

2021 IRC - Part 1 Handout

Wisdom and Associates, Inc.

Chapter 2 - Definitions

- **Approved**—Acceptable to the building official. When something in the code is said to be approved by the building official, it means there is some potential leeway or room for interpretation in the code and it is up to the inspector to decide.
- **Balanced Ventilation** - This refers to a mechanical ventilation system that supplies and exhausts ventilation air at the same time, and that the flows are within 10% of each other.
- **Cripple Wall Clear Height** - Vertical height from the top of the foundation to the underside of the floor framing above.
- **Grade Floor Emergency Escape and Rescue Opening** - Replaces “Grade Floor Opening”, A definition for a grade floor emergency escape and rescue opening has been added to replace a previous definition of just grade floor opening, and goes on to clarify that this definition is for egress openings where the bottom of the clear opening is not more than 44 inches above or below the finished ground level adjacent to the opening. There is a small but important verbiage change here from sill height to clear opening, which changes how the measurement is made. The 44 inches measurement is no longer to the sill, but to the clear open area of the window.
- **Gypsum Sheathing** - Enhanced water resistance for exterior surfaces
- **Gypsum Wallboard** - Interior surfacing wall board
- **Intermodal Shipping Container** - Six sided steel cargo container, these are more commonly referred to in Alaska as connexes.
- **Live/Work Unit** - Dwelling unit with commercial work space
- **Sleeping Unit** - A single unit that provides rooms or spaces for one or more persons, includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.
- **Townhouse** - Three or more townhouse units
- **Townhouse unit** - Attached single family dwelling from foundation to roof, open on two sides

Chapter 3 - Building Planning

Wind Speed (R301.2.1.3)

- More or less than 140 mph can greatly affect design. Find your windspeed at <http://windspeed.atcouncil.org/>
- Much of coastal Alaska in “wind design region”, must refer to alternate documents for these components
- The IRC is based on “ultimate” wind speed, many reference documents use “nominal” wind speed. There is a table to convert

Wind Speed Conversion											
Ultimate Wind Speed (IRC)	110	115	120	130	140	150	160	170	180	190	200
Nominal Wind Speed	85	89	93	101	108	116	124	132	139	147	155

Wind Exposure Category (R301.2.1.4)

- Wind exposure category of exposure affects design, each wind direction considered. Locations between two categories must use the higher exposure
- Category B: Urban, suburban, wooded areas, multiple home neighborhoods. This is the default exposure
- Category C: Open terrain, scattered obstructions less than 30' high, flat open country, grasslands
- Category D: Flat, unobstructed areas, or wind over open water or flats 5000 feet or more

Topographic Wind Effect (R301.2.1.5)

- Buildings on the top half of a hill, ridge or escarpment can experience wind speed-up. Must take into account for wind design. Required conditions:
 1. Average slope 10% or greater
 2. The hill, ridge or escarpment is 60 feet or greater in height for Exposure B, 30 feet or greater in height for Exposure C, and 15 feet greater in height for Exposure D.
 3. Isolated from other hills by at least 2 miles, or
 4. At least twice as tall as other hills within 2 miles

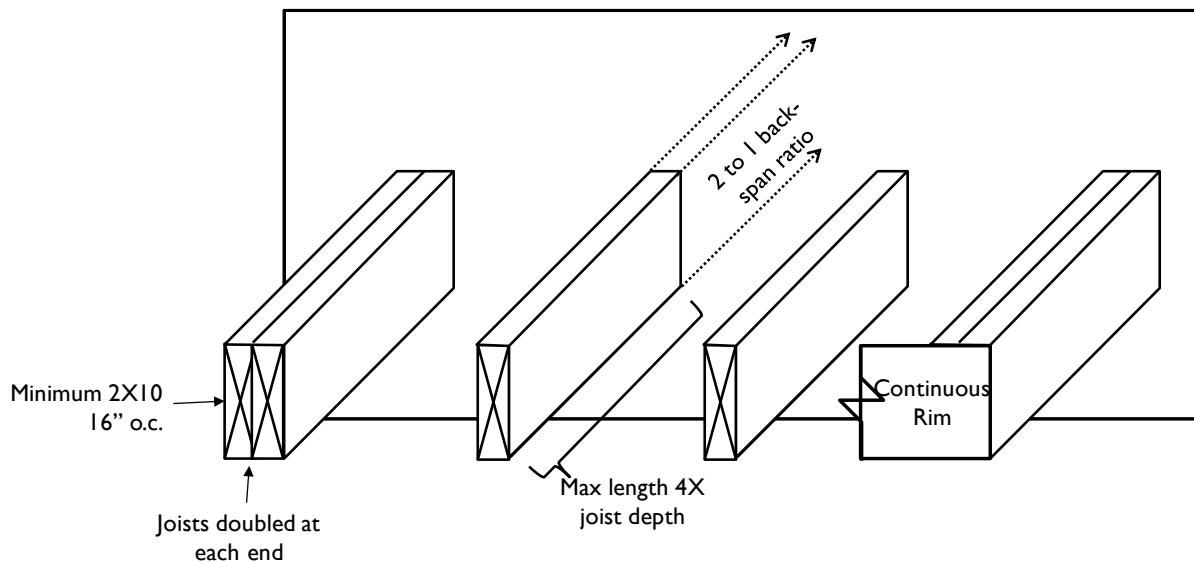
Seismic Design (R301.2.2)

- Seismic provisions apply to Townhouses in Categories C, D0, D1 and D2 and detached one and two family dwellings in D0, D1 and D2
- Category E can be reclassified to D2 to use the IRC if exterior shear walls in one plane from foundation to top story there are no cantilevers, and building is not “irregular”
- Townhouses Limited dead loads: 15psf for roof/ceiling assemblies, 10psf for floor assemblies (1.5” Gypcrete weighs approx. 13 psf)
- All structures: Buildings cannot be “irregular” unless designed and engineered

Chapter 3 - Building Planning

Irregular Buildings (R301.2.2.6) - There are 8 irregular building conditions that must be considered in Seismic categories C through D2. Irregular portions of buildings must be designed or follow listed exceptions.

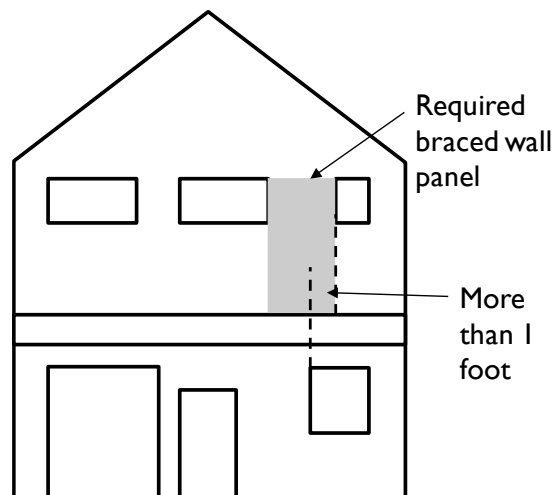
1. Shear walls not in one plane vertically from foundation to uppermost story (cantilever or setback), there is an exception for light frame construction:
 - Minimum 2X10 floor joists, max 16" o.c.
 - Cantilever does not exceed 4X joist depth
 - 2 to 1 back span
 - Continuous rim on cantilever
 - Floor joists at each end doubled



Chapter 3 - Building Planning

Irregular Buildings (R301.2.2.6) - There

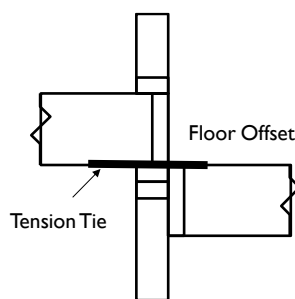
2. Where a section of floor or roof is not laterally supported by shear walls or braced wall lines on all edges
3. End of braced wall panel occurs over an opening in a wall below



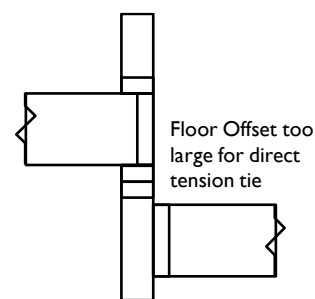
4. Opening in floor or roof does not exceed lesser of 12 feet or 50% of least floor or roof dimension (large stair openings, 2 story foyers)

5. Where portions of a floor level are vertically offset. Exceptions:

- Framing supported directly by continuous foundations at perimeter of building
- Floor framing tied per R502.6.1



"Regular"



"Irregular"

6. Where shear walls and braced wall lines do not occur in two perpendicular directions
7. Masonry or concrete construction mixed with light frame walls above grade. Exception: fireplaces, chimneys, veneer
8. Hillside Light Frame Construction where the grade slope exceeds 1 in 5 on any side, the tallest cripple wall exceeds 7 feet, and less than 50% of interior walls finished. Exception: full height foundation on all but downhill side

Chapter 3 - Building Planning

Height Limitations (R301.2.2.7)

- Light frame maximum 3 stories above grade plane (average finished ground level within 6 feet of the exterior walls)
- 2 stories in seismic categories D0-D2
- SIPS panel maximum two stories above grade plane

Snow Loads (R301.2.3)

- Code applies to a maximum of 70 PSF ground snow load, where snow load exceeds 70 PSF use accepted engineering practice

Alaska Ground Snow Loads					
Location	PSF Snow Load	Location	PSF Snow Load	Location	PSF Snow Load
Adak	30	Galena	60	Petersburg	150
Anchorage	50	Gulkana	70	St. Paul Islands	40
Angoon	70	Homer	40	Seward	50
Barrow	25	Juneau	60	Shemya	25
Barter Island	35	Kenai	70	Sitka	50
Bethel	40	Kodiak	30	Talkeetna	120
Big Delta	50	Kotzebue	60	Unalakleet	50
Cold Bay	25	McGrath	70	Valdez	160
Cordova	100	Nenana	80	Whittier	300
Fairbanks	60	Nome	70	Wrangell	60
Fort Yukon	60	Palmer	50	Yakutat	150

Story Heights (R301.3)

- Wood frame, steel, masonry, ICF, SIP wall max 11'7" story height
- Masonry max 13'7" story height
- Story: *That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above.*

Live Loads (R301.3)

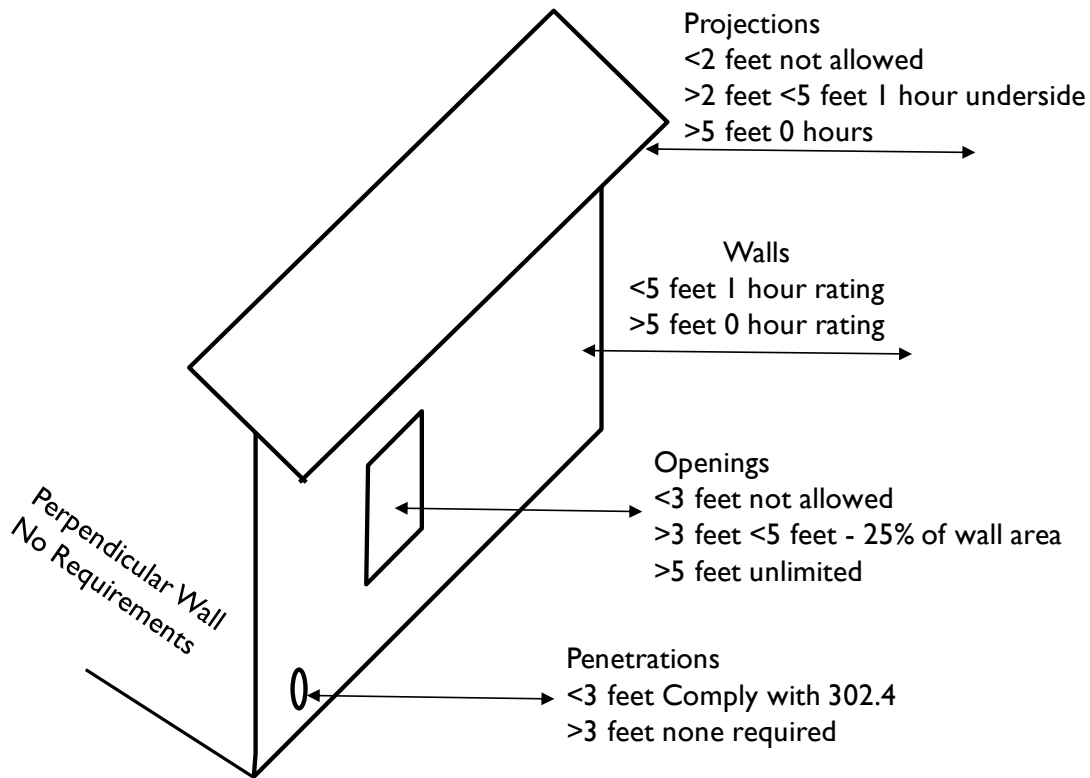
- Concentrated loads have been added, 200 lbs for guards, 50 pounds for guard in-fill components, 200 pounds for handrails, 2000 pounds point load for garages, and 300 pounds point load for stairs.

Chapter 3 - Building Planning

Fire Resistant Construction (R302.1)

- Fire protection is based on the presence of sprinkler systems, which are not required in residences in Alaska by amendment.

Exterior Wall Fire Protection – No Sprinklers			
Walls	Fire resistance rated	1 hour from both sides	< 5 feet
	Not fire resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	NA	< 2 feet
	Fire resistance rated	1 hour on underside	≥ 2 feet to < 5 feet
	Not fire resistance rated	0 hours	≥ 5 feet
Openings in Walls	Not allowed	NA	<3 feet
	25% maximum wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Section R304.2	< 3 feet
		None required	3 feet



Chapter 3 - Building Planning

Fire Protection - Townhouses (R302.2.4-5)

- Separated by two 1 hour fire rated assemblies
- Walls fire rated both sides
- No plumbing, mechanical, ducts, vents in common wall
- 30" parapet between units

Fire Protection - Two Family Dwellings (R302.2.4-5)

- Common floor and wall assemblies 1 hr fire rating
- Separation required whether lot line between the dwellings exists or not

Fire Protection - Dwelling/Garage Penetrations (R302.5)

- Private garages cannot open into a room used for sleeping purposes
- Doors between residence and garage must be 1-3/8" solid (wood) or honeycomb steel, or 20 minute fire rated. [Self latching](#) & automatic closing device required
- Ducts penetrating walls or ceilings separating the garage from the dwelling must be 26 ga. Steel with no openings into the garage

Dwelling/Garage Fire Separation (R302.6)

Garage / House Fire Separation	
Areas Being Separated	Separation Material
From the residences and attics	Not less than 1/2" gypsum board or equivalent to the garage side
From habitable rooms above the garage	Not less than 5/8" type X gypsum board or equivalent
Structures supporting floor/ceiling assemblies used for separation required by this section	Not less than 1/2" 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

Under Stair Protection (R302.7)

- Enclosed accessible space under stairs must have 1/2" gypsum board, includes walls, under-stair surface, and any soffits on the enclosed side

Fireblocking (R302.11-11.1.2)

- Fireblocking needed between stories and between top story and roof, vertically at floor and ceiling levels, and horizontally every 10 feet
- Required at drop ceiling connections to other spaces, concealed spaces between stair stringers at top and bottom, and openings at the ceiling level (piping, wires)
- Acceptable Fireblocking materials include 2X lumber, 23/32" wood panels backed at joints, 3/4" particle board backed at joints, 1/2" gypsum board, 1/4" cement board, fiberglass or mineral wool batts or blankets, and cellulose installed for the application
- Fiberglass or mineral wool allowed for 10 foot horizontal fireblock, unfaced batts allowed if at least 16 inches in height and tightly packed around obstructions

Chapter 3 - Building Planning

Draftstopping (R302.12)

- Concealed space with usable space above and below, includes drop ceilings and floor trusses that is greater than 1000 square feet is divided into approximately equal areas
- ½" gypsum board or 3/8 wood structural panels installed parallel to framing

Fire Protection of Floors (R302.13)

- ½" gypsum or 5/8" wood structural panel required on underside of floors, penetrations for wiring, ducts, lighting etc. allowed
- Exceptions:
 1. Floors directly over a space with sprinklers
 2. Floors over a crawlspace not intended for storage or fuel fired or electric heating appliances
 3. Up to 80 square feet per story, fireblocked on edges
 4. 2X10 joists or approved equivalent
- [Alaska Exception for I joists:](#)
- Floor assemblies located directly over a crawl space containing a direct-vent, sealed combustion appliance with forced draft exhaust; combustion air intake must terminate to the building exterior. Smoke alarm required in the crawlspace and CO detector required in the home

Habitable Rooms (R303.1)

- Require 8% floor area in windows, 4% operable
- [Exception - whole house ventilation system .35 ACH](#)
- [Exception – not required where kitchen is mechanically ventilated](#)

Bathrooms (R303.3)

- Require 3 square feet of window, ½ operable
- Exception: Local exhaust provided (50 CFM intermittent, 20 CFM continuous)
- [Alaska Amendment](#) - Mechanical exhaust required for all bathrooms and toilet rooms ASHRAE and BEES standards

Intake Openings (R303.5.1)

- Air intakes 10' from contaminant sources, or 3' below pollutant source
- [Dryer ducts 3 feet from any openings into building \(including soffit vents\)](#)

Outside Opening Protection (R303.6)

- Air exhaust and intake openings must be screened, ¼" to ½" mesh
- Refer to manufacturer specs for boiler/furnaces

Interior Stairway Illumination (R303.7)

- Required for all stairways, switch accessible top and bottom with 6 or more treads
- Illuminates landing and treads
- Minimum 1 Foot Candle
- Automatic controls allowed

Exterior Stairway Illumination (R303.8)

- Artificial light source at top landing and at bottom of exterior basement stairways

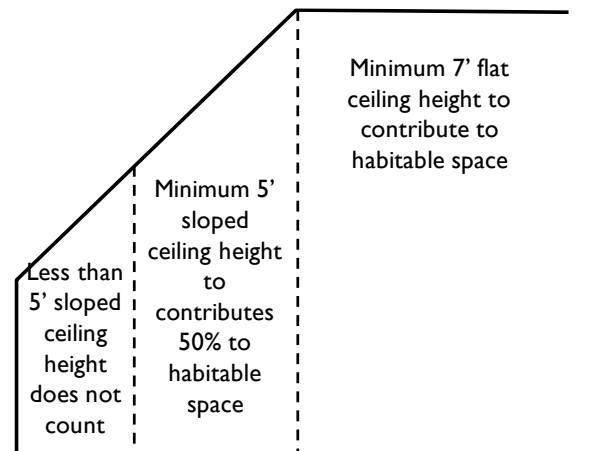
Chapter 3 - Building Planning

Minimum Room Areas (R304)

- Habitable rooms must be 70 square feet
- Minimum 7 foot least dimension
- Exception: Kitchens
- Sloped ceiling less than 5 feet does not count towards minimum room area
- Flat ceiling less than 7 feet does not count toward minimum room area
- *Habitable Space*: A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

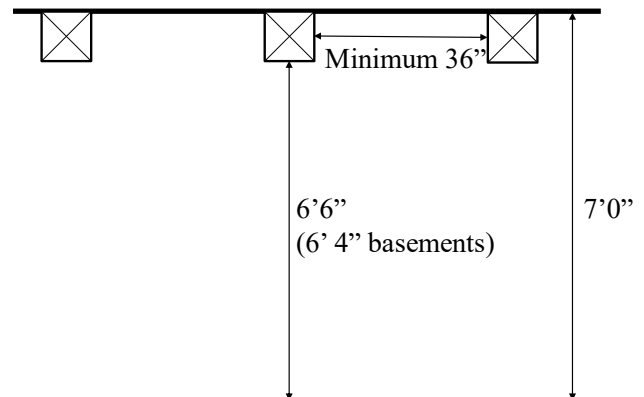
Minimum Ceiling Height (R305)

- Minimum 7' ceiling height for habitable space
- Minimum 6'8" for bathroom, toilet, laundry rooms (previously only 6'8" over fixtures)
- Only 50% of the floor area of a sloped ceiling between 5' and 7' contributes to habitable space requirements



Minimum Ceiling Height - Habitable Basement (R305)

- Private Habitable basement beams, ducts, etc. to project down to 6'4"
- Beams/girders spaced >36" project down to 6'6" (non basement areas)



Sanitation (R306)

- Minimum requirements:
- Water closet, lavatory, bathtub or shower
- Kitchen area with sink
- Plumbing fixtures (except toilets) provided with hot and cold water
- All fixtures connected to sewer (including floor drains)

Toilet, Bath & Shower Spaces (R307-.2)

- Minimum Toilets 30" minimum width, 21" in front
- Sinks 21" in front
- Showers minimum 30" by 30" with 24" in front of opening

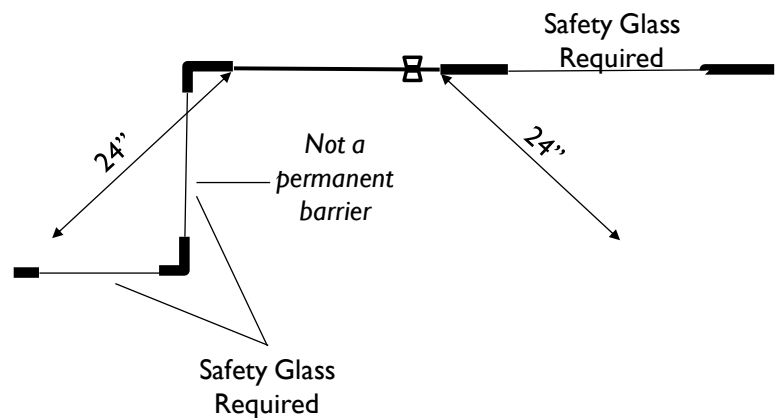
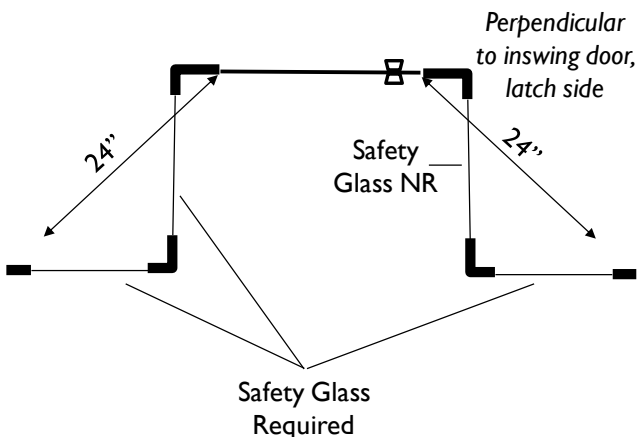
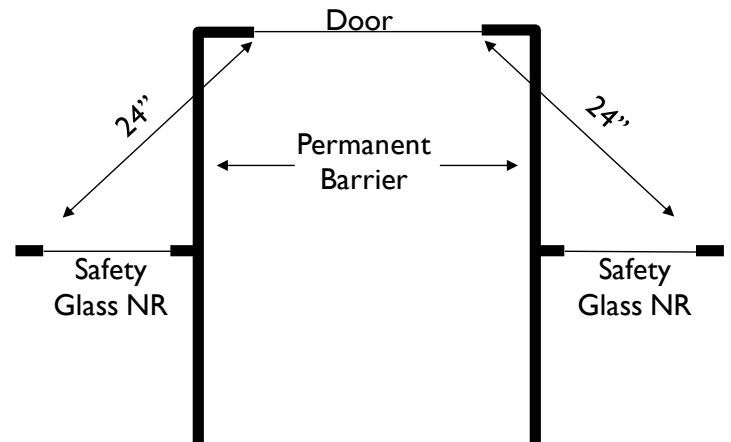
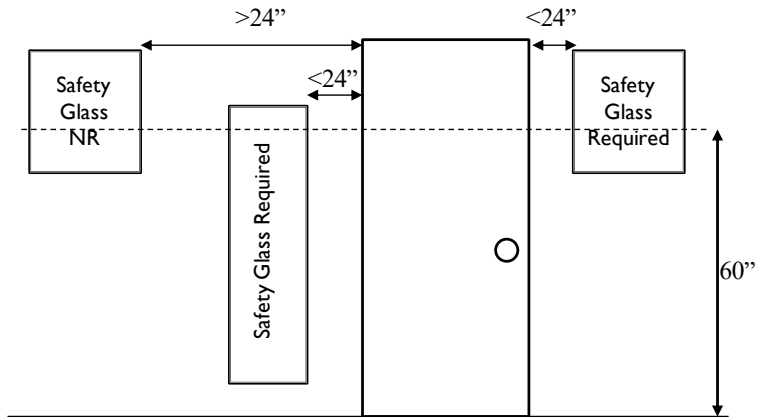
Chapter 3 - Building Planning

Safety Glazing (R308)

- Safety glazing is required in hazardous areas. Safety glass must be identifiable by an etched mark that cannot be removed. This marking is typically located in one of the far corners of the window. Etched markings are typical of tempered glass. In cases no etching is present as sometimes happens with laminated glass, the building official has discretion to approve the use of a certificate, affidavit, or other evidence confirming that safety glass is present.

Hazardous Locations - Doors (R308.4.2)

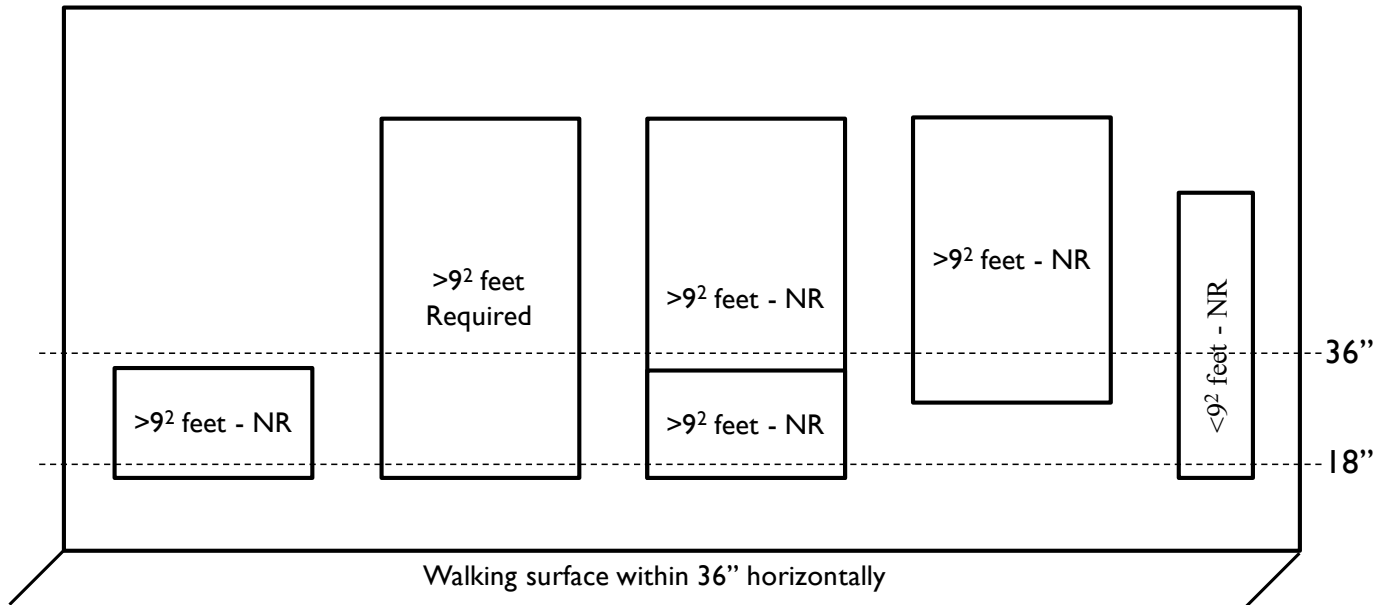
- Fixed or operable windows adjacent to doors, within 24" either side of the door & within 60" of the floor
- Exception: Where there is an intervening wall or other permanent barrier between the door and the glazing
- Exceptions: Where access through the door is to a closet or storage area 3 feet or less in depth.
- Exception: Glazing adjacent to the fixed panel of patio doors



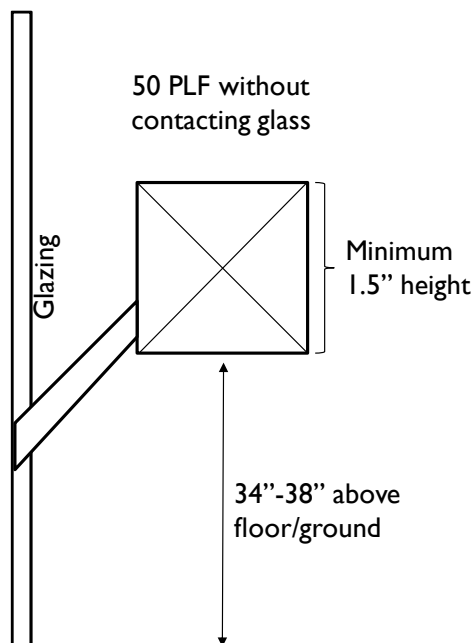
Chapter 3 - Building Planning

Hazardous Locations - Windows (R308.6.4.3)

- Safety glass required where window meets all of the following:
 1. Greater than 9 square feet
 2. Bottom edge of glass less than 18" above floor
 3. Top edge of glass more than 36" above floor
 4. Walking surface within 36" horizontally



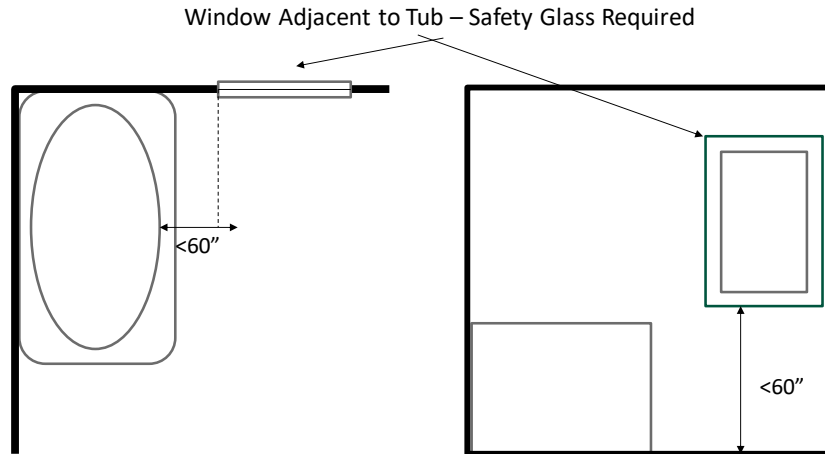
- Exception: Horizontal railing installed on accessible side, 34"-38" above walking surface and can withstand 50 PLF. Minimum cross-sectional area of 1.5"



Chapter 3 - Building Planning

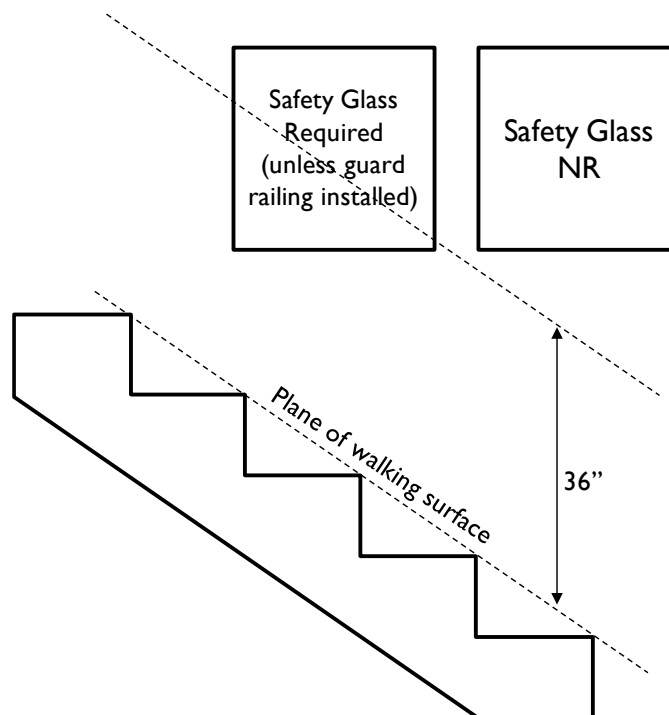
Hazardous Locations - Wet Surfaces (R308.4.5)

- Glazing enclosing tub, shower, hot tub, sauna, etc. Less than 60" vertically from standing or walking surface
- Exception: Glazing more than 60" measured horizontally ~~and in a straight line~~ from to the water's edge of bathtub, hot tub, spa, whirlpool, swimming pool, or from edge of shower, sauna or steam room.



Hazardous Locations - Stairs & Ramps (R308.4.6)

- Bottom edges of glass within 36" of the plane of the walking surface at stairways, landings between flights, ramps
- Exceptions:
 1. Guard railing installed at 34" to 38" in height, minimum 1.5" cross section, 50 PLF
 2. Glass more than 36" horizontally from walking surface



Chapter 3 - Building Planning

Hazardous Locations - Bottom of Stair (R308.4.7)

- Glazing enclosing Glass less than 36" above walking surface of landing, within 60" horizontal arc of 180°

Garages & Carports (R309.1)

- Garage floor surface approved noncombustible material
- Floor sloped to drain or main vehicle entry doorway

Carports (R309.2)

- Open on not less than two sides, otherwise considered a garage
- Carport floor surface approved noncombustible material (Asphalt acceptable)
- Floor sloped to drain to main vehicle entry doorway

Fire Sprinklers (R309.5)

- [Alaska Amendment: Private garages protected by fire sprinklers where required by the Department of Public Safety](#)

