2018 International Residential Code
Chapter 3 Building Planning
What are we going to talk about?

- Chapter 3 Building Planning
  - Non-structural provisions
  - Fire-resistant rated construction
  - Egress Openings
  - Means of Egress
  - Safety glazing
  - Photovoltaic Systems

International Residential Code

Scope

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

Instructor

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In the construction industry for over 40 years
ICC – IRC Plumbing & Mechanical Code Development Committee
ICC – Commercial Energy Code Development Committee
2003-2016 Building Official
Parker, Colorado
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.

R301.1.1 Alternative provisions

- As an alternative to the requirements in Section R301.1 the following standards are permitted subject to the limitations of this code and the limitations therein.
- Where engineered design is used in conjunction with these standards, the design shall comply with the International Building Code.

1. AF&PA Wood Frame Construction Manual (WFCM).
2. AISI Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings (AISI S230).
Construction Systems
R301.1.2

- Wood:
  - Platform Frame
  - Balloon Frame
- Concrete or Masonry:
  - Balloon Frame
- Other systems:
  - Designed per accepted engineering practices

R301.2.1.1 - Wind limitations and wind design required

- The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2(4)B or where the basic wind speed from Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s).
- Exceptions:
  1. For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R611.
  2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R613.

Climatic and geographic design criteria - Table R301.2(1)

- In regions where wind design is required in accordance with Figure R301.2(4)B or where the basic wind speed shown on Figure R301.2(4)A equals or exceeds 110 miles per hour, the design of buildings for wind loads shall be in accordance with one or more of the following methods:
  1. AF&PA Wood Frame Construction Manual (WFCM); or
  2. ICC Standard for Residential Construction in High-Wind Regions (ICC 600); or
  3. ASCE Minimum Design Loads for Buildings and Other Structures (ASCE 7); or
  4. AISI Standard for Cold-Formed Steel Framing—Prescriptive Method For One- and Two-Family Dwellings (AISI S230); or
R301.2.2 Seismic provisions

- The seismic provisions of this code shall apply as follows:
  1. Townhouses in Seismic Design Categories C, D0, D1 and D2.
  2. Detached one- and two-family dwellings in Seismic Design Categories, D0, D1 and D2.

R301.3 Story Height (Wind & Seismic)

- Wood wall framing
  - 11 feet 7 inches and Table R602.3(5)
- Cold-formed steel wall framing
  - 11 feet 7 inches and maximum 10 feet unsupported stud height
- Masonry
  - 13 feet 7 inches
  - 12 feet bearing wall clear height

R301.3 Story Height

- Insulated concrete form walls
  - 11 feet 7 inches and maximum unsupported wall height per Tables R608
- SIP walls
  - 11 feet 7 inches and Section R610 tables not to exceed 10 feet

Live Load - Table R301.5

<table>
<thead>
<tr>
<th>USE</th>
<th>LIVE LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unoccupied offices without storage</td>
<td>10</td>
</tr>
<tr>
<td>Unoccupied offices with limited storage</td>
<td>20</td>
</tr>
<tr>
<td>Hospital rooms, and offices served with food service</td>
<td>30</td>
</tr>
<tr>
<td>Bedrooms (interior) and decks</td>
<td>40</td>
</tr>
<tr>
<td>Fire stairs</td>
<td>40</td>
</tr>
<tr>
<td>Guards or handrails</td>
<td>200 pounds</td>
</tr>
<tr>
<td>Guarded exit passageways</td>
<td>200 pounds</td>
</tr>
<tr>
<td>Passenger vehicle garages</td>
<td>50 pounds</td>
</tr>
<tr>
<td>Rooms other than sleeping rooms</td>
<td>40</td>
</tr>
<tr>
<td>Sleeping rooms</td>
<td>30</td>
</tr>
<tr>
<td>Walls</td>
<td>20 pounds</td>
</tr>
</tbody>
</table>
R301.7 Deflection

- The allowable deflection of any structural member under the live load listed in Sections R301.5 and R301.6 or wind loads determined by Section R301.2.1 shall not exceed the values in Table R301.7.

R302 Fire Resistant Construction

- Moves everything fire-resistance related to R302
  - Exterior Walls
  - Townhouse Separation
  - Two-Family Separation
  - Penetrations
  - Garage to Dwelling
  - Under Stairs
  - Foam Plastics
  - Interior Finishes
  - Fireblocking
  - Draftstopping
  - Insulation

R302.1 Exterior Walls

- Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1(1); or dwellings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904 shall comply with Table R302.1(2).

Location on Lot - R302

<table>
<thead>
<tr>
<th>TABLE R302.1(1), EXTERIOR WALLS</th>
<th>EXTERIOR WALL ELEMENT</th>
<th>MINIMUM FIRE RESISTANCE RATING</th>
<th>MINIMUM FIRE RESISTANCE RATING</th>
<th>MINIMUM FIRE RESISTANCE RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>Fire-resistance rated</td>
<td>4 hours</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Not fire-resistance rated</td>
<td>1 hour</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td>Projections</td>
<td>Not allowed</td>
<td>1 hour</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Fire-resistance rated</td>
<td>4 hours</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Not fire-resistance rated</td>
<td>1 hour</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td>Openings in walls</td>
<td>Not allowed</td>
<td>1 hour</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>25% maximum of halflength</td>
<td>1 hour</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Unrestricted</td>
<td>1 hour</td>
<td>3 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td>Penetrations</td>
<td>All</td>
<td>Comply with Section P2904</td>
<td>3 feet</td>
<td>3 feet</td>
</tr>
<tr>
<td></td>
<td>None required</td>
<td>3 feet</td>
<td>3 feet</td>
<td>3 feet</td>
</tr>
</tbody>
</table>

a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where soffit vent openings are not installed.
Table R302.1 (1)
footnote: a

Table R302.1 (1)
footnote: b

Gable vent not allowed

Location on Lot - R302

<table>
<thead>
<tr>
<th>EXTERIOR WALL ELEMENT</th>
<th>MINIMUM FIRE RESISTANCE RATING</th>
<th>MINIMUM SEPARATION DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>Fire-resistance rated</td>
<td>0 feet</td>
</tr>
<tr>
<td></td>
<td>Not fire-resistance rated</td>
<td>3 feet</td>
</tr>
<tr>
<td>Projections</td>
<td>Not allowed</td>
<td>6 ft.</td>
</tr>
<tr>
<td></td>
<td>Fire-resistance rated</td>
<td>3 feet</td>
</tr>
<tr>
<td></td>
<td>Not fire-resistance rated</td>
<td>3 feet</td>
</tr>
<tr>
<td>Openings in walls</td>
<td>Not allowed</td>
<td>6 ft.</td>
</tr>
<tr>
<td></td>
<td>Unrated</td>
<td>3 feet</td>
</tr>
<tr>
<td>Penetrations</td>
<td>All</td>
<td>3 feet</td>
</tr>
</tbody>
</table>

a. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistant rated and for fire-resistant rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where gable vent openings are not installed.

Table R302.1(2)
Footnote A

- For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with Section P2904, the fire separation distance for nonrated exterior walls and rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.
302.1 Exterior Walls Exceptions

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the fire separation distance.
2. Walls of dwellings and accessory structures located on the same lot.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
4. Detached garages accessory to a dwelling located within 2 feet of a lot line are permitted to have roof eave projections not exceeding 4 inches.
5. Foundation vents installed in compliance with this code are permitted.
R302.2 Townhouses
Walls separating townhouse units shall be constructed in accordance with Section R302.2.1 or R302.2.2.

- Common walls separating townhouses shall be assigned a fire-resistance rating in accordance with Section R302.2, Item 1 or 2.
  1. Sprinklers = 1-hour
  2. No Sprinklers = 2 hours

R302.2.1 Double walls
Each townhouse shall be separated by two 1-hour fire-resistance-rated wall assemblies tested in accordance with ASTM E119, UL 263 or Section 703.3 of the International Building Code.

The common wall shared by two townhouses shall be constructed without plumbing or mechanical equipment, ducts or vents in the cavity of the common wall.

The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing.
Continuity
R302.2.1

- The fire-resistance-rated wall or assembly separating townhouses 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.

Parapet
R302.2.2

- 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.

- 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.

- 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.
Parapet

R302.2.2

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.

Parapet Construction

R302.2.3

- Same fire resistance of supporting wall
- Non-combustible faces at uppermost 18"
- >2:12 roof slope
  - extend to same height or roof 3’ away, not less than 30”

Structural Independence

R302.2.4

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

Dwelling Unit Separation

R302.3

- Two-family dwellings
  - One-hour fire-resistive wall and/or floor assembly
    - ASTM E119 / UL263
    - Extend to and against exterior wall and to underside of roof sheathing
Dwelling Unit Separation

R302.3

- Exception 1
- ½ hour separation when buildings are equipped with NFPA 13 Sprinklers

R302.3.1
Supporting construction

- When floor assemblies are required to be fire-resistance rated by Section R302.3, the supporting construction of such assemblies shall have an equal or greater fire-resistance rating.

Dwelling Unit Separation

R302.3

- Exception 2.
- Wall assemblies need not extend through attic spaces 5/8-inch Type X ceiling and an attic draft stop provided above and along the wall separating the dwellings.
- Framing supporting the ceiling shall also be protected by 1/2-inch gypsum board or equivalent.

Rated Penetrations

R302.4

- 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
### Through Penetration Exceptions

**R317.3.1**
- Penetrating items - steel, ferrous or copper pipes or steel conduits
- Concrete/masonry wall or floor assembly max. 6” diameter, max 144 sq. in. - concrete, grout or mortar OK
- Material in annular space prevents passage of flame or hot gases.

### Membrane Penetrations

**R302.4**
- 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

### 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
- Ducts
  - 26 gauge or other approved material

### Other Penetrations

**R302.5.3**
- Must be protected as required by Section R302.11, Item 4.
- An approved material to resist the free passage of flame and products of combustion.
- The material filling this annular space shall not be required to meet the ASTM E 136 requirements.
### Separation Required

Table R302.6

#### Dwelling/Garage Separation

<table>
<thead>
<tr>
<th>Separation</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the residence and attic</td>
<td>Not less than 1/2-inch gypsum board or equivalent applied to the garage side</td>
</tr>
<tr>
<td>From habitable rooms above the garage</td>
<td>Not less than 1/2-inch gypsum board or equivalent</td>
</tr>
<tr>
<td>Structural supporting flooring assemblies used for separation required by this section</td>
<td>Not less than 1/2-inch gypsum board or equivalent</td>
</tr>
</tbody>
</table>

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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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### Table R302.6

Dwelling/Garage Separation

- Garages located less than 3 feet from a dwelling unit on the same lot
- Garages located less than 1/2-inch gypsum board or equivalent applied to the interior side of interior walls that are within this area

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### 302.9

Interior Finishes

- Flame spread = 200 max.
- Smoke Developed = 450 max.
- Tested per ASTM E84 / UL 723 – Steiner Tunnel

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Insulation

R302.10

Flame-spread index not to exceed 25 with an accompanying smoke-developed index not to exceed 450.

Insulating materials, where tested in accordance with the requirements of this section, shall include facings, where used, such as vapor retarders, vapor permeable membranes and similar coverings.

Except:
- 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

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:
  - 1.1. Vertically at the ceiling and floor levels.
  - 1.2. Horizontally at intervals not exceeding 10 feet.

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

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

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

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

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.
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.

R302.11.1.2 Unfaced fiberglass
- Unfaced fiberglass batt insulation used as fireblocking shall fill the entire cross section of the wall cavity to a minimum height of 16 inches measured vertically.
- When piping, conduit or similar obstructions are encountered, the insulation shall be packed tightly around the obstruction.

R302.11.1.3 Loose-fill insulation material
- Loose-fill insulation material shall not be used as a fireblock unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.

Draftstopping Required R302.12
- Usable space above & below
  - Suspended ceiling, open-web trusses
  - No concealed area exceeds 1,000 s.f., divided equally
R302.12.1 Draftstopping Materials

- 1/2-inch gypsum board
- 3/8-inch wood structural panels
- other approved materials adequately supported
- Must be installed parallel to the floor framing members unless otherwise approved by the building official.
- The integrity of the draftstops shall be maintained.

R302.13 Fire Protection of Floors

- Non FR floor assemblies:
  - shall be provided with
    - ½" Gypsum Board
    - 5/8" Wood Structural Panel
    - Or equivalent...
  - on the underside of the floor framing member

R302.13 – Fire Protection of Floors

- Exception 1
- Floor assemblies located directly over a space protected by fire sprinklers
  - P2904
  - NFPA 13d
R302.13 – Fire Protection of Floors

**Exception 2**
- Floor assemblies located directly over a crawl space not intended for storage or for the installation of fuel-fired or electric heating appliances
- Intended to recognize conditions where low fuel loading will occur.

**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.

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

R302.14
Combustible insulation clearance

- Combustible insulation must be separated a minimum of 3 inches from recessed luminaires, fan motors and other heat-producing devices.
- Exception: Where devices are listed for lesser clearances.
Natural light & ventilation

R303.1

- Habitable Rooms
  - Aggregate glazing area of 8 percent of floor area of room
  - Natural ventilation via openings to the outdoor air shall be 4 percent of the floor area.

Light, Ventilation & Heating

R303.1 Exceptions

- 1. The glazed areas need not be openable where an egress opening is not required and a whole-house mechanical ventilation system is installed per Section M1507.

- 2. The glazed areas need not be installed in rooms where Exception 1 above is satisfied and artificial light is provided capable of producing an average illumination of 6 footcandles over the area of the room at a height of 30 inches above the floor level.

- 3. Use of sunroom and patio covers shall be permitted for natural ventilation if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.
R303.2 Adjoining rooms

- For the purpose of determining light and ventilation requirements, any room can be considered as a portion of an adjoining room when at least 1/2 of the area of the common wall is open and unobstructed and provides an opening of not less than 1/10 of the floor area of the interior room but not less than 25 square feet.

R303.2, Exception

- Openings shall be permitted to open into a sunroom with thermal isolation or a patio cover, provided that there is an openable area between the adjoining room and the sunroom or patio cover of not less than 1/10 of the floor area of the interior room but not less than 20 square feet.
- The minimum openable area to the outdoors shall be based upon the total floor area being ventilated.

R303.3 Bathrooms

- Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet, one-half of which must be openable.
- Exception: Not required where artificial light and a local exhaust system in accordance with Section M1507. Exhaust air from the space shall be exhausted directly to the outdoors.

R303.4 Mechanical Ventilation Required

- Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c (50 Pa) in accordance with Section N1102.4.1.2, the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.
R303.5.1  Intake openings

- Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code.
- Where a source of contaminant is located within 10 feet of an intake opening, such opening shall be located a minimum of 3 feet below the contaminant source.
- For the purpose of this section, the exhaust from dwelling unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.

R303.5.2  Exhaust openings

- Exhaust air shall not be directed onto walkways.

R303.6  Outside opening protection

- Air exhaust and intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles having a minimum opening size of 1/4 inch and a maximum opening size of 1/2 inch, in any dimension.
- Openings shall be protected against local weather conditions.
- Outdoor air exhaust and intake openings shall meet the provisions for exterior wall opening protectives in accordance with this code.

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.
- There shall be a wall switch at each floor level to control the light source where the stairway has six or more risers.
R303.8 Exterior stairway illumination

- Exterior stairways shall be provided with an artificial light source located at the top landing of the stairway.
- 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.

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

R303.9.1 Sunroom additions

- Required glazed openings shall be permitted to open into sunroom additions or patio covers that abut a street, yard or court if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening, and the ceiling height of the sunroom is not less than 7 feet.

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
  - Portable space heaters not permitted to be used for required heating
Minimum Room Areas
R304

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

R304.4 Height effect on room area

- Portions of a room with a sloping ceiling measuring less than 5 feet or a furred ceiling measuring less than 7 feet from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required habitable area for that room.

R305.1 Minimum ceiling height

- 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

R305.1 Exception 1.

- Sloped ceilings - at least 90% of the required floor area must have a ceiling height of at least 7 feet and no portion of the required floor area may have a ceiling height of less than 5 feet
R305.1 Minimum ceiling height

**Exception 2**
- The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose.
- A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches above an area of not less than 30 inches by 30 inches at the showerhead.

**R305.1.1 Basements**
- Portions of basements that do not contain habitable space, hallways, bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches.
- Exception: Beams, girders, ducts or other obstructions may project to within 6 feet 4 inches of the finished floor.

**R305.1 Minimum ceiling height**

**Exception 3**
- Beams, girders, ducts or other obstructions in basements containing habitable space shall be permitted to project to within 6 feet 4 inches of the finished floor.

**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
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.

R307.2
Bathtub and shower spaces

- Bathtub and shower floors and walls above bathtubs with installed shower heads and in shower compartments shall be finished with a nonabsorbent surface.
- Such wall surfaces shall extend to a height of not less than 6 feet above the floor.

R308
Labeling Safety Glazing

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

R308.3.1

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

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:
  1. Where the glazing is within 24 inches of either side of the door in the plane of the door in a closed position.
  2. Where the glazing is on a wall 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.
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.

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 1½ 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.

R308.4.5 – Glazing and Wet Surfaces

- Glazing in walls, enclosures, or fences containing OR FACING:
  - Bathtubs
  - Showers
  - Whirlpools, saunas, steam rooms, indoor and outdoor pools

  Shall be safety glazing if less than 60” AFF and 60” or less measured horizontally and in a straight line, from the water's edge.
R308.4.5 – Glazing and Wet Surfaces

Exception:
Glazing that is more than 60” measured horizontally and in a straight line 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.

R308.4.6 – Glazing Adjacent to Stairs and Ramps

- Changes hazardous location of glazing along stairs to 36” from walking surfaces of stairways, landings between flights, and ramps.
- Exception: Glazing protected by a guard complying with Section R312 and the plane of the glass is more than 18 inches from the guard.

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.
- Exception: Glazing protected by a guard complying with Section R312 and the plane of the glass is more than 18 inches from the guard.

R308.6.2
Skylight Permitted materials

- The following types of glazing may be used:
  1. Laminated glass with a minimum 0.015-inch polyvinyl butyral interlayer for glass panes 16 square feet or less in area located such that the highest point of the glass is not more than 12 feet above a walking surface or other accessible area; for higher or larger sizes, the minimum interlayer thickness shall be 0.030 inch.
  2. Fully tempered glass.
  3. Heat-strengthened glass.
  4. Wired glass.
  5. Approved rigid plastics.
R308.6.3 Screens, general

- For fully tempered or heat-strengthened glass, a retaining screen meeting the requirements of Section R308.6.7 shall be installed below the glass, except for fully tempered glass that meets either condition listed in Section R308.6.5.

R308.6.4 Screens with multiple glazing

- When the inboard pane is fully tempered, heat-strengthened or wired glass, a retaining screen meeting the requirements of Section R308.6.7 shall be installed below the glass, except for either condition listed in Section R308.6.5.
- All other panes in the multiple glazing may be of any type listed in Section R308.6.2.

R308.6.5 Screens not required

- Screens shall not be required when fully tempered glass is used as single glazing or the inboard pane in multiple glazing and either of the following conditions are met:
  1. Glass area 16 square feet or less. Highest point of glass not more than 12 feet above a walking surface or other accessible area, nominal glass thickness not more than 3/16 inch, and (for multiple glazing only) the other pane or panes fully tempered, laminated or wired glass.
  2. Glass area greater than 16 square feet. Glass sloped 30 degrees or less from vertical, and highest point of glass not more than 10 feet above a walking surface or other accessible area.

R308.6.8 Curbs for skylights

- All unit skylights installed in a roof with a pitch flatter than three units vertical in 12 units horizontal shall be mounted on a curb extending at least 4 inches above the plane of the roof unless otherwise specified in the manufacturer's installation instructions.
R308.6.9 .
Testing and labeling

- Unit skylights and tubular daylighting devices shall be tested by an approved independent laboratory, and bear a label identifying manufacturer, performance grade rating and approved inspection agency to indicate compliance with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440.

R309.1
Garage floor surface

- Garage floor surfaces shall be of approved noncombustible material.
- The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

R309.2
Carports

- Carports shall be open on at least two sides.
- Carport floor surfaces shall be of approved noncombustible material.
- Carports not open on at least two sides shall be considered a garage and shall comply with the provisions of this section for garages.
- Exception: Asphalt surfaces shall be permitted at ground level in carports.
- The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

R309.3
Flood hazard areas

- For buildings located in flood hazard areas as established by Table R301.2(1), garage floors shall be:
  1. Elevated to or above the design flood elevation; or
  2. Located below the design flood elevation provided they are at or above grade on at least one side, are used solely for parking, building access or storage, meet the requirements of Section R322 and are otherwise constructed in accordance with this code.
R309.4
Automatic garage door openers

- Automatic garage door openers, if provided, shall be listed and labeled in accordance with UL 325.

R309.5
Fire sprinklers

- Private garages shall be protected by fire sprinklers where the garage wall has been designed based on Table R302.1(2), Footnote a, (Subdivision 0’ lot line)
- Connected to an automatic sprinkler system that complies with Section P2904.
- Must be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft².
- Garage doors not considered obstructions with respect to sprinkler placement.

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.
- Exception: Storm shelters and basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet.

- Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.
R310.1 Exceptions
Emergency Escape/Rescue

1. Storm shelters and basements used only to house mechanical equipment not exceeding a total floor area of 200 square feet

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 complying with ASTM F 2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening.

R310.2.1 - Minimum opening area

- 5.7 square feet net clear opening
  - 5 square feet at grade floor (w/in 44")
  - > 24 inches height
  - > 20 inches width
- Must be obtained by the normal operation of the emergency escape and rescue opening from the inside.
R310.2.2
Window sill height

- Where a window is provided as the emergency escape and rescue opening, it shall have a sill height of not more than 44 inches above the floor;
- Where the sill height is below grade, it shall be provided with a window well in accordance with Section R310.2.3.

R310.2.3
Window wells

- Minimum horizontal area of the window well be 9 square feet
- Minimum horizontal projection and width of 36 inches.
- Must allow the emergency escape and rescue opening to be fully opened.
- Exception: Ladders & steps can encroach 6”.

R310.2.3.1
Ladder and steps

- Window wells with a vertical depth greater than 44 inches shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position.
  - Not required to comply with Sections R311.7 and R311.8.
  - Ladders or rungs - inside width of at least 12 inches
  - Must project at least 3 inches from the wall
  - Must be spaced not more than 18 inches on center vertically for the full height of the window well.

R310.2.3.2
Drainage

- Window wells shall be designed for proper drainage by connecting to the building’s foundation drainage system required by Section R405.1 or by an approved alternative method.
  - Exception: A drainage system for window wells is not required when the foundation is on well-drained soil or sand-gravel mixture soils according to the United Soil Classification System, Group I Soils, as detailed in Table R405.1.
R310.2.4 Emergency escape windows under decks and porches

- Escape and rescue window must open fully and the path is not less than 36 inches in height to yard or court.

R310.2.5 Replacement windows

Replacement windows installed in buildings meeting the scope of this code shall be exempt from the maximum sill height requirements of Section R310.2.2 and the requirements of Section R310.2.1, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window is of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement window is not part of a change of occupancy.

R310.3 Emergency Escape/Rescue Doors (2018)

- Where a door is provided as the required emergency escape and rescue opening, it shall be permitted to be a side-hinged door or a slider.
- Where the opening is below the adjacent ground elevation, it shall be provided with an area well.
R310.3.1 Minimum door opening size

- The minimum net clear height opening for any door that serves as an emergency and escape rescue opening shall be in accordance with Section R310.2.1. (Egress openings)

R310.3.2 Area wells (2018)

Area wells shall have a width of not less than 36 inches. The area well shall be sized to allow the emergency escape and rescue door to be fully opened.

R310.3.2.1 Ladders and steps

Required if area well greater than 44” deep
Need not comply with R311.7 (Stairways)

Ladders or rungs
- Inside ≥ 12”
- Project ≥ 3”
- Rung spacing ≤ 18”

R310.4 Bars, grilles, covers and screens

- Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosures, or window wells that serve such openings, provided:
  - Minimum net clear opening size complies with Sections R310.1.1 to R310.1.3.
  - Such devices are releasable or removable from the inside without the use of a key, tool, special knowledge or force greater than that which is required for normal operation of the escape and rescue opening.
R310.5  Dwelling additions

- Where dwelling additions occur that contain sleeping rooms, an emergency escape and rescue opening shall be provided in each new sleeping room.
- Where dwelling additions occur that have basements, an emergency escape and rescue opening shall be provided in the new basement.

R310.5  Dwelling additions

- Exceptions:
  1. An emergency escape and rescue opening is not required in a new basement that contains a sleeping room with an emergency escape and rescue opening.
  2. An emergency escape and rescue opening is not required in a new basement where there is an emergency escape and rescue opening in an existing basement that is accessible from the new basement.

R310.6  Alterations or repairs of existing basements

- An emergency escape and rescue opening is not required where existing basements undergo alterations or repairs.
- Exception: New sleeping rooms created in an existing basement shall be provided with emergency escape and rescue openings in accordance with Section R310.1.

R311.1  Means of Egress

- All dwellings 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.
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.

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.

Floors and Landings at EXTERIOR Doors - R311.3

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

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 ¼:12
R311.3
Small Balcony Exception

- Exterior balconies less than 60 square feet and only accessible from a door are permitted to have a landing less than 36 inches measured in the direction of travel.

R311.3.1 Floor Elevation at REQUIRED EGRESS Doors

- Landings or finished floors at the required egress door shall not be more than 1 ½ inches lower than the top of the threshold.

- Exception: The landing or floor on the exterior side shall not be more than 7 ¾ inches below the top of the threshold provided the door does not swing over the landing or floor.

- 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.
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 ¾ inches below the top of the threshold.

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.

R311.4 Vertical Egress

- Egress from habitable levels including habitable attics and basements not provided with an egress door shall be by a ramp or a stairway.

Attachment R311.5.1

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

R311.6

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

Stairway Width

R311.7.1

- 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

Stairway Headroom

R311.7.2

- Exception: Where the nosings of treads at the side of a flight extend under the edge of a floor opening through which the stair passes, the floor opening shall be allowed to project horizontally into the required headroom a maximum of 4 3/4 inches.
Vertical Rise

311.7.3

- A flight of stairs shall not have a vertical rise larger than 151 inches between floor levels or landings.

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.

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.
- 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.
R311.7.5.1
Risers

Exceptions:

1. The opening between adjacent treads is not limited on spiral stairways.
2. The riser height of spiral stairways shall be in accordance with Section R311.7.10.1.

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.

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 from the side where the winders are narrower).
- Minimum tread depth of 6 inches at any point within the clear width of the stair.
- Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8 inch.
- Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch of the rectangular tread depth.

R311.7.5.3
Nosings

- The radius of curvature at the leading edge of the tread shall be no greater than 9/16 inch
- A nosing not less than 3/4 inch but not more than 1 ¼ inches shall be provided on stairways with solid risers
- Beveling of nosing shall not exceed 1/2 inch
- Exception where 11” tread provided.
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

R311.7.7

Stairway walking surface

- The walking surface of treads and landings of stairways shall be sloped no steeper than one unit vertical in 48 inches horizontal.

Handrails

R311.7.8

- At least one side of each continuous run of treads or flight 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

R311.7.8.3 Grip-size

- Type I.
- Circular cross section shall have an outside diameter of at least 1¼ inches and not greater than 2 inches.
- If not circular, must have a perimeter dimension of at least 4 inches and not greater than 6¼ inches with a maximum cross section of dimension of 2¼ inches.
- Edges - minimum radius of 0.01 inch
R311.7.8.3 Grip-size

- Type II.
- Perimeter greater than 6 ¼ inches shall have a graspable finger recess area on both sides of the profile.
- The finger recess shall begin within a distance of ¾ 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 maximum of 1 ¾ inches below the tallest portion of the profile.
- The minimum width of the handrail above the recess shall be 1 ¼ inches to a maximum of 2 ¾ inches.
- Edges - minimum radius of 0.01 inch.

R311.7.10.1 Spiral stairways

- Spiral stairways are permitted, provided that the clear width at and below the handrail is not less than 26 inches and the walkline radius is not greater than 24 ½ inches.
- Each tread shall have a depth of not less than 6 ¾ inches at the walkline. All treads shall be identical, and the rise shall be not more than 9 ½ inches. Headroom shall be not less than 6 feet 6 inches.

R202 Definitions

ALTERNATING TREAD DEVICE:

- A device that has a series of steps between 50 and 70 degrees from horizontal, usually attached to a center support rail in an alternating manner so that the user does not have both feet on the same level at the same time.

R311.7.11 Alternating tread devices

- Alternating tread devices shall not be used as an element of a means of egress.
- Alternating tread devices shall be permitted provided that the required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required.
- The clear width at and below the handrails shall be not less than 20 inches.
R311.7.12  Ships ladders

- Ships ladders shall not be used as an element of a means of egress.
- Ships ladders shall be permitted provided that a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required.
- The clear width at and below the handrails shall be not less than 20 inches.

R311.7.12.1 Treads of ships ladders

- Treads shall have a depth of not less than 5 inches.
- The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than 8½ inches. The riser height shall be not more than 9 ½ inches.

R311.7.12.2 Handrails of ships ladders

- Handrails shall be provided on both sides of ships ladders and shall comply with Sections R311.7.8.2 to R311.7.8.4.
- Handrail height shall be uniform, not less than 30 inches and not more than 34 inches.

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.
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.

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 1/2 inches between the wall and the handrails.

R312
Guards

- Guards shall be located along open-sided walking surfaces, including 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.

R312.1.2
Height

- 36 inches high measured vertically above the adjacent walking surface or the line connecting the leading edges of the treads.
- Exceptions:
  - 34” along the side of stairs.
  - Serving as a handrail can be 34-38 inches along stairs.
Guard Opening Limitations

R312.2

- 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

R312.2.1 Window sills

- In dwelling units, where the top of the sill 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:

  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.

  2. Operable windows that are provided with window fall prevention devices that comply with ASTM F 2090.
R312.2.1 Window sills

3. Operable windows that are provided with window opening control devices that comply with Section R312.2.2.

R312.2.2 Window opening control devices

- Window opening control devices shall comply with ASTM F 2090.
- The window opening control device, after operation to release the control 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 Section R310.2.1.

R313.1 Automatic fire sprinklers

- Required in all new one- and two-family dwellings and townhouses
- Must be designed in accordance with P2904 or NFPA 13D

P2904 Residential Sprinkler Design

- Prescriptive Residential Sprinkler Provisions
- Intended to be installed by
  - Plumber
  - Homeowner
R314.1
Smoke Alarm Listings

- Smoke alarms must comply with NFPA 72
- Smoke alarms must be listed in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be listed in accordance with UL 217 and UL 2034.

Alterations, repairs and additions
R314.2.2

- When alterations, repairs or additions requiring a permit occur, or when one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings.

Alterations, repairs and additions
R314.2.2 Exceptions

- Work involving the exterior surfaces of dwellings
- Plumbing and mechanical exemptions for:
  - Installation
  - Repairs
  - Alterations

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
**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.

**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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Contains small amount of americium-241
Creates a small electrical current which is interrupted when smoke enters the chamber
Will detect a small amount of smoke produced by fast flaming fires
Like cooking, or fires fueled by paper or flammable liquids

Contain a light source in a light-sensitive electric sensor, which are positioned at 90-degree angles to one another. Normally, light from the light source shoots straight across and misses the sensor. When smoke enters the chamber, it scatters the light, which then hits the sensor and triggers the alarm.
Typically respond faster to a fire in its early, smoldering stage
R314.4 Interconnection (2018)

Removed the exception:
Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without the removal of interior finishes.

R314.5 Combination alarms

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

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

R314.7 Fire alarm systems

- Must comply with IRC and the household fire warning equipment provisions of NFPA 72.
- Detectors listed in accordance with UL 268.
- Detectors installed in the locations specified in Section R314.3.
- Must be a permanent fixture of the occupancy, owned by the homeowner.
- Combination smoke and carbon monoxide detectors shall be permitted if listed in accordance with UL 268 and UL 2075.
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.
  - The dwelling unit contains a fuel-fired appliance.
  - The dwelling unit has an attached garage with an opening that communicates with the dwelling unit.

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R315.2.2 Alterations, repairs and additions

- Where alterations, repairs or additions requiring a permit occur, or where one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with carbon monoxide alarms located as required for new dwellings.

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R315.2.2 Alterations, repairs and additions

- Exceptions:
  - Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacment of windows or doors, or the addition of a porch or deck, is exempt from the requirements of this section.
  - Installation, alteration or repairs of plumbing or mechanical systems are exempt from the requirements of this section.
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.

R315.4 Combination alarms
- Combination carbon monoxide and smoke alarms shall be permitted to be used in lieu of carbon monoxide alarms.

R315.5 Power source
- Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and, where primary power is interrupted, shall receive power from a battery.
- Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

R315.5 Interconnectivity (2018)

When more than one required
Shall be interconnected

Exception:
Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without the removal of interior finishes.
R315.6 Power source

- Exceptions:
  1. Carbon monoxide alarms shall be permitted to be battery operated where installed in buildings without commercial power.
  2. Carbon monoxide alarms installed in accordance with Section R315.2.2 shall be permitted to be battery powered.

R315.7 Carbon monoxide detection systems

- Carbon monoxide detection systems shall be permitted to be used in lieu of carbon monoxide alarms and shall comply with Sections R315.6.1 through R315.6.4.
  - Listing
  - Location
  - Permanent fixture
  - Combination detectors

R316.2 – Foam Plastic Labeling and identification

- Packages and containers of foam plastic insulation and foam plastic insulation components delivered to the job site shall bear the label of an approved agency showing the manufacturer's name, the product listing, product identification and information sufficient to determine that the end use will comply with the requirements.

R316.3 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.
R316.4 Thermal barrier

- Unless otherwise allowed in Section R316.5 or Section R316.6, foam plastic shall be separated from the interior of a building by an approved thermal barrier of minimum ½ inch gypsum wallboard 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.

R316.5.1 Masonry or concrete construction

- The thermal barrier is not required in a masonry or concrete wall, floor or roof when the foam plastic insulation is separated from the interior of the building by a minimum 1-inch thickness of masonry or concrete.

R316.5.2 Roofing

- The thermal barrier is not required when the foam plastic in a roof assembly or under a roof covering is installed in accordance with the code and the manufacturer's installation instructions and is separated from the interior of the building by tongue-and-groove wood planks or wood structural panel sheathing not less than 15/32 inch thick bonded with exterior glue and identified as Exposure 1, with edges supported by blocking or tongue-and-groove joints or an equivalent material.
- The smoke-developed index for roof applications shall not be limited.

R316.5.3 Attics

- The thermal barrier is not required where all of the following apply:
  1. Attic access is required by Section R807.1.
  2. The space is entered only for purposes of repairs or maintenance.
  3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
     - 1½-inch-thick mineral fiber insulation;
     - ¼-inch-thick wood structural panels;
     - 3/8-inch particleboard;
     - ¼-inch hardboard;
     - ⅝-inch gypsum board;
     - Corrosion-resistant steel having a base metal thickness of 0.016 inch;
     - 1 ½-inch-thick cellulose insulation.
- The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.
R316.5.4  Crawl spaces

- The thermal barrier is not required where all of the following apply:
  1. Crawlspace access is required by Section R408.4.
  2. Entry is made only for purposes of repairs or maintenance.
  3. The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
     3.1 1 1/2-inch-thick mineral fiber insulation;
     3.2 1/4-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.

- The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.

R316.5.5 & R316.5.6  Doors

- Foam-filled exterior doors are exempt from the requirements of Sections R316.3 and R316.4.

- Foam-filled garage doors in attached or detached garages are exempt from the requirements of Sections R316.3 and R316.4.

R316.5.7  Foam backer board

- The thermal barrier is not required where siding backer board foam plastic insulation has a maximum thickness of 0.5 inch and a potential heat of not more than 2000 Btu per square foot when tested in accordance with NFPA 259 provided that:
  1. The foam plastic insulation is separated from the interior of the building by not less than 2 inches of mineral fiber insulation;
  2. The foam plastic insulation is installed over existing exterior wall finish in conjunction with re-siding; or
  3. The foam plastic insulation has been tested in accordance with Section R316.6.

R316.5.8  Re-siding

- The thermal barrier specified in Section R316.4 is not required where the foam plastic insulation is installed over existing exterior wall finish in conjunction with re-siding provided the foam plastic has a maximum thickness of 0.5 inch and a potential heat of not more than 2000 Btu per square foot when tested in accordance with NFPA 259.
R316.5.9 Interior trim

• The thermal barrier specified in Section R316.4 is not required for exposed foam plastic interior trim, provided all of the following are met:
  1. The minimum density is 20 pounds per cubic foot.
  2. The maximum thickness of the trim is ½ inch and the maximum width is 8 inches.
  3. The interior trim shall not constitute more than 10 percent of the aggregate wall and ceiling area of any room or space.
  4. The flame spread index does not exceed 75 when tested per ASTM E 84 or UL 723. The smoke-developed index is not limited.

R316.5.10 Interior finish

• Foam plastics shall be permitted as interior finish where approved in accordance with Section R316.6
• Foam plastics that are used as interior finish shall also meet the flame spread index and smoke-developed index requirements of Sections R302.9.1 and R302.9.2.

R316.5.11 Sill plates and headers

• Foam plastic shall be permitted to be spray applied to a sill plate and header without the thermal barrier subject to all of the following:
  1. The maximum thickness of the foam plastic shall be 3½ inches.
  2. The density of the foam plastic shall be in the range of 0.5 to 2.0 pounds per cubic foot.
  3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723.

R316.5.12 Sheathing

• Foam plastic insulation used as sheathing shall comply with Section R316.3 and Section R316.4.
• Where the foam plastic sheathing is exposed to the attic space at a gable or kneewall, the provisions of Section R316.5.3 shall apply.
R316.5.13 Floors

- The thermal barrier is not required to be installed on the walking surface of a structural floor system that contains foam plastic insulation when the foam plastic is covered by a minimum nominal ½-inch-thick wood structural panel or equivalent.
- The thermal barrier is required on the underside of the structural floor system that contains foam plastic insulation when the underside of the structural floor system is exposed to the interior of the building.

R316.6 Specific approval

- Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically approved on the basis of one of the following approved tests:
  - NFPA 286 with the acceptance criteria of Section R302.9.4,
  - FM4880,
  - UL 1040, or UL 1715, or
  - fire tests related to actual end-use configurations.
- Approval shall be based on the actual end-use configuration and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use.
- Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

R302.9.4 Alternative test method

- As an alternative to having a flame spread index of not greater than 250 and a smoke-developed index of not greater than 45, wall and ceiling finishes shall be permitted to be tested in accordance with NFPA 286. Materials tested in accordance with NFPA 286 shall meet the following criteria:
  - The interior finish shall comply with the following:
    1. During the 40 kW exposure, flames shall not spread to the ceiling.
    2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling, as defined in NFPA 286, wall and ceiling finishes shall be permitted to be tested in accordance with NFPA 286. Materials tested in accordance with NFPA 286 shall meet the following criteria:
  - The interior finish shall comply with the following:
    1. During the 40 kW exposure, flames shall not spread to the ceiling.
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    2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling, as defined in NFPA 286, wall and ceiling finishes shall be permitted to be tested in accordance with NFPA 286. Materials tested in accordance with NFPA 286 shall meet the following criteria:
Protection Against Decay

R317

- Approved species of wood or treated lumber required if:
  - Joists <18" to ground
  - Beams <12" to ground
  - Wood framing members resting 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

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”

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

R317.1.3

Geographical areas

- In geographical areas where experience has demonstrated a specific need, approved naturally durable or pressure-preservative-treated wood shall be used for those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances when 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.
R317.1.3 Geographical areas

- Depending on local experience, such members may include:
  - 1. Horizontal members such as girders, joists and decking.
  - 2. Vertical members such as posts, poles and columns.
  - 3. Both horizontal and vertical members.

R317.1.4 Wood columns

- Wood columns shall be approved wood of natural decay resistance or approved pressure-preservative-treated wood.
  - Exceptions:
    - 1. Columns exposed to the weather or in basements when supported by concrete piers or metal pedestals projecting 1 inch above a concrete floor or 6 inches above exposed earth and the earth is covered by an approved impervious moisture barrier.
    - 2. Columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building when supported by concrete or metal pedestals at a height more than 8 inches from exposed earth and the earth is covered by an impervious moisture barrier.

R317.1.5 Exposed glued-laminated timbers

- The portions of glued-laminated timbers that form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave or similar covering shall be pressure treated with preservative, or be manufactured from naturally durable or preservative-treated wood.

R317.2 Quality mark

- Lumber and plywood required to be pressure-preservative-treated in accordance with Section R318.1 shall bear the quality mark of an approved inspection agency that maintains continuing supervision, testing and inspection over the quality of the product and that has been approved by an accreditation body that complies with the requirements of the American Lumber Standard Committee treated wood program.
R317.3.1 - Fasteners for preservative-treated wood

- Fasteners, including nuts and washers, for preservative-treated wood shall be of hot-dipped, zinc-coated galvanized steel, stainless steel, silicon bronze or copper.
- Coating types and weights for connectors in contact with preservative-treated wood shall be in accordance with the connector manufacturer’s recommendations.
- In the absence of manufacturer’s recommendations, a minimum of ASTM A 653 type G185 zinc-coated galvanized steel, or equivalent, shall be used.

Exceptions:
1. ½-inch-diameter or greater steel bolts.
2. Fasteners other than nails and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.
3. Plain carbon steel fasteners in SBX/DOT and zinc borate preservative-treated wood in an interior, dry environment shall be permitted.

R317.4 - Plastic Composites

- New definition
- Decks and exterior structures
- ASTM D 7032
- installed according to the manufacturer’s instructions

Protection Against Termites R318

- In areas favorable to termite damage as established by Table R301.2(1), methods of protection shall be provided.
R319.1 Address Numbers

- 4” Height
- ½” Stroke
- Contrasting background
- Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response
- Address identification shall be maintained

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.

R320.1.1 Guestrooms

- A dwelling with guestrooms shall comply with the provisions of Chapter 11 of the International Building Code for Group R-3.
- For the purpose of applying the requirements of Chapter 11 of the International Building Code, guestrooms shall be considered to be sleeping units.
- Exception: Owner-occupied lodging houses with five or fewer guestrooms constructed in accordance with the International Residential Code are not required to be accessible.

R321 Elevators and platform lifts

- Passenger elevators shall comply with ASME A17.1
- Platform lifts shall comply with ASME A18.1
- Elevators or platform lifts that are apart of an accessible route shall comply with ICC A117.1
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) 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.

R323

Storm Shelters

- This section applies to the construction of storm shelters when constructed as separate detached buildings or when constructed as safe rooms within buildings for the purpose of providing safe refuge from storms that produce high winds, such as tornados and hurricanes.
- In addition to other applicable requirements in this code, storm shelters shall be constructed in accordance with ICC/NSSA-500.

ICC 500 – Storm Shelters

- 2009 IRC for construction of storm shelters.

324

Solar energy systems

- Solar energy systems shall comply with the provisions of this section.
R324.2 Solar thermal systems
- Solar thermal systems shall be designed and installed in accordance with Chapter 23 and the International Fire Code.

R324.3 Photovoltaic systems
- Photovoltaic systems shall be designed and installed in accordance with Sections R324.3.1 through R324.7.2.5 and NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741.
- Systems connected to the utility grid shall use inverters listed for utility interaction.
- Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703.

R324.4 Rooftop-mounted photovoltaic systems
- Rooftop-mounted photovoltaic panel systems installed on or above the roof covering shall be designed and installed in accordance with Section R907.

R324.4.1 Roof live load
- Roof structures that provide support for photovoltaic panel systems shall be designed for applicable roof live load.
- The design of roof structures need not include roof live load in the areas covered by photovoltaic panel systems.
- Portions of roof structures not covered by photovoltaic panels shall be designed for roof live load.
- Roof structures that provide support for photovoltaic panel systems shall be designed for live load, LR, for the load case where the photovoltaic panel system is not present.
R324.5 Building-integrated photovoltaic systems

- Building-integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section R905.
- Photovoltaic shingles shall comply with Section R905.16.

R324.6 Roof access and pathways (2018)

Shall be provided

Exceptions:
1. Detached non-habitable structures, carports, detached garages
2. AHJ determined roof top no roof top operations
3. Roof pitch 2/12 and less

R324.6.1 Pathways (2018)

Two pathways, on separate roof planes from lowest roof edge to ridge and not less than 36 inches wide.
One pathway shall be provided on the street or driveway side of the roof.
Each roof plane with a photovoltaic array:
Pathway not less than 36 inches wide shall be provided from the lowest roof edge to ridge on the same roof plane as the photovoltaic array,
on an adjacent roof plane, or straddling the same and adjacent roof planes.
Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.
R324.6.2.2 Emergency escape and rescue opening (2018)

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

R324.7 Ground-mounted photovoltaic systems

- Ground-mounted photovoltaic systems shall be designed and installed in accordance with Section R301.
- Ground-mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

R325.2 Mezzanines

- The clear height above and below mezzanine floor construction shall be not less than 7 feet.

R325.3 Area limitation

- The aggregate area of a mezzanine or mezzanines shall be not greater than one-third of the floor area of the room or space in which they are located.
- The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the mezzanine is located.
R325.3 Area limitation 2018

Exception: The aggregate area of a mezzanine located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904 shall not be greater than one-half of the floor area of the room, provided that the mezzanine meets all of the following requirements:

1. Except for enclosed closets and bathrooms, the mezzanine is open to the room in which such mezzanine is located.
2. The opening to the room is unobstructed except for walls not more than 42 inches in height, columns and posts.
3. The exceptions to Section R325.5 are not applied.

R325.4 Means of egress

- The means of egress for mezzanines shall comply with the applicable provisions of Section R311.

R325.5 Openness

- Mezzanines shall be open and unobstructed to the room in which they are located except for walls not more than 36 inches in height, columns and posts.
  - Exceptions:
    1. Mezzanines or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the mezzanine area.
    2. In buildings that are not more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with NFPA 13R or NFPA 13D, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.

R326 Swimming pools, spas and hot tubs

- The design and construction of pools and spas shall comply with the International Swimming Pool and Spa Code.
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