonry foundation walls shall be designed in accordance with accepted engineering practice where either of the following conditions exists:
 - Walls are subject to hydrostatic pressure from ground water.
 - Walls supporting more than 48 inches of unbalanced backfill that do not have permanent lateral support at the top or bottom.



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Concrete foundation walls R404.1.3

- Concrete foundation walls that support light-frame walls shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or PCA 100.



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Height Above Finished Grade R404.1.6



- 4 inches for masonry veneer
- 6 inches elsewhere

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Backfill Placement R404.1.7



- Backfill shall not be placed against the wall until the wall has sufficient strength and has been anchored to the floor above, or has been sufficiently braced to prevent damage by the backfill.
 - Except walls supporting less than 4' of unbalance backfill

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Structural Requirements R407.3



- The columns shall be restrained to prevent lateral displacement at the bottom end.
- Wood columns shall not be less in nominal size than 4 inches by 4 inches.
- Steel columns shall not be less than 3-inch-diameter Schedule 40 pipe manufactured in accordance with ASTM A 53 Grade B or approved equivalent.

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Structural Requirements R407.3

- Exception:
- In Seismic Design Categories A, B and C, columns no more than 48 inches in height on a pier or footing are exempt from the bottom end lateral displacement requirement within under-floor areas enclosed by a continuous foundation.



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Under floor Ventilation R408

- 1/150 square feet
- Exception
 - May be 1/1500 with Class I vapor retarder over ground surface
 - Class 1 vapor retarder, openings not required to be within 3' of corners, but placed to provide cross ventilation



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R408.3 Unvented crawl space



- Provisions for elimination of ventilation openings for crawl and under floor spaces.
 - Mechanical exhaust
 - Condition space
 - Under-floor plenum
 - Dehumidification

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Crawlspace Access R408.4



- Minimum opening
 - 18" X 24" in floor
 - 16" X 24" in perimeter wall
 - 16" X 24" areaway required if access is below grade
- Mechanical equipment access (22x30)

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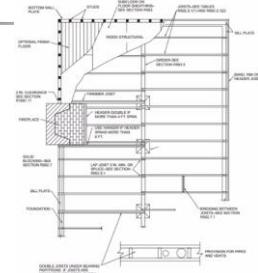
FLOORS CHAPTER 5



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R502.2 Design and construction.

- Floors shall be designed and constructed in accordance with the provisions of this chapter, Figure R502.2 and Sections R317 and R318 or in accordance with ANSI AWC NDS.



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R502.11.3 Alterations to trusses



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

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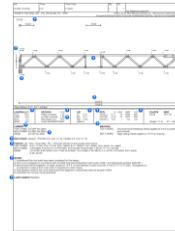
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R502.11.4 Truss design drawings



- Truss design drawings, prepared in compliance with Section R502.11.1, shall be submitted to the building official and approved prior to installation.
- Truss design drawings shall be provided with the shipment of trusses delivered to the job site.



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R502.1.2 Prefabricated wood I-joists



- Structural capacities and design provisions for prefabricated wood I-joists shall be established and monitored in accordance with ASTM D5055.



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L/480 Live Load Deflection

Depth	Type	40 PSF Live Load / 50 PSF Dead Load				40 PSF Live Load / 20 PSF Dead Load			
		12" o.c.	16" o.c.	18" o.c.	24" o.c.	12" o.c.	16" o.c.	18" o.c.	24" o.c.
8"	T1B	18.1"	15.4"	14.2"	13.7"	18.1"	15.4"	14.3"	13.7"
	T2B	17.9"	15.1"	14.0"	13.5"	17.9"	15.1"	14.0"	13.4"
	T3B	18.3"	15.4"	14.4"	13.8"	18.3"	15.4"	14.3"	13.6"
	T4B	18.2"	15.3"	14.3"	13.7"	18.2"	15.3"	14.2"	13.5"
10"	T1B	20.2"	16.7"	15.4"	14.9"	20.2"	16.7"	15.6"	14.9"
	T2B	19.9"	16.4"	15.2"	14.6"	19.9"	16.4"	15.3"	14.6"
	T3B	20.4"	16.8"	15.6"	15.0"	20.4"	16.8"	15.7"	15.0"
	T4B	20.3"	16.7"	15.5"	14.9"	20.3"	16.7"	15.6"	14.9"
12"	T1B	22.1"	18.1"	16.6"	16.1"	22.1"	18.1"	17.0"	16.2"
	T2B	21.8"	17.8"	16.5"	15.9"	21.8"	17.8"	16.7"	16.0"
	T3B	22.3"	18.2"	16.9"	16.3"	22.3"	18.2"	17.1"	16.3"
	T4B	22.2"	18.1"	16.7"	16.1"	22.2"	18.1"	17.0"	16.2"
14"	T1B	23.9"	19.4"	17.7"	17.2"	23.9"	19.4"	18.3"	17.5"
	T2B	23.6"	19.1"	17.6"	17.0"	23.6"	19.1"	17.9"	17.2"
	T3B	24.1"	19.5"	17.9"	17.3"	24.1"	19.5"	18.4"	17.6"
	T4B	24.0"	19.4"	17.7"	17.1"	24.0"	19.4"	18.3"	17.5"

L/360 Live Load Deflection (Minimum Criteria per Code)

Depth	Type	40 PSF Live Load / 50 PSF Dead Load				40 PSF Live Load / 20 PSF Dead Load			
		12" o.c.	16" o.c.	18" o.c.	24" o.c.	12" o.c.	16" o.c.	18" o.c.	24" o.c.
8"	T1B	18.1"	15.4"	14.2"	13.7"	18.1"	15.4"	14.3"	13.7"
	T2B	17.9"	15.1"	14.0"	13.5"	17.9"	15.1"	14.0"	13.4"
	T3B	18.3"	15.4"	14.4"	13.8"	18.3"	15.4"	14.3"	13.6"
	T4B	18.2"	15.3"	14.3"	13.7"	18.2"	15.3"	14.2"	13.5"
10"	T1B	20.2"	16.7"	15.4"	14.9"	20.2"	16.7"	15.6"	14.9"
	T2B	19.9"	16.4"	15.2"	14.6"	19.9"	16.4"	15.3"	14.6"
	T3B	20.4"	16.8"	15.6"	15.0"	20.4"	16.8"	15.7"	15.0"
	T4B	20.3"	16.7"	15.5"	14.9"	20.3"	16.7"	15.6"	14.9"
12"	T1B	22.1"	18.1"	16.6"	16.1"	22.1"	18.1"	17.0"	16.2"
	T2B	21.8"	17.8"	16.5"	15.9"	21.8"	17.8"	16.7"	16.0"
	T3B	22.3"	18.2"	16.9"	16.3"	22.3"	18.2"	17.1"	16.3"
	T4B	22.2"	18.1"	16.7"	16.1"	22.2"	18.1"	17.0"	16.2"
14"	T1B	23.9"	19.4"	17.7"	17.2"	23.9"	19.4"	18.3"	17.5"
	T2B	23.6"	19.1"	17.6"	17.0"	23.6"	19.1"	17.9"	17.2"
	T3B	24.1"	19.5"	17.9"	17.3"	24.1"	19.5"	18.4"	17.6"
	T4B	24.0"	19.4"	17.7"	17.1"	24.0"	19.4"	18.3"	17.5"

11) This table contains a summary of all joists. For and the span within the side of joists. © 2023 Shums Coda Associates, Inc.

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R502.8.2 - Engineered wood products

ALLOWABLE HOLES

Table 6: Field Joist Allowable Hole Dimensions (per Code)

Joist Depth	Joist Spacing	Max. Hole Diameter	Max. Hole Length
8"	12" o.c.	1 1/2"	12"
8"	16" o.c.	1 1/2"	12"
8"	18" o.c.	1 1/2"	12"
8"	24" o.c.	1 1/2"	12"
10"	12" o.c.	1 1/2"	12"
10"	16" o.c.	1 1/2"	12"
10"	18" o.c.	1 1/2"	12"
10"	24" o.c.	1 1/2"	12"
12"	12" o.c.	1 1/2"	12"
12"	16" o.c.	1 1/2"	12"
12"	18" o.c.	1 1/2"	12"
12"	24" o.c.	1 1/2"	12"
14"	12" o.c.	1 1/2"	12"
14"	16" o.c.	1 1/2"	12"
14"	18" o.c.	1 1/2"	12"
14"	24" o.c.	1 1/2"	12"

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

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Wood I-Joists

SECTION 3: DESIGN INFORMATION FOR ALL JOISTS

This section contains framing details and design information applicable to all joist depths shown in this guide.

T&P Joist Floor Framing

1) Use the framing plan and details.

2) Joists must be closely spaced to facilitate and fasten to blocking, girders, trusses, or steel attached to a wall below.

3) Use wood joist bottom joists.

4) 1" x 4" Wood Joist Spacing: 12" o.c., 16" o.c., 18" o.c., 24" o.c.

5) Joist blocking (See blocking detail at 11) in member's design for 12" o.c. and 16" o.c. spacing. See blocking detail at 12) in member's design for 18" o.c. and 24" o.c. spacing.

6) Steel blocking.

7) See Joist Spacing (Blocking) in page 11 and 12.

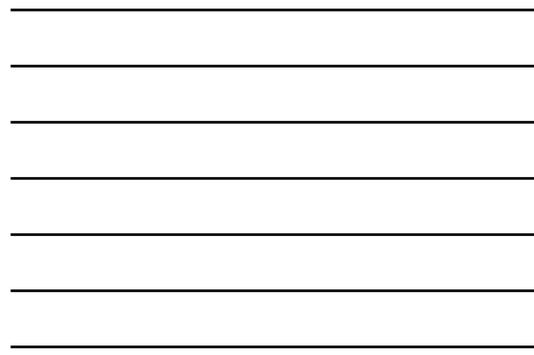
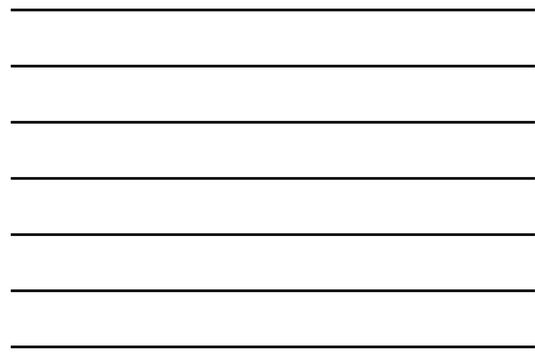
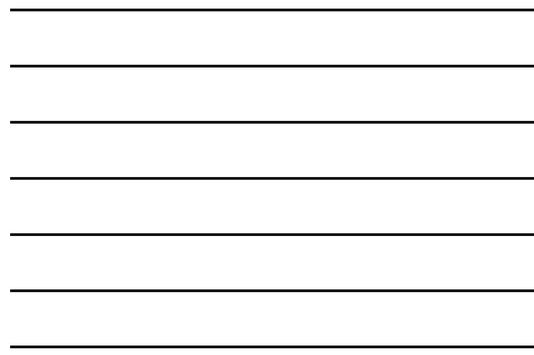
8) 1" x 4" Wood Joist Spacing: 12" o.c., 16" o.c., 18" o.c., 24" o.c.

9) See Joist Spacing (Blocking) in page 11 and 12.

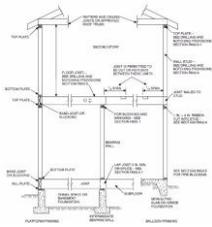
WARNING
Joist blocking must be installed per manufacturer's instructions. See blocking detail at page 11.

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R602.3 Design and construction



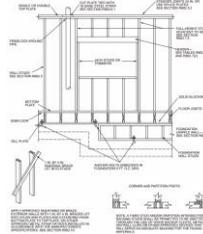
- Exterior walls of wood-frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(1) and R602.3(2), or in accordance with AWC NDS.

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Figure R602.3.2 Design and construction



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Stud Size, Height and Spacing - R602.3.1

- The size, height and spacing of studs shall be in accordance with Table R602.3.(5).

TABLE R602.3(5)
SIZE, HEIGHT AND SPACING OF WOOD STUDS*

STUD SIZE (inches)	Laterally unsupported stud height ¹ (feet)	BEARING WALLS				NONBEARING WALLS	
		Maximum spacing when supporting a roof/ceiling assembly or a habitable attic assembly only (inches)	Maximum spacing when supporting one floor, plus a roof/ceiling assembly or a habitable attic assembly (inches)	Maximum spacing when supporting two floors, plus a roof/ceiling assembly or a habitable attic assembly (inches)	Maximum spacing when supporting one floor height ² (inches)	Laterally unsupported stud height ¹ (feet)	Maximum spacing (inches)
2 x 2 ³	---	---	---	---	---	10	16
2 x 4	10	24 ⁴	16 ⁵	---	24	14	24
2 x 4	10	24	24	---	24	14	24
2 x 6	10	24	24	---	24	16	24
2 x 6	10	24	24	16	24	20	24

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Interior Walls R602.4 & R602.5



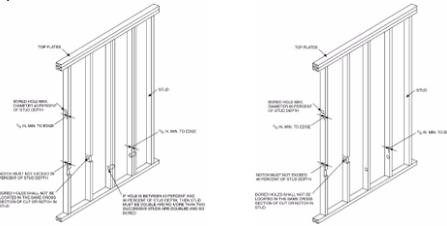
- Interior Load bearing walls same as exterior walls
- Nonbearing
 - 2X3 24"
 - 2X4 16" OC flat when not part of braced wall lines
 - Single top plate

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R602.6 Drilling and notching of studs



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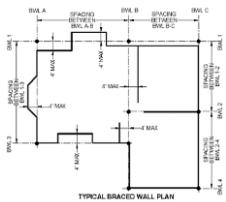
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R602.10.1 Braced wall lines



- For the purpose of determining the amount and location of bracing required in each story level of a building, braced wall lines shall be designated as straight lines in the building plan placed in accordance with this section.

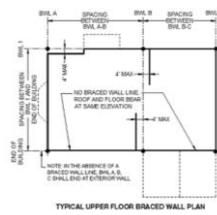
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R602.10.1.1 Length of a braced wall line

- The length of a braced wall line shall be the distance between its ends.
- The end of a braced wall line shall be the intersection with a perpendicular braced wall line, an angled braced wall line as permitted in Section R602.10.1.4 or an exterior wall as shown in Figure R602.10.1.1.



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R602.10.1.2 - Location of braced wall lines and permitted offsets

- Each braced wall line shall be located such that no more than two-thirds of the required braced wall panel length is located to one side of the braced wall line.
- Braced wall panels shall be permitted to be offset up to 4 feet from the designated braced wall line. Braced wall panels parallel to a braced wall line shall be offset not more than 4 feet from the designated braced wall line location as shown in Figure R602.10.1.1.

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TABLE R602.10.1.3
BRACED WALL LINE SPACING

APPLICATION	CONDITION	BUILDING TYPE	BRACED WALL LINE SPACING CRITERIA	
			Maximum Spacing	Exception to Maximum Spacing
Wind bracing	Ultimate design wind speed 100 mph to < 140 mph	Detached townhouse	60 feet	None
		Detached		Use wind bracing
Seismic bracing	SDC A - C	Townhouse		Use wind bracing
	SDC A - B	Townhouse		Use wind bracing
	SDC C	Townhouse	35 feet	Up to 50 feet when length of required bracing per Table R602.10.3(2) is adjusted in accordance with Table R602.10.3(4)
	SDC D ₀ , D ₁ , D ₂	Detached townhouses, one- and two-story only	25 feet	Up to 35 feet to allow for a single room not to exceed 900 square feet. Spacing of all other braced wall lines shall not exceed 25 feet.
	SDC D ₀ , D ₁ , D ₂	Detached townhouse	25 feet	Up to 35 feet when length of required bracing per Table R602.10.3(2) is adjusted in accordance with Table R602.10.3(4)

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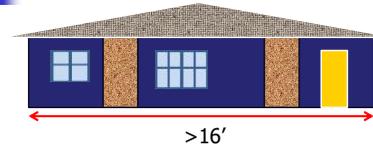
R602.10.2.3 Minimum number of braced wall panels



- Minimum bracing panel numbers:
- If wall line is 16' long or less:
 - Two panels of any length
 - One panel of 48" or more.

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R602.10.2.3 Minimum number of braced wall panels



- A braced wall line having a distance greater than 16 feet shall have a minimum of two braced wall panels.

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R602.10.3 Braced Wall Length

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

Ultimate Design Wind Speed (mph)	Story Location	Braced Wall Line Spacing (feet)	MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE ^a			
			Method LIP	Method GB	Methods DWS, SFS, PFS, PCT, HPS, CS, WSP, CS-G, CS-GB	Methods CS, WSP, CS-G, CS-GB
≤ 115		10	3.5	3.5	7.0	2.0
		30	6.5	6.5	3.5	3.5
		50	9.5	9.5	5.5	4.5
		60	12.5	12.5	7.0	6.0
		90	15.0	15.0	9.0	7.5
		60	18.0	18.0	10.5	9.0
120		10	7.0	7.0	4.0	3.5
		30	12.5	12.5	7.5	6.5
		50	18.0	18.0	10.5	9.0
		60	23.5	23.5	13.5	11.5
		90	29.0	29.0	16.5	14.0
		60	34.5	34.5	20.0	17.0
130		10	NP	18.5	11.0	9.0
		30	NP	27.0	15.5	13.0
		40	NP	28.0	17.0	15.0
		50	NP	43.0	24.5	21.0
		60	NP	51.0	29.0	25.0
		NP	NP	NP	NP	NP

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R602.10.3 – Braced Wall Length

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

Seismic Design Category	Story Location	Braced Wall Line Length (feet)	MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE ^a			
			Method LIP	Method GB	Methods DWS, SFS, PFS, PCT, HPS, CS, WSP, CS-G, CS-GB	Methods CS, WSP, CS-G, CS-GB
A		10	2.5	2.5	2.5	1.4
		20	5.0	5.0	5.0	3.2
		30	7.5	7.5	7.5	4.6
		40	10.0	10.0	10.0	6.4
		50	12.5	12.5	12.5	8.0
		60	15.0	15.0	15.0	9.8
B		10	NP	4.5	4.5	3.0
		20	NP	9.0	9.0	6.0
		30	NP	13.5	13.5	9.0
		40	NP	18.0	18.0	12.0
		50	NP	22.5	22.5	15.0
		60	NP	27.0	27.0	19.0
C (Dwellings only)		10	NP	6.0	6.0	4.5
		20	NP	12.0	12.0	9.0
		30	NP	18.0	18.0	13.5
		40	NP	24.0	24.0	18.0
		50	NP	30.0	30.0	22.5
		60	NP	36.0	36.0	27.0

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TABLE R602.10.3(2)
WIND ADJUSTMENT FACTORS TO BE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON STORY/SUPPORTING CONDITION	ADJUSTMENT FACTOR ^a	ADJUSTMENT FACTOR ^b (Length of Wall Bracing Required)	APPLICABLE METHODS	
1	Exposure category ^c	Openness structure	0	1.00	All methods
		C	1.25	1.25	
		D	1.50	1.50	
		E	1.75	1.75	
		F	2.00	2.00	
		G	2.25	2.25	
2	Roof span-to-ridge height	Roof only	0.75	0.75	All methods
		Roof + 1 floor	0.75	0.75	
		Roof + 2 floors	0.75	0.75	
		Roof + 3 floors	0.75	0.75	
		Roof + 4 floors	0.75	0.75	
		Roof + 5 floors	0.75	0.75	
		Roof + 6 floors	0.75	0.75	
		Roof + 7 floors	0.75	0.75	
		Roof + 8 floors	0.75	0.75	
		Roof + 9 floors	0.75	0.75	
		Roof + 10 floors	0.75	0.75	
		Roof + 11 floors	0.75	0.75	
3	Story height (Maximum R/RH: 3)	0-8 feet	0.75	0.75	All methods
		9-16 feet	0.75	0.75	
		17-24 feet	0.75	0.75	
		25-32 feet	0.75	0.75	
		33-40 feet	0.75	0.75	
		41-48 feet	0.75	0.75	
4	Number of braced wall lines (per floor elevation)	2	1.00	1.00	All methods
		3	1.00	1.00	
		4	1.45	1.45	
		5	1.90	1.90	
		6	2.35	2.35	
		7	2.80	2.80	
5	Additional R/RH perched hold-down device	Fastened to the end studs of high braced wall panel and/or	0.50	0.50	DWS, WSP, SFS, PFS, PCT, HPS
		W/ provision of framing	1.00	1.00	
6	Riveted gypsum board joints on exterior	Checked from inside face of braced wall panels	1.40	1.40	DWS, WSP, SFS, PFS, PCT, HPS, CS, WSP, CS-G, CS-GB
		Checked from exterior face of braced wall panels	1.40	1.40	
7	Openness board fastening	4 inches o.c. or panel edges including top and bottom panels, and all horizontal panels, unless indicated	0.7	0.7	GB
		Horizontal bracing	1.0	1.0	
8	Horizontal bracing	Any story	1.0	1.0	WSP, CS, WSP
		Horizontal bracing	1.0	1.0	

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R602.10.3 – Braced Wall Length

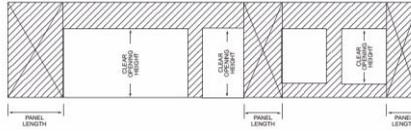
TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON:	STORY	CONDITION	ADJUSTMENT FACTOR ^{A,B} (Multiply length from Table R602.10.3(3) by this factor)	APPLICABLE METHODS
6	Walls with stone or masonry veneer, townhouses in SDC C ^{5,6}		1.0	1.0	All methods
			1.5	1.5	
			1.5	1.5	
7	Walls with stone or masonry veneer, detached one and two-family dwellings in SDC D ₁₋₂	Any story	See Table R602.10.6.5	1.5	BV-WSP
8	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PDS, PCP, HPS, CS-WSP, CS-G, CS-SFB

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R602.10.5 Minimum length of a braced wall panel

- The minimum length of a braced wall panel shall comply with Table R602.10.5. For Methods CS-WSP and CS-SFB, the minimum panel length shall be based on the adjacent clear opening height in accordance with Table R602.10.5 and Figure R602.10.5. Where a panel has an opening on either side of differing heights, the taller opening height shall be used to determine the panel length.



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Installation R701.2



- 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.

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R702.4.2. Tile backing – Wet areas

- Materials used as backers for wall tile in tub and shower areas and wall panels in shower areas shall be of materials listed in Table R702.4.2, and installed in accordance with the manufacturer's recommendations.

MATERIAL	REFERENCE
Glass mat gypsum backing panel	ASTM C1798
Fiber-reinforced gypsum panels	ASTM C1378
Noncombustible fiber-reinforced cement backer board	ASTM C1288 or ISO 15106, Category C
Noncombustible fiber-reinforced cementitious backer units	ASTM C1325

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Wall Covering 702.5

- WSRC:
- All structural panel components with the conditioned space such as plywood, particle board, wafer board and osb shall be identified as EXPOSURE 1, EXTERIOR, OR HUD-APPROVED.

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R702.7 Vapor retarders

- Vapor retarder materials shall be classified in accordance with Table R702.7(1).
- A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable.
- An approved design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative.
- The climate zone shall be determined in accordance with Section N1101.7.



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R702.7 Vapor retarders

- Exceptions:
 1. Basement walls.
 2. Below-grade portion of any wall.
 3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
 4. A vapor retarder shall not be required in Climate Zones 1, 2 and 3.



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Exterior Covering R703

- The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a water-resistant barrier behind the exterior cladding as required by Section R703.2 and a means of draining to the exterior water that penetrates the exterior cladding.



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R703.2 Water-resistive barrier

- Not fewer than 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

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Flashing R703.4



- Approved corrosion-resistive flashing shall be provided in the exterior wall envelope in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components

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Flashing R703.4



- Required
 - Exterior window & door openings
 - Intersection of masonry with frame or stucco walls
 - Under/ends of copings and sills
 - Projecting wood trim
 - Porch, deck or stair attachments
 - Wall/roof intersections
 - Built-in gutters

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R802.7.2 Engineered wood products

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



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Member	Material	Grade	Species	Modulus of Elasticity (E)	Modulus of Rupture (F _b)	Compression Parallel to Grain (F _c)	Compression Perpendicular to Grain (F _{c⊥})	Tension Parallel to Grain (F _t)	Tension Perpendicular to Grain (F _{t⊥})	Shear (F _v)
1	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
2	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
3	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
4	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
5	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
6	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
7	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
8	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
9	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
10	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
11	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
12	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
13	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
14	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
15	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
16	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
17	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
18	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
19	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
20	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
21	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
22	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
23	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
24	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
25	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
26	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
27	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
28	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
29	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
30	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
31	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
32	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
33	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
34	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
35	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
36	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
37	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
38	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
39	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
40	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
41	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
42	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
43	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
44	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
45	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
46	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
47	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
48	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
49	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100
50	2x6	DF-L	Douglas Fir-Larch	1,900,000	1,000	1,500	650	1,000	100	100

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R802.10.4 Alterations to trusses

- Truss members shall not be cut, notched, drilled, spliced or otherwise altered in any way without the approval of a registered design professional.
- Alterations resulting in the addition of load such as HVAC equipment or water heater that exceeds the design load for the truss shall not be permitted without verification that the truss is capable of supporting such additional loading.



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R806.2 Roof Ventilation



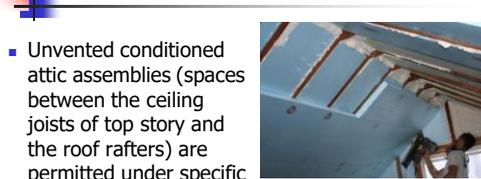
- 40-50% of ventilation at upper portion of attic.
- Upper ventilation no more than 3' below the ridge
 - More than 3' if wall or roof framing will not permit the opening to be within the 3'
- Remainder at eave or cornice.

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R806.5 Conditioned attic assemblies



- Unvented conditioned attic assemblies (spaces between the ceiling joists of top story and the roof rafters) are permitted under specific conditions.

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R806.5 Conditioned attic assemblies



1. Must be within the building thermal envelope.
2. No interior vapor barriers on ceiling side
3. Wood shingles/shakes – 1/4 inch air between sheathing
4. Air-impermeable insulation on underside of roof deck (Climate Zones 5, 6, 7, and 8)
 1. Or vapor retarder coating applied.

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R806.5 Conditioned attic assemblies

- Either Items 5.1, 5.2 or 5.3 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

TABLE R806.5 INSULATION FOR CONDENSATION CONTROL	
CLIMATE ZONE	MINIMUM R-VALUE (BASED ON AIR-IMPERMEABLE INSULATION R-VALUE) ^a
2B and 3B tile roof only	0 (none required)
1, 2A, 2B, 3A, 3B, 3C	R-5
4C	R-10
4A, 4B	R-15
5	R-20
6	R-25
7	R-30
8	R-35

^a Continues to but does not supersede the requirements in Section R103.2.1.

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Attic Access R807

- Combustible ceiling or roof construction
- 22"x30" opening
 - hallway or readily accessible location
 - M1305.1.3 mechanical access



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Roof Classification R902



- Class A, B, C required
 - less than 3' to lot line, or
 - designated by law
- Brick, masonry, exposed concrete roof deck is considered Class A,

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Weather Protection R903



- Roof decks shall be covered with approved roof coverings secured to the building or structure in accordance with the provisions of this chapter.
- Roof assemblies shall be designed and installed in accordance with this code and the approved manufacturer's installation instructions such that the roof assembly shall serve to protect the building or structure.

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Roof Drainage R903.4



- Unless roof drains over roof edge, roof drains and scuppers required
 - Sized per **Washington State Plumbing Code**
 - Overflow 2" above roof drain inlet
 - Scuppers 3 times roof drain, 2" above inlet
 - Overflow not allowed to be connected to roof drain lines

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Roof Coverings R905

- Asphalt Shingles
- Clay & concrete tiles
- Metal roof shingles
- Mineral-surfaced roll roofing
- Slate shingles
- Wood shingles/shakes
- Built-up roofs
- Modified Bitumen
- Single-ply roofing
- Sprayed foam roofing
- Liquid-applied coatings



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