R310.3 Emergency escape and rescue doors.

Where a door is provided as the required *emergency escape and rescue opening*, it shall be a side-hinged door or a sliding door.

Update of the IRC from 2015 to 2021

MARK STAMBACH CODE ENFORCEMENT OFFICER, LISBON ME

PAUL DEMERS, ***FORMER*** MAINE STATE BUILDING OFFICIAL,

What is MUBEC

MUBEC is made up of the following codes and standards:

2015 International Residential Code (IRC)

2015 International Building Code (IBC)

2015 International Existing Building Code (IEBC)

2015 International Energy Conservation Code (IECC)

2015 International Mechanical Code (IMC)

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standards:

- 62.1 - 2016 (Ventilation for Acceptable Indoor Air Quality)
- 62.2 - 2016 (Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings)
- 90.1 - 2016 (Energy Standard for Buildings except Low-Rise Residential Buildings) editions without addenda.
- E-1465-2008, Standard Practice for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings.

Maine has adopted these national model codes and standards with amendments. The amendments are listed in Rule Chapters 1-7 below. c

- Chapter 1 - Administration (Dox)
- Chapter 2 -Third Party Inspectors (Word DOC)
- Chapter 3 - IBC International Building Code (Word DOC)
- Chapter 4 - IEBC International Existing Building Code (Word DOC)
- Chapter 5 - IRC International Residential Building Code (Word DOC)
- Chapter 6 - IECC International Energy Conservation Code (docx)
- Chapter 7 - IMC Uniform Building and Energy Code - Mechanical Code (docx)

Course Description

- Overview of significant changes made in the International Residential Code (IRC) from the 2015 edition to the 2021 edition. The instruction will also cover changes made specifically for the State of Maine by the Technical Codes and Standards Board

R302.2 Townhouses

R302.2 Townhouse Separation Changes

R302.2 **Townhouses.** Walls separating townhouse units shall be constructed in accordance with Section R302.2.1 or Section R302.2.2.

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*.

R302.2.2 Common Wall Townhouse Dwelling Separation

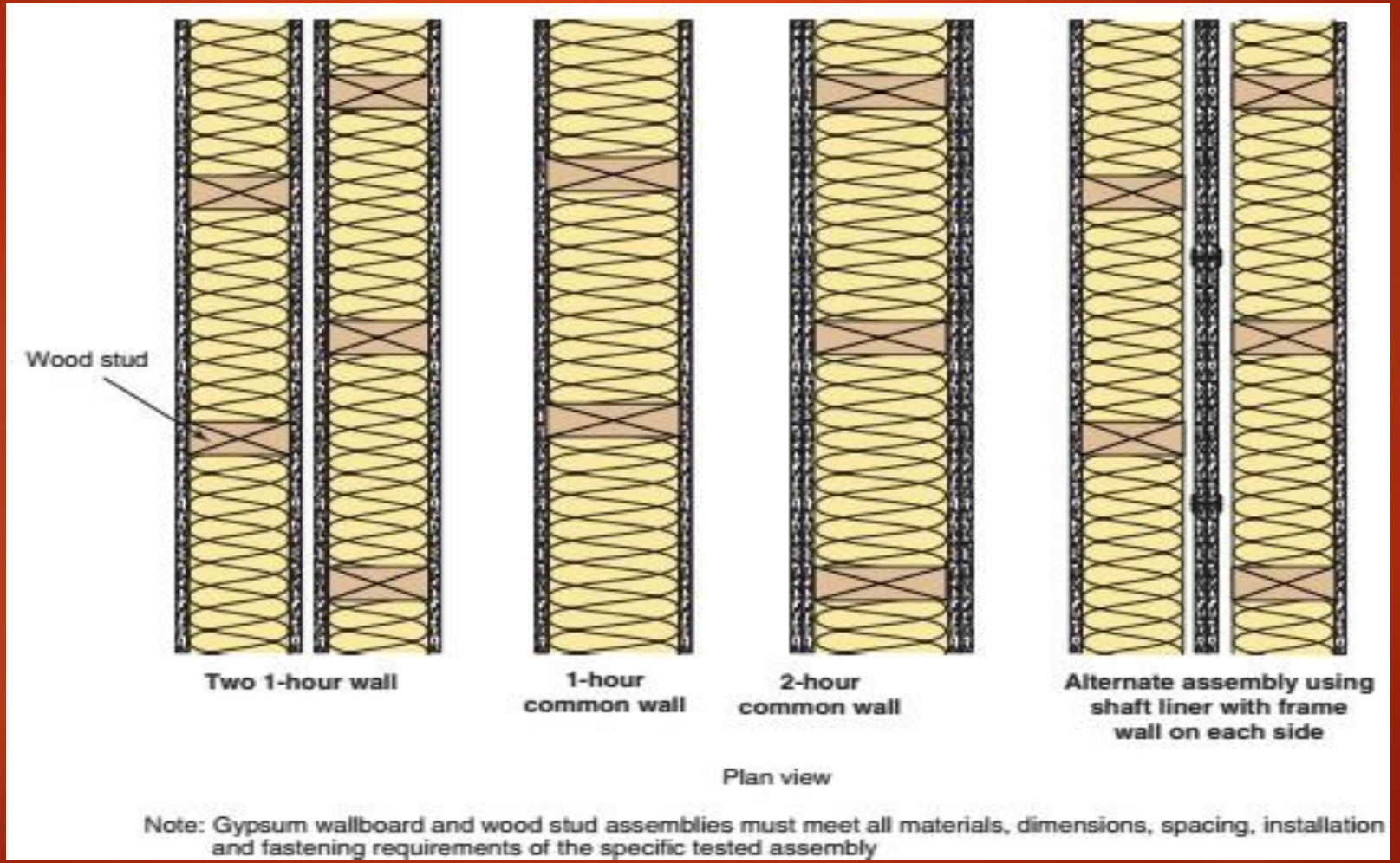
- **1.** Where a fire sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire resistance-rated wall assembly tested in accordance with ASTM E 119, or UL 263 or Section 703.3 of the *International Building Code*.

- **2.** Where a fire sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119, or UL 263 or Section 703.3 of the *International Building Code*.

R302.2 Townhouse Separation Changes

R302.2.2 **Common Walls.** Common walls separating townhouses shall be assigned a fire-resistance rating in accordance with Section R302.2 Item 1 or 2. 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. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

Typical fire-rated wall assemblies for separating townhouse dwelling units



R302.3 Two-Family Dwelling Separation

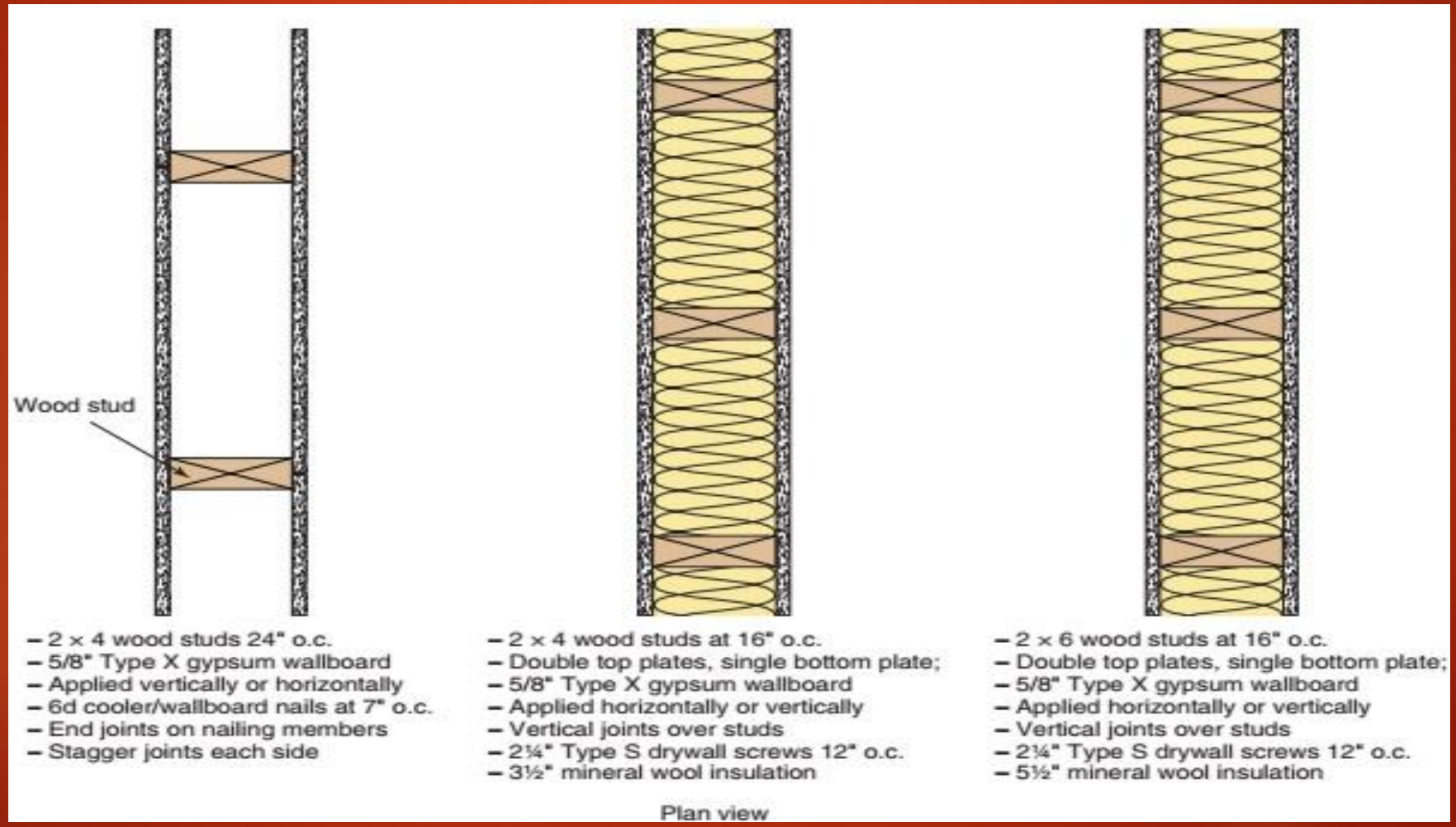
CHANGE SUMMARY: The prescribed fire-resistance-rated separation between two dwelling units in a single building is not affected by the presence of a lot line between the units.

Two Family Dwelling Separation

These alternate methods must still be based on the acceptance criteria of ASTM E 119 or UL 263. In addition to approval of alternate methods per Section R104.11 or acceptance of designs from approved sources or agencies, the fire resistance of an assembly or its components can be determined by the following:

- •The prescriptive methods provided in IBC Section 721
- •Calculations in accordance with IBC Section 722
- •Engineering analysis based on test procedures of ASTM E 119 or UL 263

Examples from IBC Table 721.1(2)



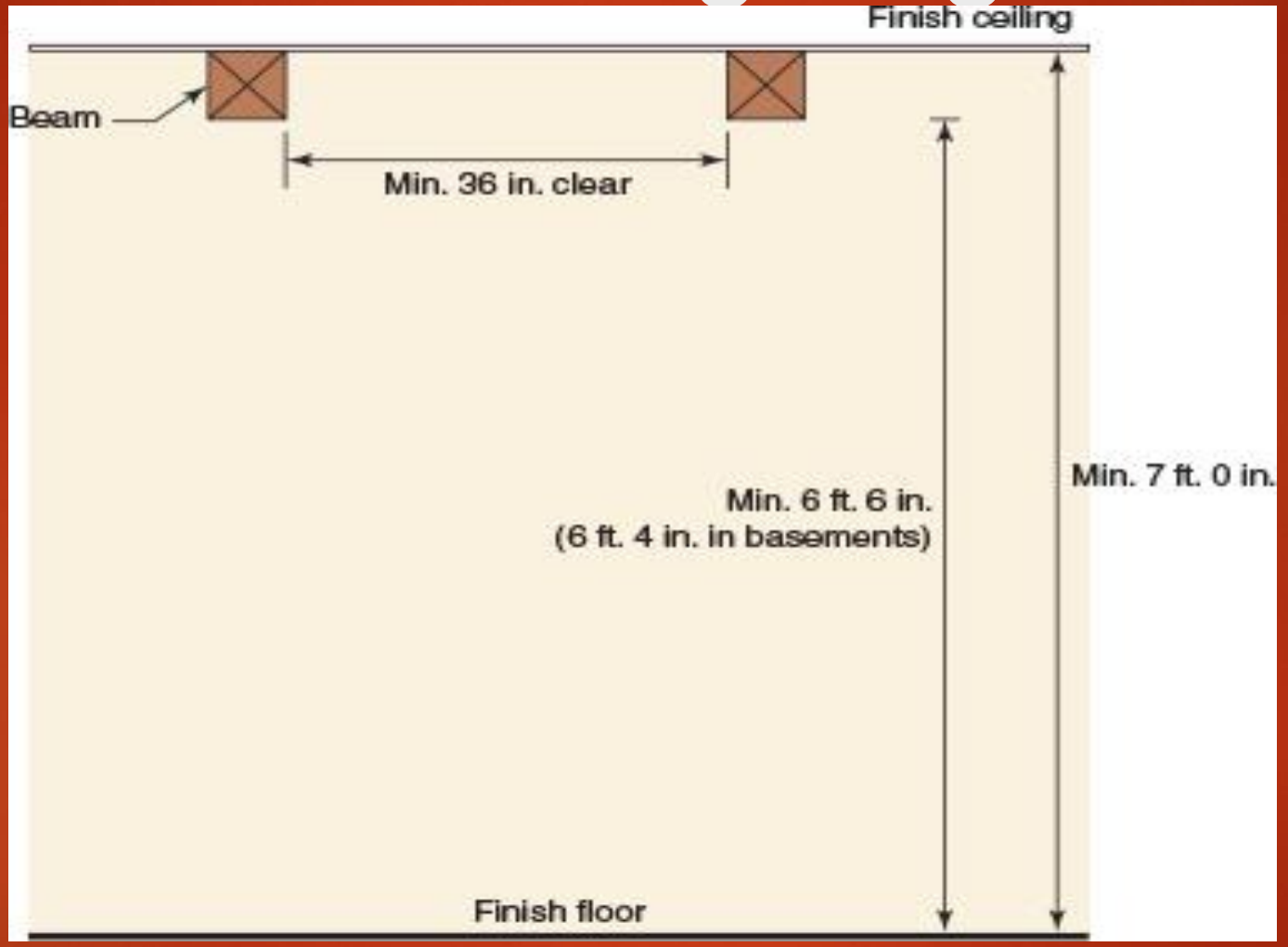
302.5 Dwelling Garage Opening Protection

CHANGE SUMMARY:

R302.5.1 Opening protection.
Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than $1^3/_8$ inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than $1^3/_8$ inches (35 mm) thick, or 20-minute fire-rated doors. **Doors shall be self-latching and equipped with a self-closing or automatic-closing device.**

apps

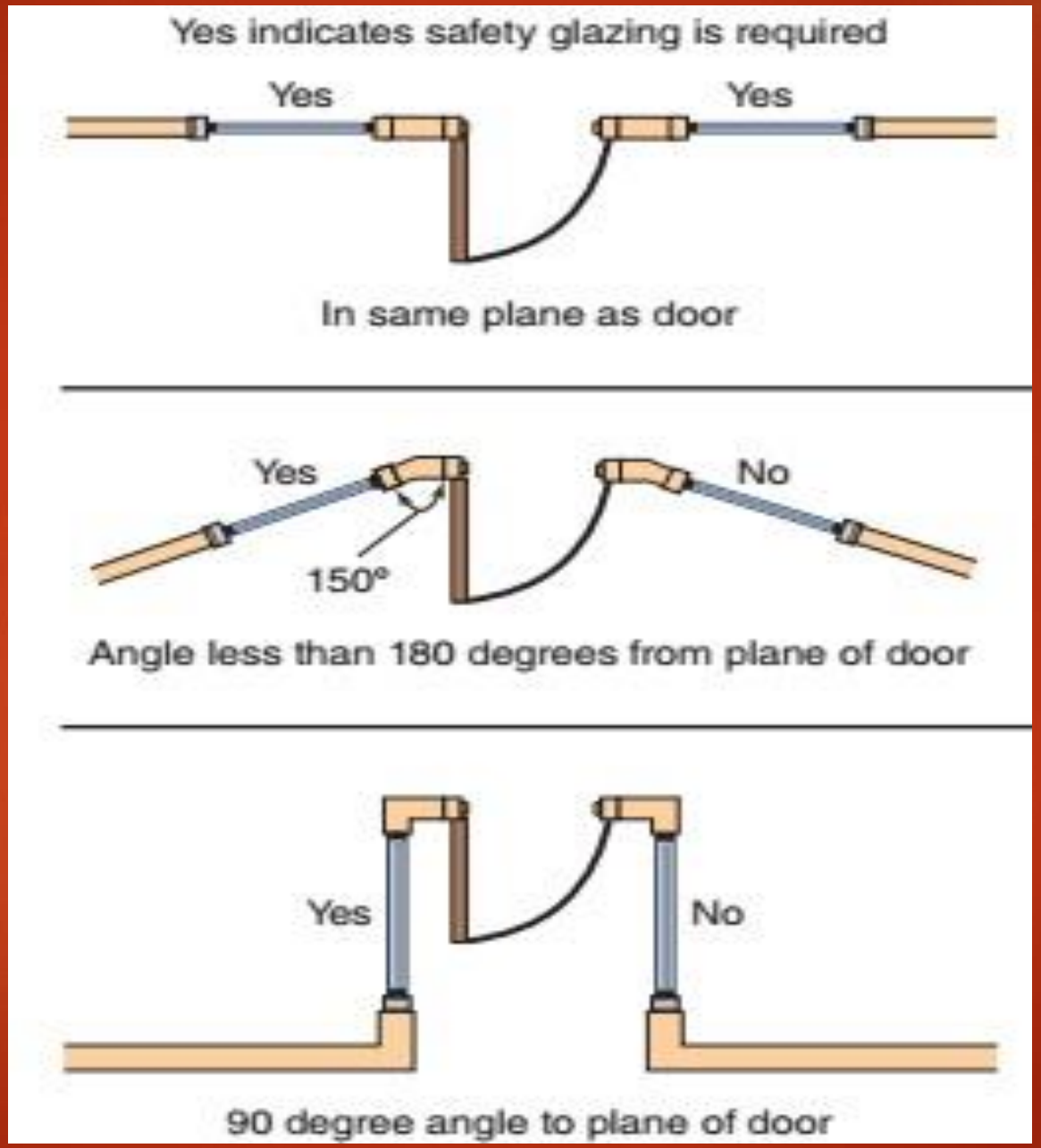
R305.1 Ceiling Height



THE MINIMUM CEILING HEIGHT IS REDUCED TO 6 FEET 6 INCHES UNDER BEAMS SPACED AT LEAST 36 INCHES APART.

R308.4.2 Glazing Adjacent to Doors

CHANGE SUMMARY: Glazing within 24 inches of the hinge side of an in-swinging door now requires safety glazing where the glazing is at an angle less than 180 degrees from the plane of the door.


Yes indicates safety glazing is required
Yes
Yes
In same plane as door
Yes
No
150°
Angle less than 180 degrees from plane of door
Yes
No
90 degree angle to plane of door

R308.4.4 Glazing in guards and railings.

R308.4.4.1 **Structural glass baluster panels.** Guards with structural glass baluster panels shall be installed with an attached top rail or handrail. The top rail or handrail shall be supported by not less than three glass baluster panels, or shall be otherwise supported to remain in place should one glass baluster panel fail.

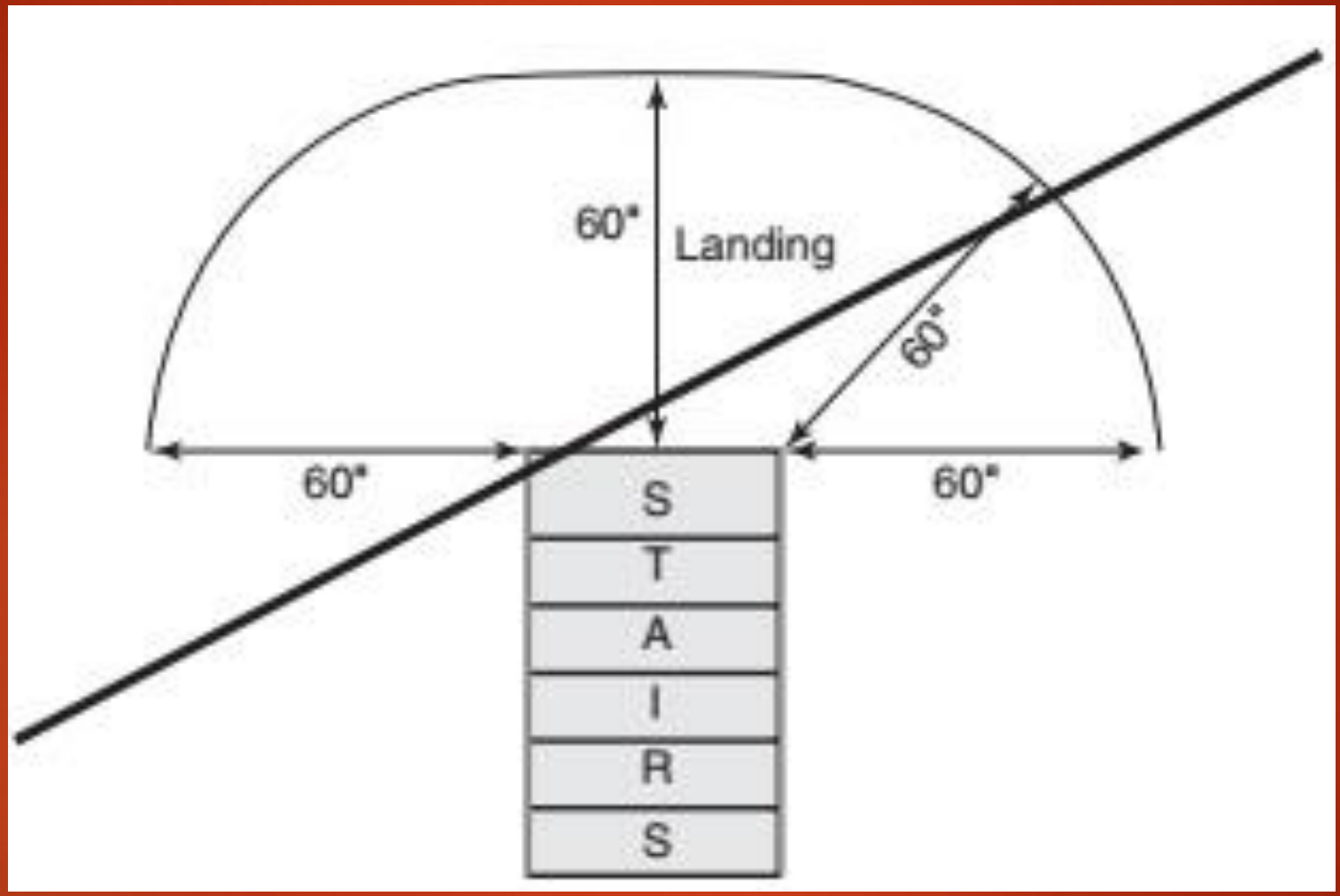
Exception: An attached top rail or handrail is not required where the glass baluster panels are laminated glass with two or more glass plies of equal thickness and of the same glass type

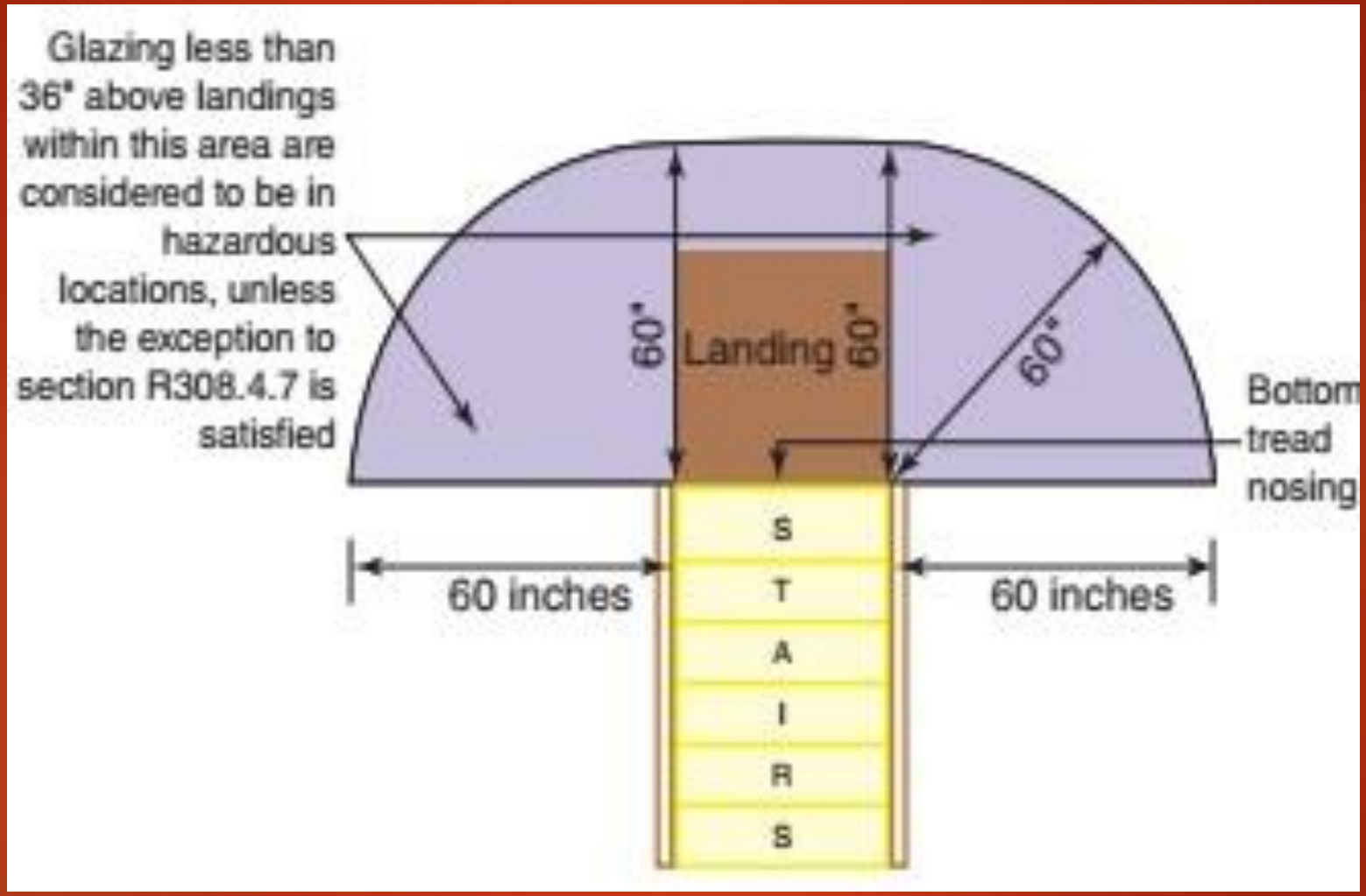
Structural glass baluster panels

Non-structural glass in-fill panels

R308.4.7 - Glazing Adjacent to the Bottom Stair Landing

Figure R308.4.7 has been replaced with a new figure and the caption modified to more accurately reflect the related code provision.


60°
Landing
60°
60°
60°
S
T
A
I
R
S


Glazing less than 36" above landings within this area are considered to be in hazardous locations, unless the exception to section R308.4.7 is satisfied
60"
Landing
60"
60"
Bottom tread nosing
60 inches
60 inches
STAIRS

R310.1 - Emergency Escape and Rescue Openings

CHANGE SUMMARY: Emergency escape and rescue openings are no longer required for bedrooms in basements when the dwelling unit is protected with an automatic fire sprinkler system and other conditions are met.

1.2.1.One means of egress complying with Section R311 and one emergency escape and rescue opening.
2.2.2.Two means of egress complying with Section R311.

R310.1 Emergency Escape and Rescue Openings (exception added)

(2) Where the dwelling or townhouse is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in basements shall not be required to have emergency escape and rescue openings provided that the basement has one of the following:

1.2.1.One means of egress complying with Section R311 and one emergency escape and rescue opening.

2.2.2.Two means of egress complying with Section R311.

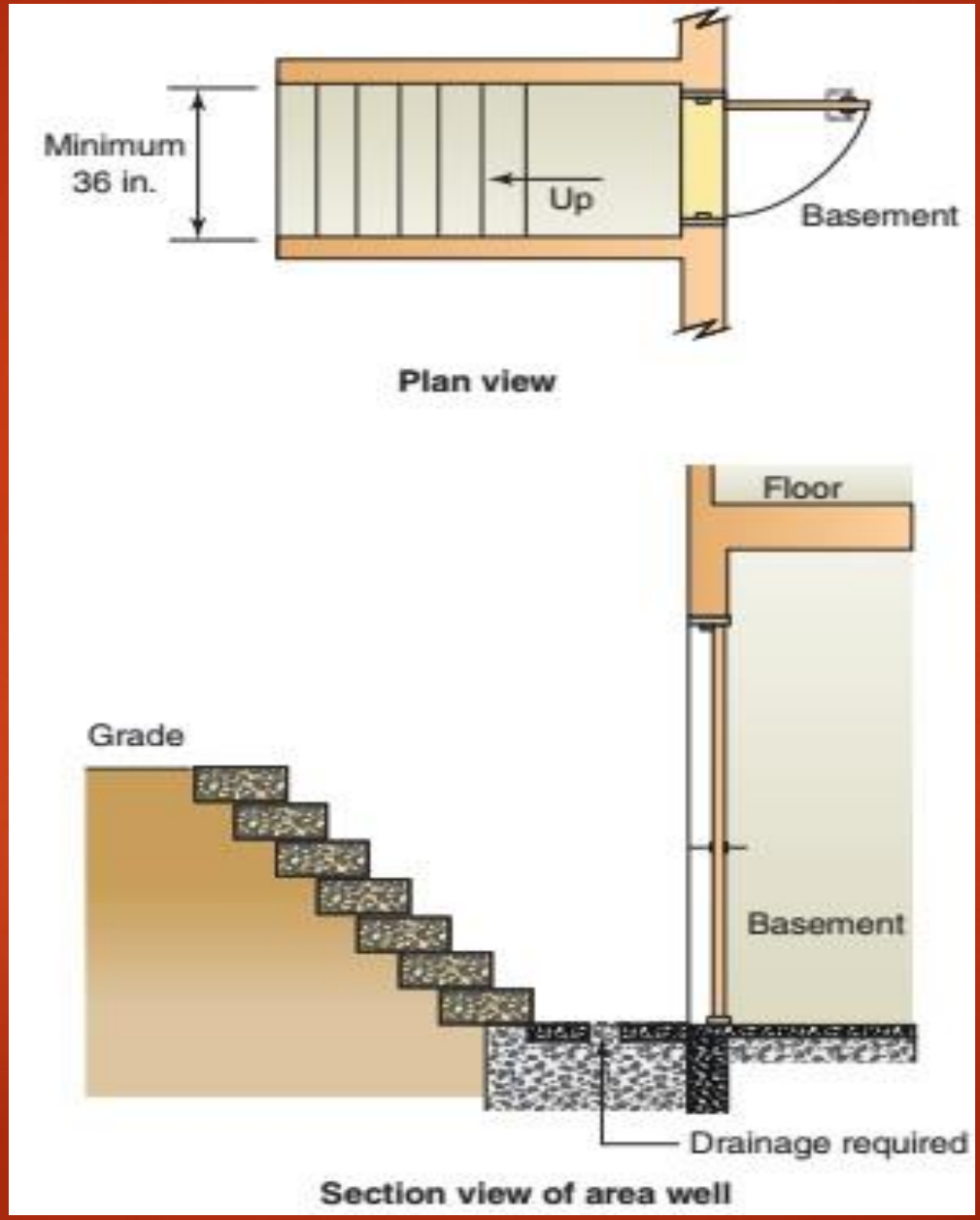
R310.3 - Area Wells for Emergency Escape and Rescue Doors

R310.3.2 **~~Bulkhead enclosures~~ Area Wells.** ~~Bulkhead enclosures shall provide direct access from the basement. The bulkhead enclosure shall provide the minimum net clear opening equal to the door in the fully open position.~~ Area wells shall have a width of not less than 36 inches (914 mm). The area well shall be sized to allow the emergency escape and rescue door to be fully opened.

R310.3.2.1 **Ladder and steps.** Area wells with a vertical depth greater than 44 inches (1118 mm) shall be equipped with a permanently affixed ladder or steps usable with the door in the fully open position. Ladders or steps required by this section shall not be required to comply with Section R311.7. Ladders or rungs shall have an inside width of not less than 12 inches (305 mm), shall project not less than 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center vertically for the full height of the exterior stairwell.

R310.3 - Area Wells for Emergency Escape and Rescue Doors

R310.3 Emergency escape and rescue doors.
Where a door is provided as the required emergency escape and rescue opening, it shall be a side-hinged door or a sliding door.


Minimum
36 in.
Up
Basement
Plan view
Floor
Grade
Basement
Drainage required
Section view of area well

R311.7 - Stairways, and R311.8 - Ramps

The provisions of Sections R311.7 and R311.8 ***apply only to stairways and ramps within or serving a building, porch or deck.***

R311.7 Stairways. Where required by this code or provided, stairways shall comply with this section.

Exceptions:

R311.7 - Stairways

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

Stairway requirements exempted

R311.7.1 Width.
R311.7.2 Headroom.
R311.7.3 Vertical Rise.
R311.7.4 Walkline.
R311.7.5 Stair Treads and Risers.
R311.7.6 Landings for Stairways.
R311.7.7 Stairway Walking Surface.
R311.7.8 Handrails.

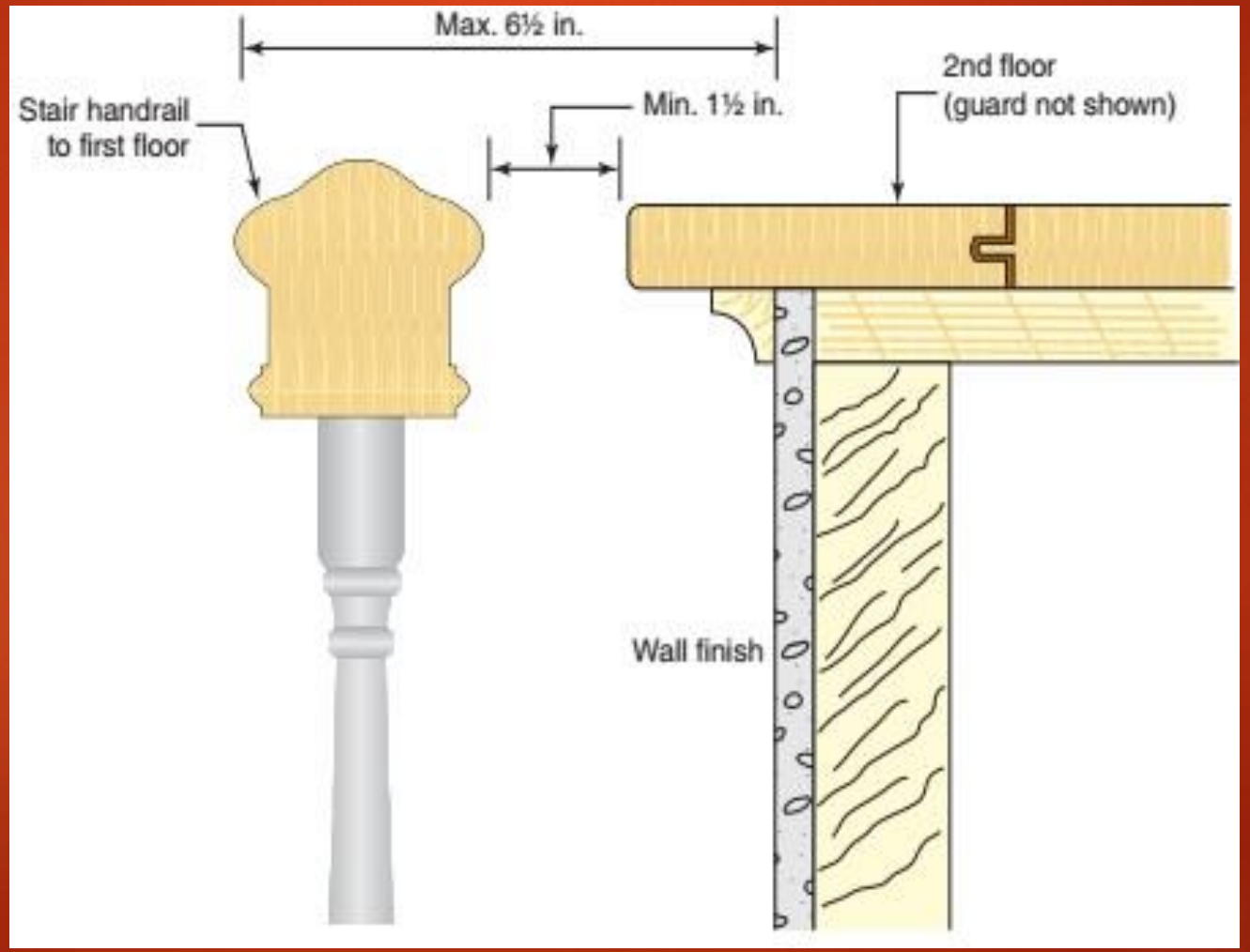
Ramp requirements exempted

R311.8.1 Maximum Slope.
R311.8.2 Landings Required.
R311.8.3 Handrails Required

R311.8 Ramps. Where required by this code or provided, ramps shall comply with this section.

Exception: Ramps not within or attached to a building, porch or deck.

R311.7.1, R311.7.8 Handrail Projection



2018 CODE: R311.7.3 **Vertical rise.** A flight of stairs shall not have a vertical rise larger than 147 151 inches (3734 3835 mm) between floor levels or landings.

311.7.3 - Maximum Stair Rise between Landings

2018 CODE: R311.7.3 **Vertical rise.** A flight of stairs shall not have a vertical rise larger than ~~147~~ 151 inches (3734 3835 mm) between floor levels or landings

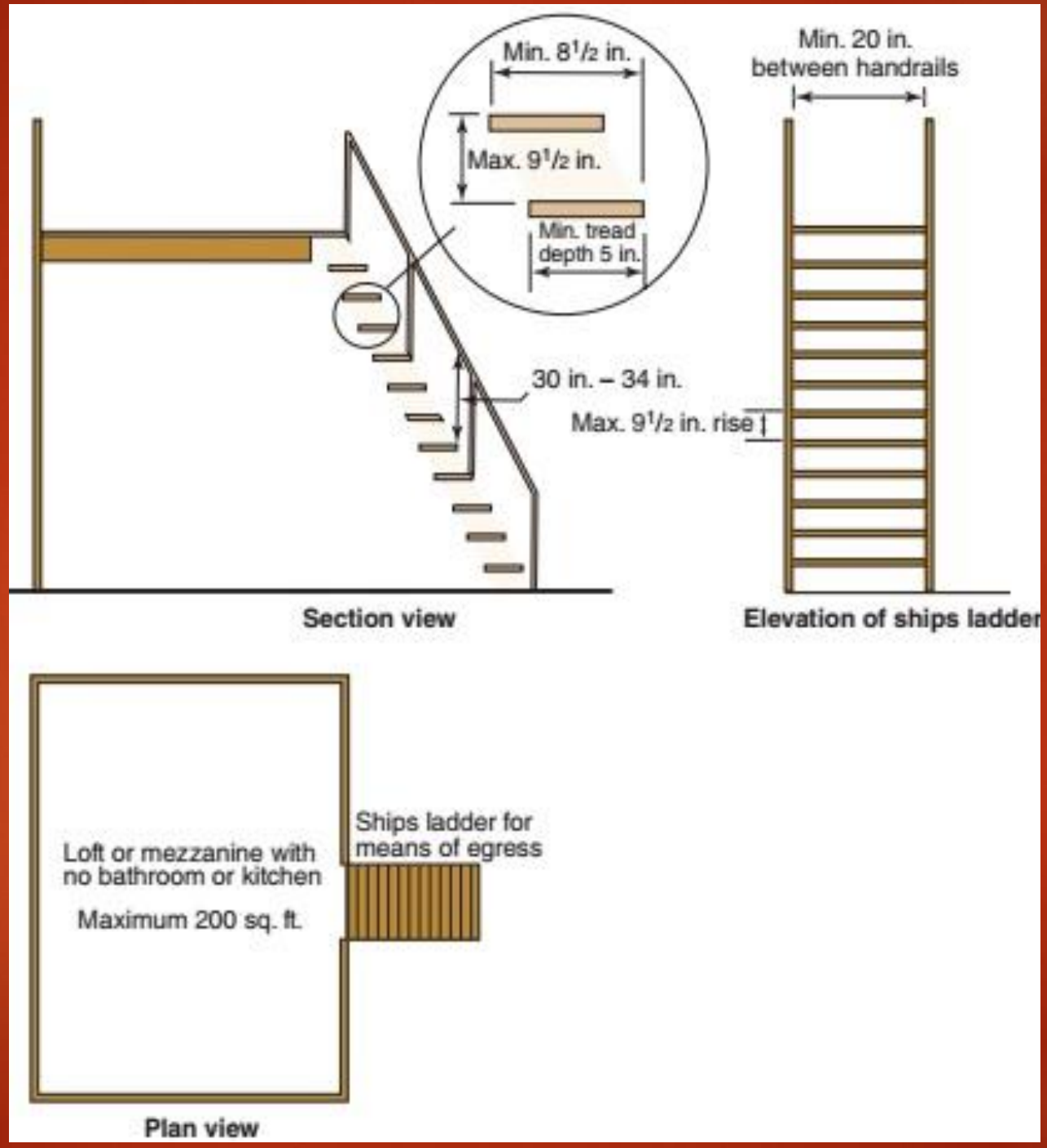
The code change proponent submitted a maximum height of 12 feet 6 inches to accommodate the 10- foot ceilings and large floor trusses of modern construction techniques without impairing stair safety. To afford even greater flexibility, the proposal was modified by the committee to increase the height to 12 feet 7 inches (151 inches). To achieve the increased floor-to-floor height would require a minimum of 20 risers so as not to exceed the 7¾-inch maximum riser height.

Exception: Alternating tread devices are allowed to be used as an element of a means of egress for lofts, mezzanines, and similar areas of 200 gross square feet (18.6 m^2) or less w

R311.7.11, R311.7.12 Alternating Tread Devices and Ships Ladders

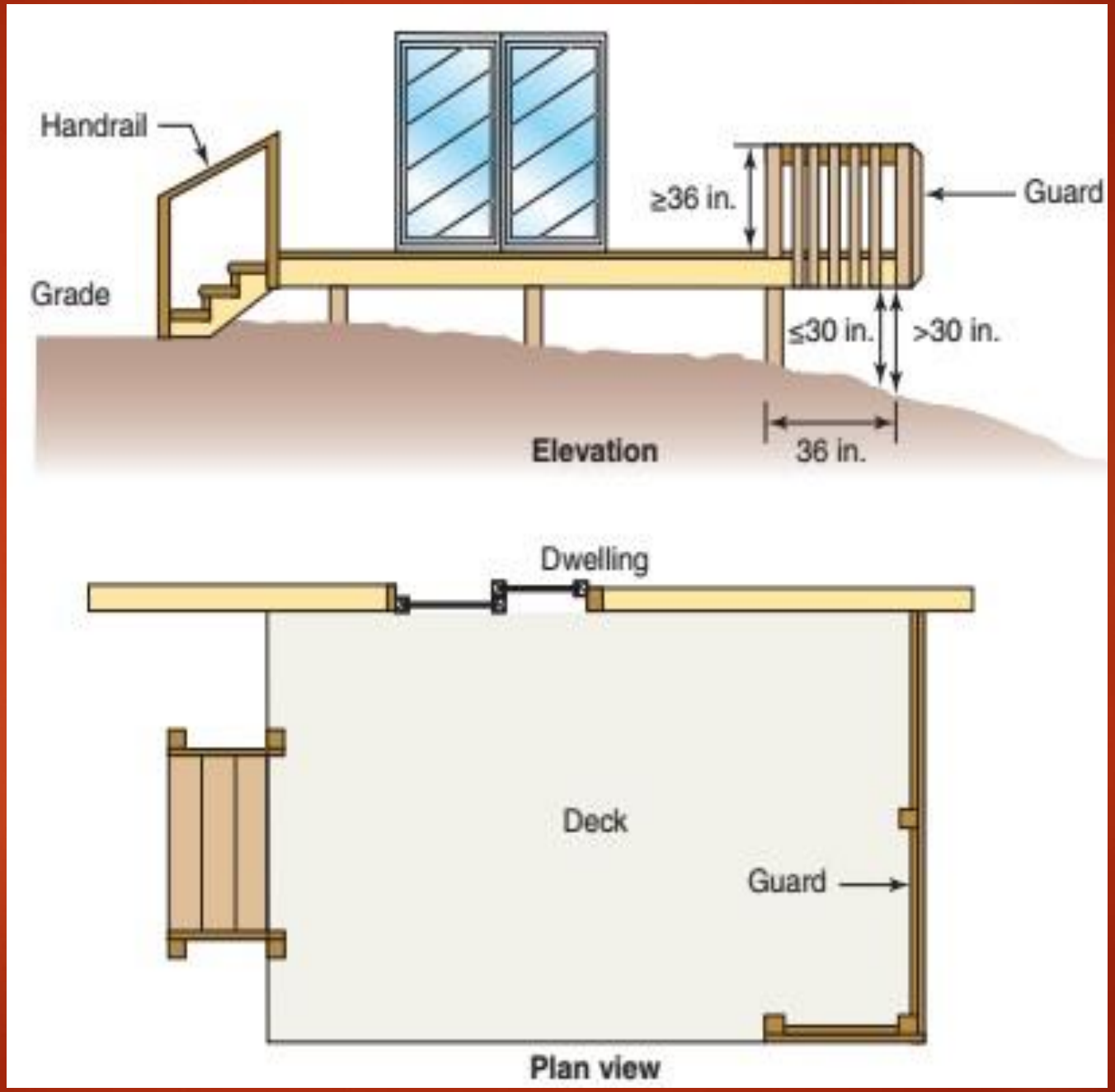
R311.7.11"…Alternating tread devices shall not be used as an element of a means of egress…"

Exception: Alternating tread devices are allowed to be used as an element of a means of egress for lofts, mezzanines, and similar areas of 200 gross square feet (18.6 m^2) or less where such devices do not provide exclusive access to a kitchen or bathroom.


Min. 8½ in.
Max. 9½ in.
Min. tread depth 5 in.
30 in. – 34 in.
Max. 9½ in. rise
Min. 20 in. between handrails
Section view
Elevation of ships ladder
Loft or mezzanine with no bathroom or kitchen
Maximum 200 sq. ft.
Ships ladder for means of egress
Plan view

R312.1 - Guards

CHANGE SUMMARY: The guard requirements **only apply to the specific portion of a walking surface** that exceeds 30 inches above grade.

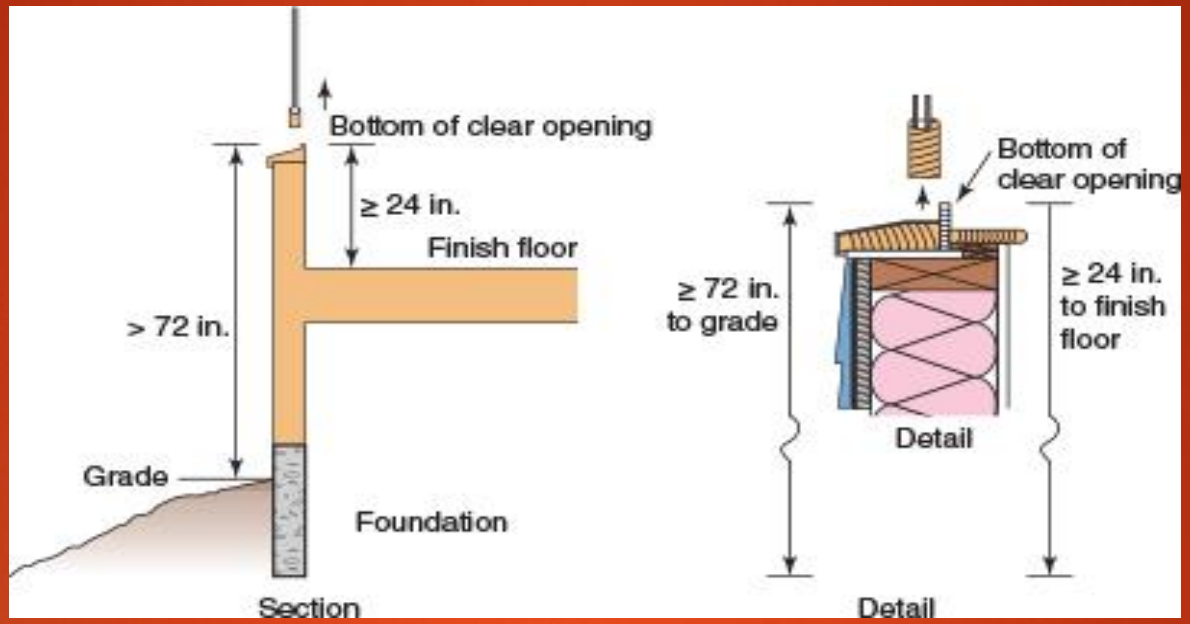

Handrail
Grade
≥36 in.
Guard
≤30 in.
>30 in.
36 in.
Elevation
Dwelling
Deck
Guard
Plan view

R314.2.2 Alterations, repairs and additions.

R314.2.2 **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 smoke alarms located as required for new dwellings.

CHANGE SUMMARY: The exemption for interconnection of alarms during alterations based on feasibility has been removed from the code.

R312.2 - Window Fall Protection



The revised language clarifies that measurements for determining the need for fall protection are taken to the bottom of the clear opening of the window.

R315.5 **Interconnectivity.** Where more than one carbon monoxide alarm is required to be installed within an individual dwelling unit in accordance with Section R315.3, the alarm devices shall be in

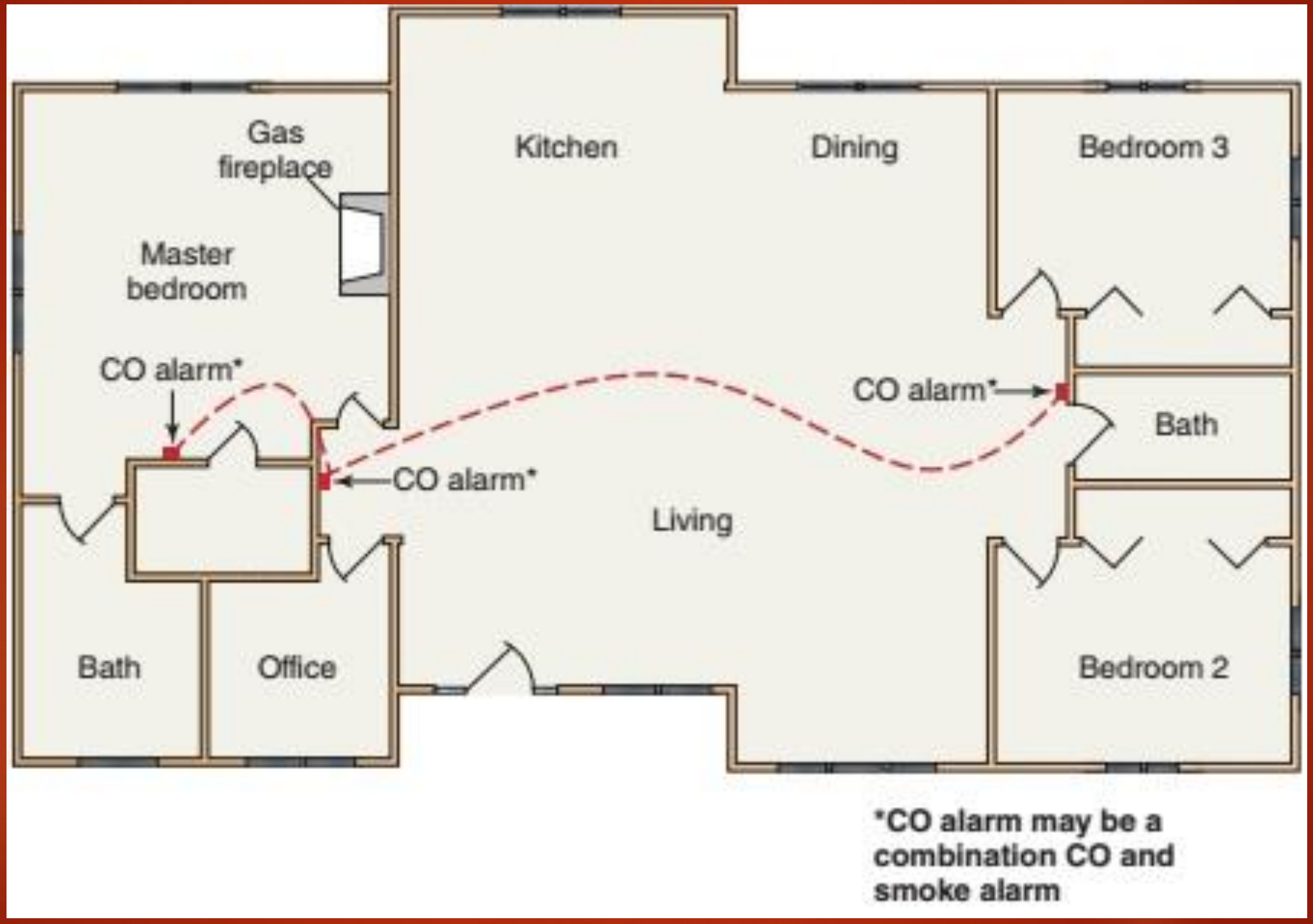
Exception: Interconnection of carbon monoxide alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the stru

R315 - Carbon Monoxide Alarms

CHANGE SUMMARY: Interconnection is now required where multiple carbon monoxide alarms are required in a dwelling unit.

R315.5 **Interconnectivity.** Where more than one carbon monoxide alarm is required to be installed within an individual dwelling unit in accordance with Section R315.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

Exception: Interconnection of carbon monoxide 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.


Gas fireplace
Kitchen
Dining
Bedroom 3
Master bedroom
CO alarm*
CO alarm*
CO alarm*
Bath
Living
Bath
Office
Bedroom 2
*CO alarm may be a combination CO and smoke alarm

R317.3 - Fasteners in Treated Wood

CHANGE SUMMARY: Staples in preservative-treated wood and fireretardant-treated wood are now required to be made of stainless steel.

R324.4 - Rooftop-Mounted Photovoltaic Systems

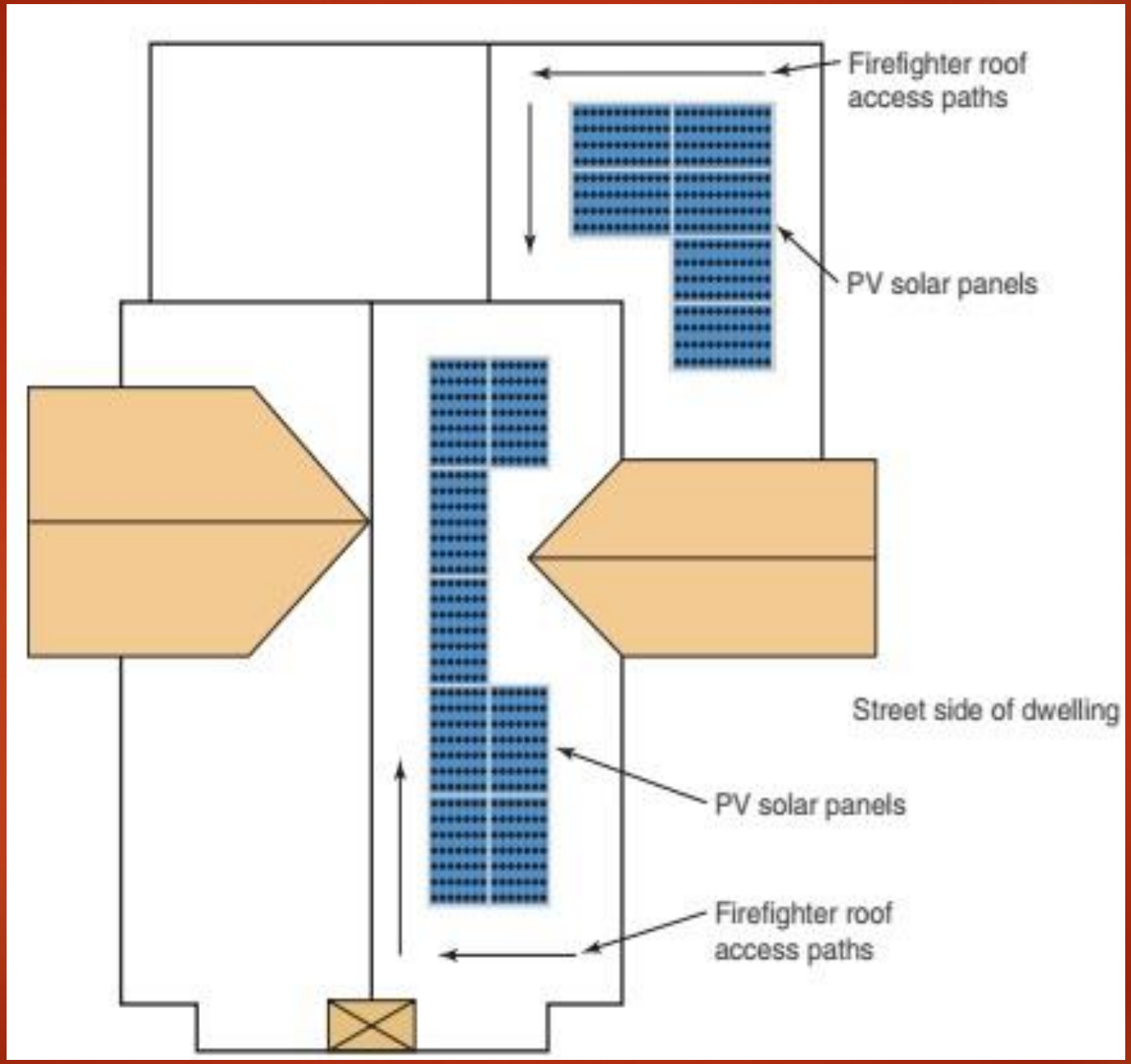
R324.4.1 R324.4.1.1 **Roof live load.** Roof structures that provide support for photovoltaic panel systems shall be designed for applicable roof live load. The design of roof structures need not include roof live load in the areas covered by photovoltaic panel systems. Portions of roof structures not 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. Portions of roof structures not covered with photovoltaic panel systems shall be designed for dead loads and roof loads in accordance with Sections R301.4 and R301.6. Portions of roof structures covered with photovoltaic panel systems shall be designed for the following load cases:

•1.Dead load (including photovoltaic panel weight) plus snow load in accordance with Table R301.2(1).

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

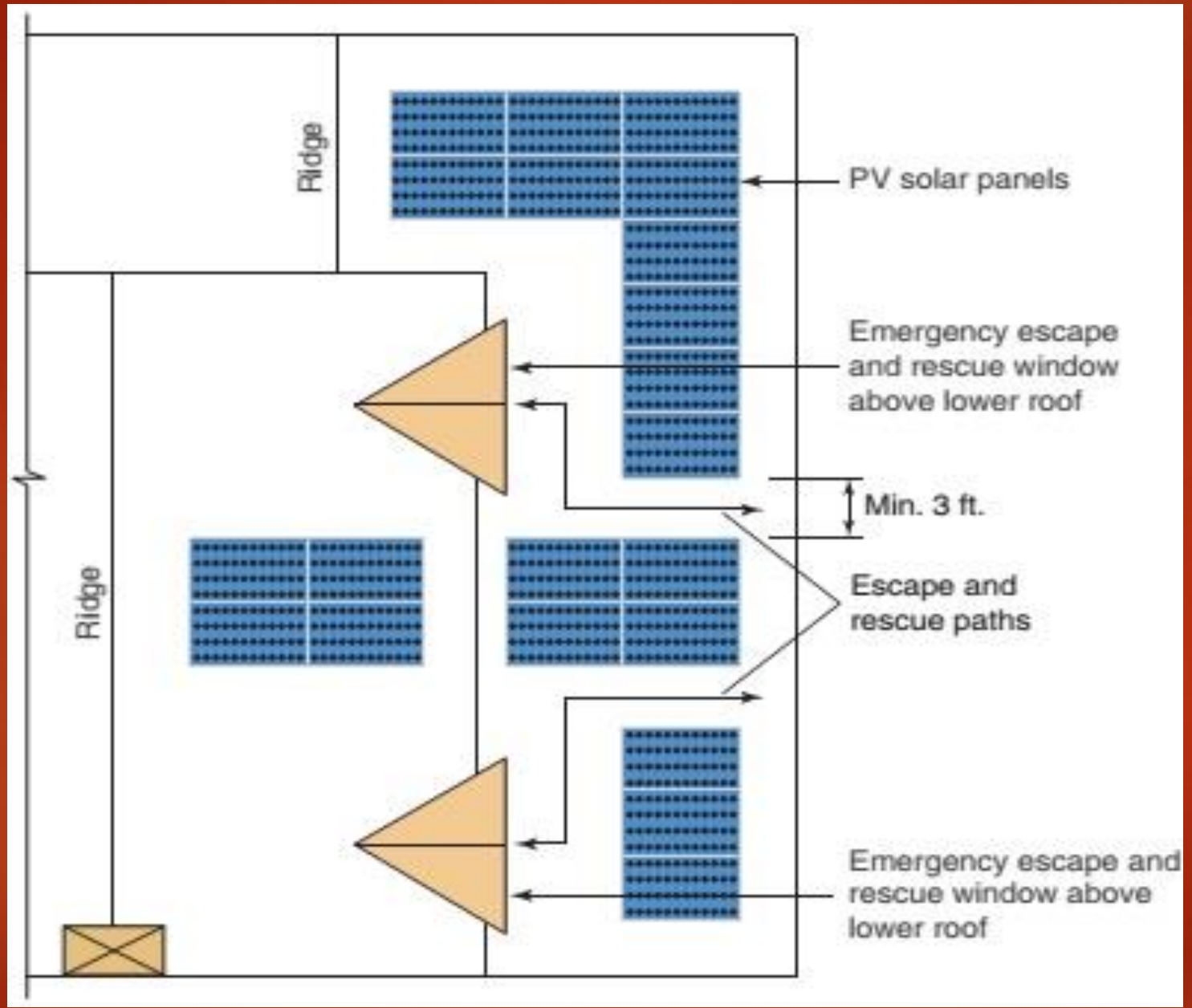
R324.6 - Roof Access for Photovoltaic Solar Energy Systems

CHANGE SUMMARY: Requirements for roof access and pathways for firefighters have been introduced into the IRC provisions for rooftop mounted photovoltaic solar energy systems


Firefighter roof access paths
PV solar panels
Street side of dwelling
PV solar panels
Firefighter roof access paths

Solar Panels near Emergency Escape and Rescue Openings

R324.6.2.2 **Emergency escape and rescue opening.** 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 (914 mm) wide shall be provided to the emergency escape and rescue opening.


Ridge
Ridge
PV solar panels
Emergency escape and rescue window above lower roof
Min. 3 ft.
Escape and rescue paths
Emergency escape and rescue window above lower roof

R325.3 - Mezzanine Area Limitation

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.

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 (1067 mm) in height, columns and posts.

R325.6, R202 - Habitable Attics

R325.6 **Habitable attic.** A habitable attic shall not be considered a story when complying with all of the following requirements:

- 1.The occupiable floor area is not less than 70 square feet (17 m^2), in accordance with Section R304.
- 2.The occupiable floor area has a ceiling height in accordance with Section R305.
- 3.The occupiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides and the floor-ceiling assembly below.

- New definition in R202 - **ATTIC, HABITABLE.** A finished or unfinished habitable space within an attic

R328 Energy Storage Systems

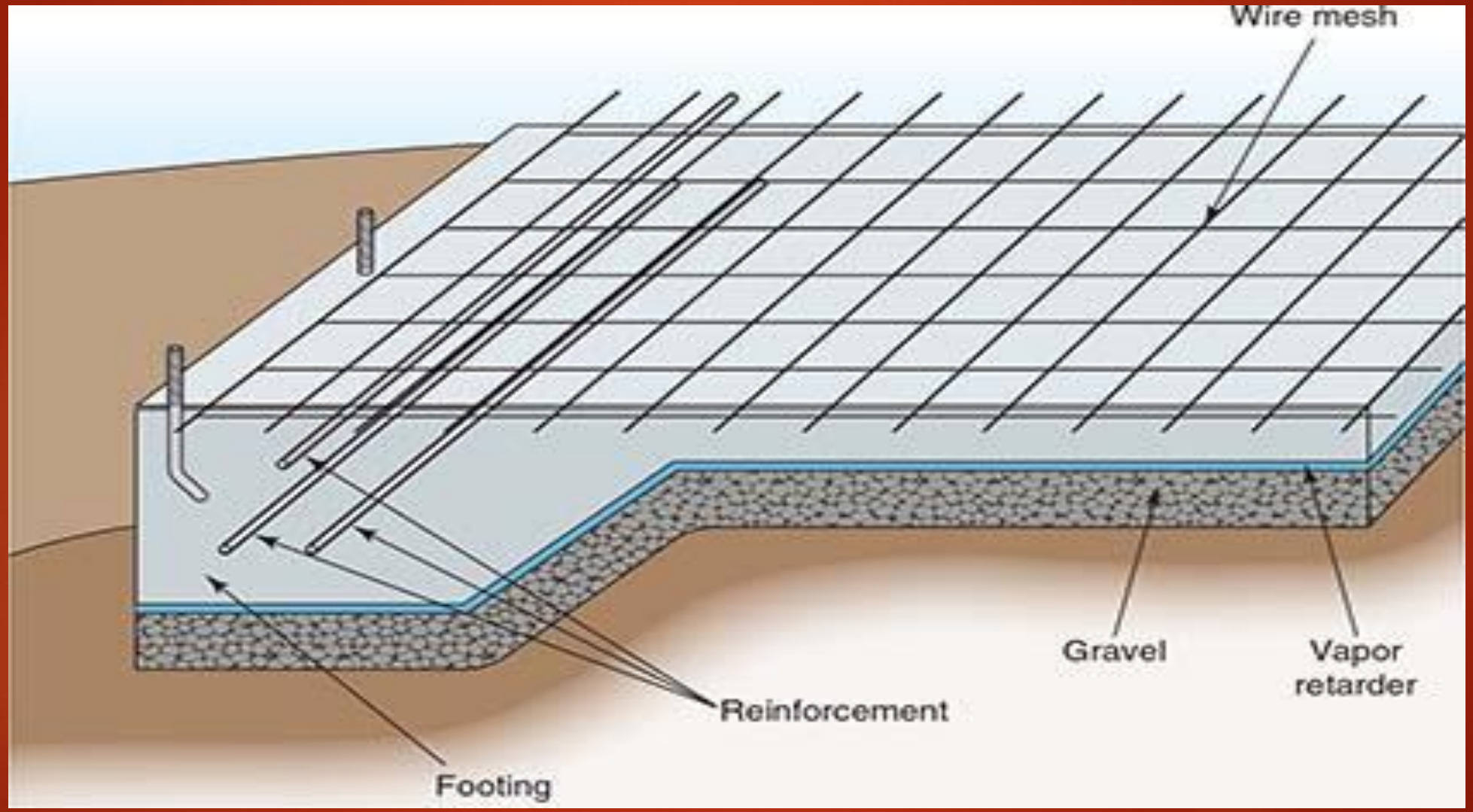
- Section includes requirements for maximum size of units, total kWh for specific locations, fire detection, ventilation, electrical vehicle use and documentation.

R506.2.3-Vapor Retarders Under Concrete Slabs

A ***minimum 10-mil*** (0.010 inch; 0.254 mm) vapor retarder conforming to ASTM E1745 Class A requirements with joints lapped not less than 6 inches (152 mm) ***shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.***

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

1. **1.**Garages, utility buildings and other unheated accessory structures.
2. **2.**For unheated storage rooms having an area of less than 70 square feet (6.5 m) and carports.
3. **3.**Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
4. **4.**Where approved by the building official, based on local site conditions.


Wire mesh
Gravel
Vapor retarder
Reinforcement
Footing

Maine Amendments to IRC 2021 Chapter 5

HTTPS://WWW.MAINE.GOV/DPS/FMO/BUILDING-CODES/MUBEC-RULES

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- Chapter 5 - IRC International Residential Building Code (Word DOC)
- Chapter 6 - IECC International Energy Conservation Code (docx)
- Chapter 7 - IMC Uniform Building and Energy Code - Mechanical Code (docx)

Scope – R101.2

- The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height.

Section R101.2 - Scope

Delete entire Exception and Subcategories; *and* ***Insert;*** "**Exception:** The following shall be permitted to be constructed in accordance with this code:

1. Work unit, provided the portion used exclusively for nonresidential use shall be limited to less than 10 percent of the area of the dwelling unit.
2. Detached one- and two-family dwellings or townhouses accommodating no more than 3 outsiders in rented rooms provided the rooms do not contain separate cooking facilities.
3. A "Day-Care Home" as defined by "Fire Codes and Standards adopted pursuant to Title 25, M.R.S §§ 2452 and 2465" in its place."

Section R105.2 – Work exempt from permit

R105.2 Work exempt from permit.

Exemption from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this *jurisdiction*. *Permits* shall not be required for the following ***or as further exempted by municipal ordinance:***

- **Building:**
  1. Other than *storm shelters*, one-*story* detached *accessory structures*, provided that the floor area does not exceed 200 square feet (18.58 m^2).
  2. Fences not over 7 feet (2134 mm) high.
  3. Retaining walls that are not over 4 feet (1219 mm) in height measured from finish grade to the top of the wall, unless supporting a surcharge.” in its place.

R301.2.5 - Radon Control

Insert new Section "R301.2.5 "Radon Control": A Radon Control system constructed in compliance with ASTM E1465-08 Standard Practice for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings, shall be installed in new one- and two-family dwellings and townhouses."

Table R302.6 Dwelling-garage fire separation

Delete all reference to "½-inch gypsum board or equivalent"; and

Insert "5/8-inch Type-X gypsum board or equivalent" in its place.

Section 310.4 –Area Wells

Insert (at end of sentence) "Area wells shall be maintained free and clear at all times."

R313.1.1 Design and installation

Section R313.1.1

Delete all language in R313.1.1; *and*
Insert "Automatic sprinkler systems for *townhouses* shall be designed and installed in compliance with Fire Codes and Standards adopted pursuant to Title 25, M.R.S §§ 2452 and 2465" in its place.

R313.2 One- and two-family dwellings automatic fire systems

Delete ~~Section 313.2 in its entirety.~~ all language in R313.2; *and* ***Insert*** "An automatic sprinkler system is not required in one- and two-family *dwellings*, including *additions* or *alterations* to existing buildings that are not already provided with a sprinkler system." in its place.

R313.2.1 Design and installation

Delete all language in R313.2.1; *and*
Insert "Automatic sprinkler systems shall be designed and installed in compliance with Fire Codes and Standards adopted pursuant to Title 25, M.R.S §§ 2452 and 2465" in its place.

Sawn Lumber - (Floor)- R502.1.1, (Wall) - R602.1.1and (Roof-Ceiling) R802.1.1

Insert after section:

"**Exceptions:**

1. Sawn lumber used in buildings and structures exempt from permit by R105.2
2. Sawn lumber used in free-standing non-habitable accessory structures with an area of 600 square feet (56 m2) or less, of light-frame construction, with an eave height of 10 feet (3048 mm) or less."

Tables N1102.1.2 and N1102.1.3 Insulation and Fenestration Requirements

TABLE N1102.1.3

(R402.1.3)

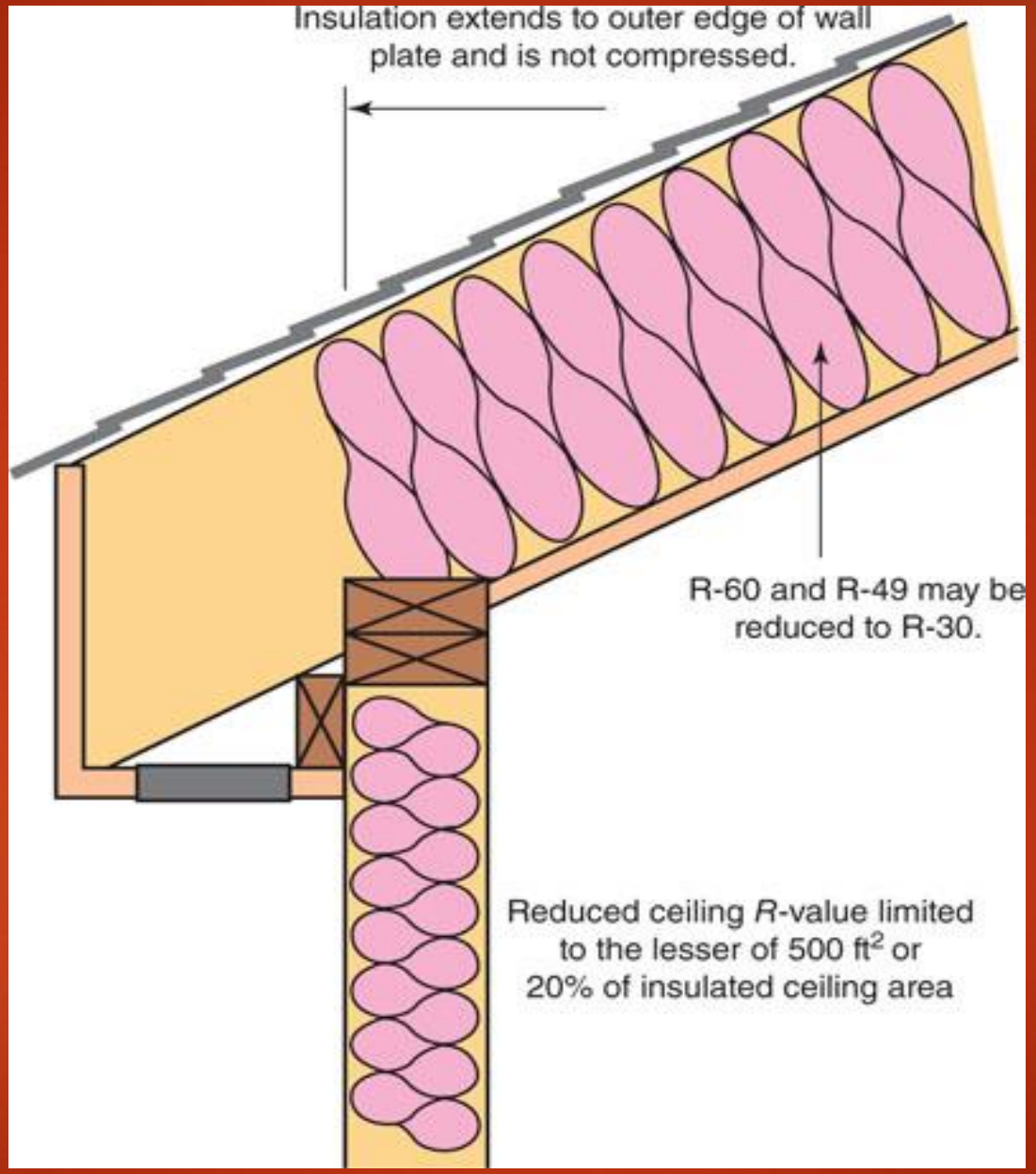
INSULATION MINIMUM *R*-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b, i]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE[g]	MASS WALL *R*-VALUE[h]	FLOOR *R*-VALUE	BASEMENT[c,g] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c,g] WALL *R*-VALUE
0	NR	0.75	0.25	30	13 or 0&10ci	3/4	13	0	0	0
1	NR	0.75	0.25	30	13 or 0&10ci	3/4	13	0	0	0
2	0.40	0.65	0.25	49	13 or 0&10ci	4/6	13	0	0	0
3	0.30	0.55	0.25	49	20 or 13&10ci[h] or 0&15ci[h]	8/13	19	5ci or 13[f]	10ci, 2 ft	5ci or 13[f]
4 except Marine	0.30	0.55	0.40	60	30 or 20&5ci[h] or 13&10ci[h] or 0&20ci[h]	8/13	19	10ci or 13	10ci, 4 ft	10ci or 13
5 and Marine 4	0.30	0.55	0.40	60	30 or 20&5ci[h] or 13&10ci[h] or 0&20ci[h]	13/17	30	15ci or 19 or 13&5ci	10ci, 4 ft	15ci or 19 or 13&5ci
6	0.30	0.55	NR	60	30 or 20&5ci[h] or 13&10ci[h] or 0&20ci[h]	15/20	30	15ci or 19 or 13&5ci	10ci, 4 ft	15ci or 19 or 13&5ci
7 and 8	0.30	0.55	NR	60	30 or 20&5ci[h] or 13&10ci[h] or 0&20ci[h]	19/21	38	15ci or 19 or 13&5ci	10ci, 4 ft	15ci or 1 9 or 13&5ci

N1102.2 - Ceiling Insulation

N1102.2.1 - Ceilings with attic spaces

"...Where Section N1102.1.3 requires R-60 insulation in the ceiling or attic, installing R-49 over 100 percent of the ceiling or attic area requiring insulation shall satisfy the requirement for R-60 insulation wherever the full height of uncompressed R-49 insulation extends over the top plate at the eaves. This reduction shall not apply to the insulation and fenestration criteria in Section N1102.1.3 and the Total UA alternative in Section N1102.1.5.

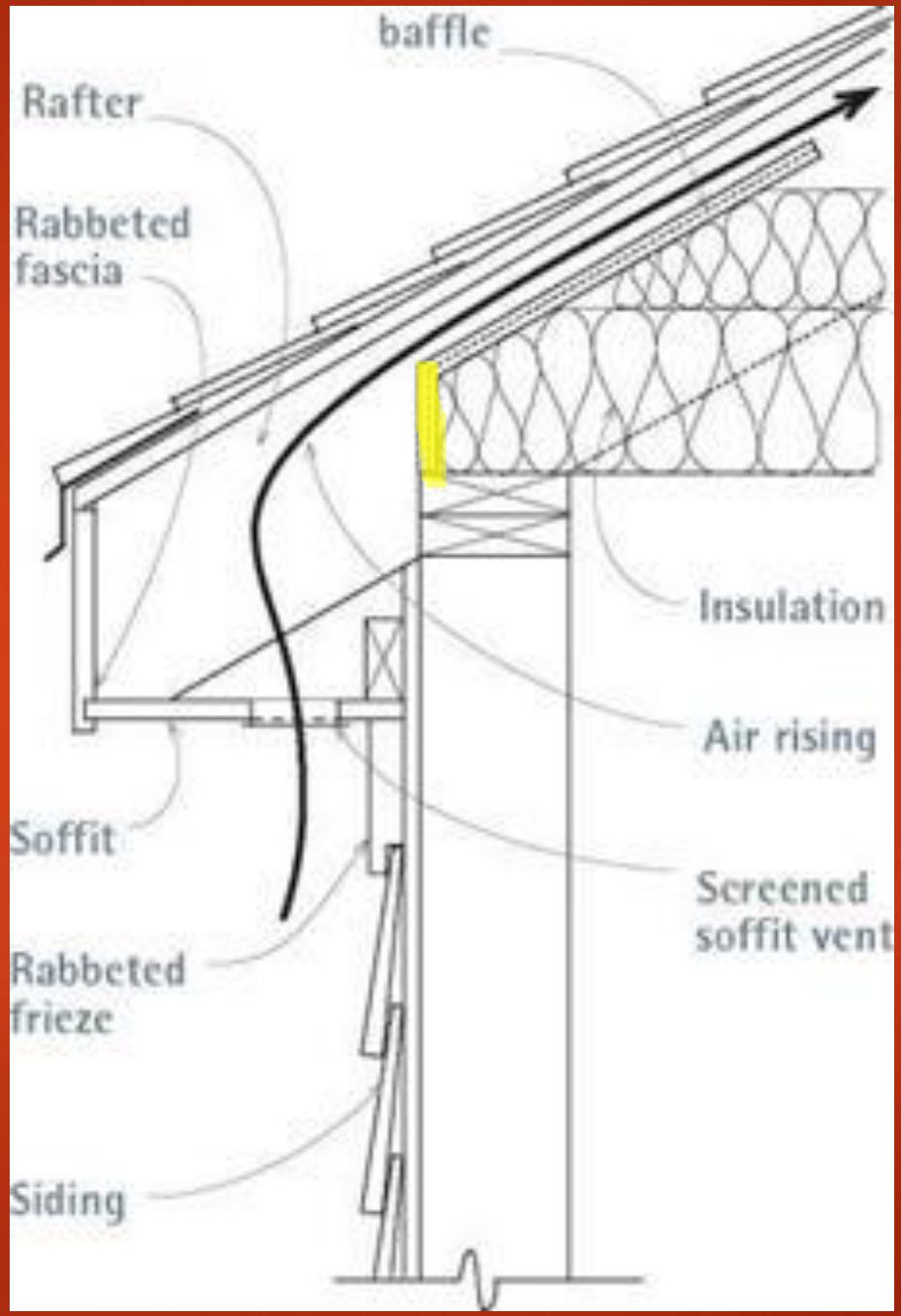

Insulation extends to outer edge of wall plate and is not compressed.
R-60 and R-49 may be reduced to R-30.
Reduced ceiling *R*-value limited to the lesser of 500 ft^2 or 20% of insulated ceiling area

N1102.2.2 (R402.2.2) Ceilings without attics

Where Section N1102.1.3 requires insulation *R*-values greater than R-30 in the interstitial space above a ceiling and below the structural roof deck and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation *R*-value for such roof/ceiling assemblies shall be R-30. Insulation shall extend over the top of the wall plate to the outer edge of such plate and shall not be compressed. This reduction of insulation from the requirements of Section N1102.1.3 shall be limited to 500 square feet (46 m^2) or 20 percent of the total insulated ceiling area, whichever is less.

N1102.2.3 - Eave baffle

For air-permeable insulations in vented attics, a baffle shall be installed adjacent to soffit and eave vents. Baffles shall maintain a net free area opening equal or greater than the size of the vent. The baffle shall extend over the top of the attic insulation. The baffle shall be permitted to be any solid material. The baffle shall be installed to the outer edge of the exterior wall top plate so as to provide maximum space for attic insulation coverage over the top plate. Where soffit venting is not continuous, baffles shall be installed continuously to prevent ventilation air in the eave soffit from bypassing the baffle.

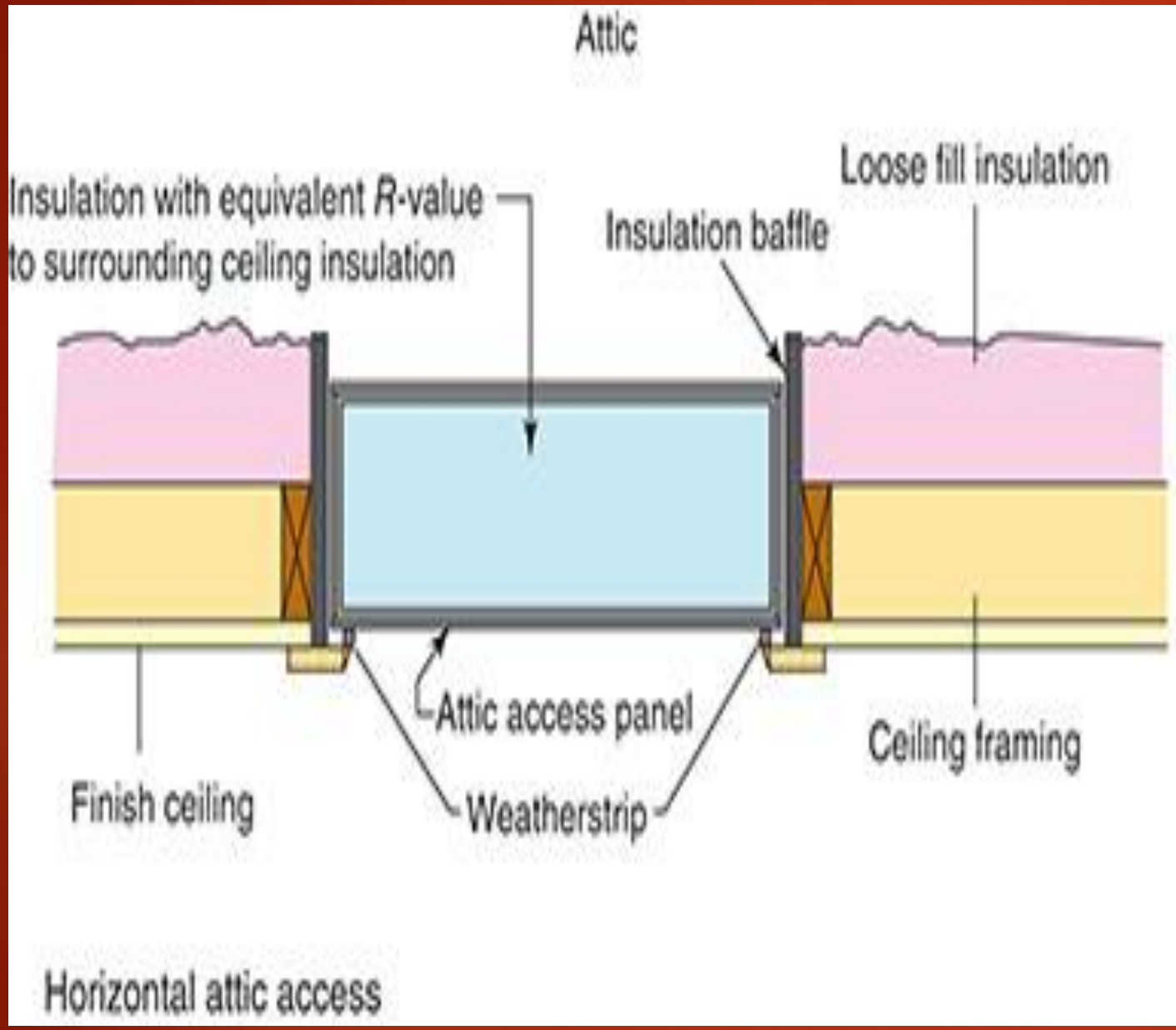

baffle
Rafter
Rabbeted fascia
Insulation
Air rising
Soffit
Screened soffit vent
Rabbeted frieze
Siding

N1102.2.4 -Access Hatches and Doors

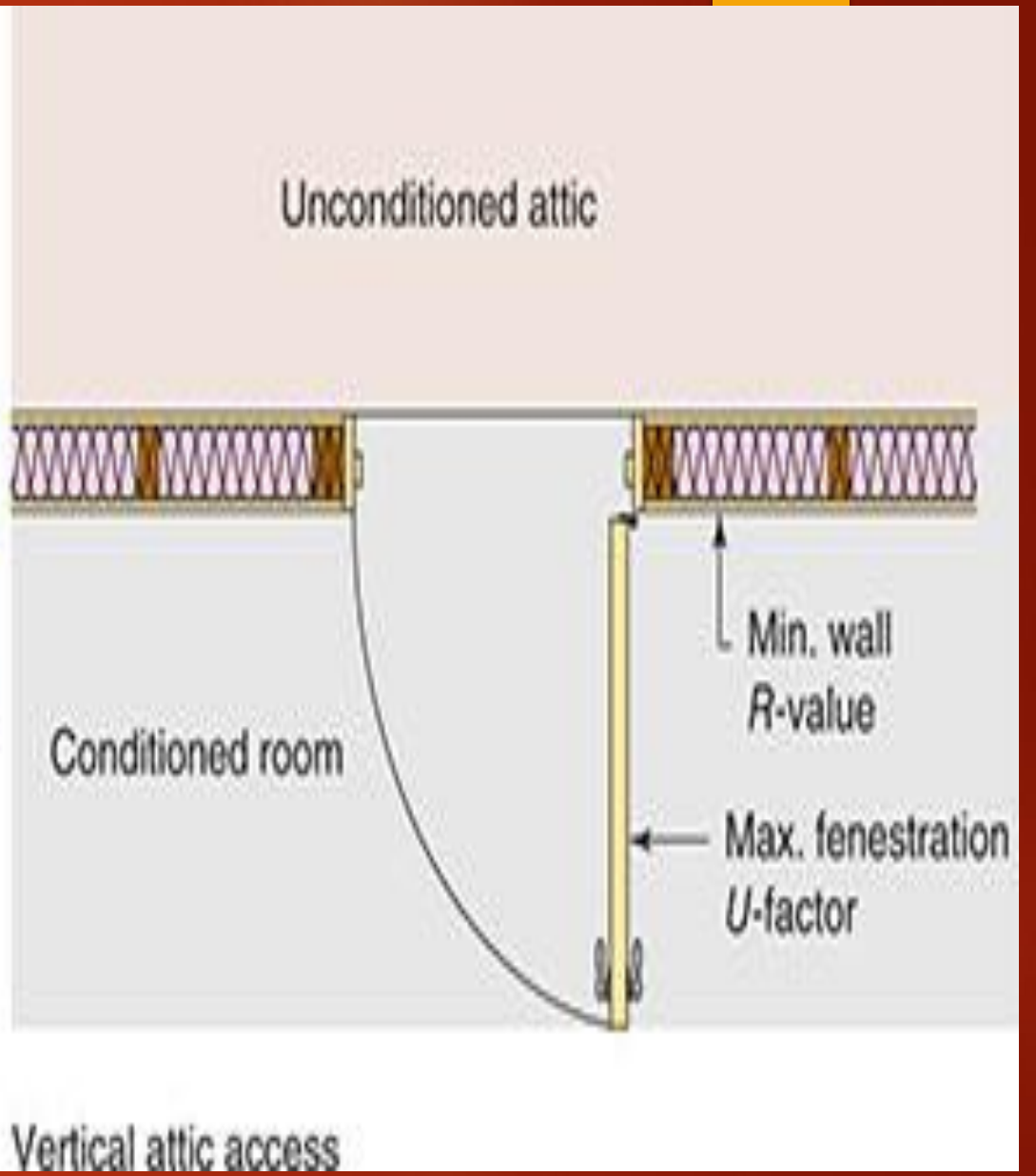
(R402.2.4) Access hatches and doors. Access hatches and doors from conditioned to unconditioned spaces such as attics and crawlspaces shall be insulated to the same level required for the wall or ceiling *R*-value in Table N1102.1.3 in which they are installed.

Exceptions:

1. **1.**Vertical doors providing access from conditioned spaces to unconditioned spaces that comply with the fenestration requirements of Table N1102.1.3 based on the applicable climate zone specified in Section N1101.7.
2. **2.**Horizontal pull-down, stair-type access hatches in ceiling assemblies that provide access from conditioned to unconditioned spaces in **Climate Zones 0 through 4** shall not be required to comply with the insulation level of the surrounding surfaces provided that the hatch meets all of the following:
    1. **2.1.**The average *U*-factor of the hatch shall be less than or equal to U-0.10 or have an average insulation *R*-value of *R*-10 or greater.
    2. **2.2.**Not less then 75 percent of the panel area shall have an insulation *R*-value of R-13 or greater.
    3. **2.3.**The net area of the framed opening shall be less than or equal to 13.5 square feet (1.25 m^2).
    4. **2.4.**The perimeter of the hatch edge shall be weatherstripped.



Horizontal attic access



Vertical attic access

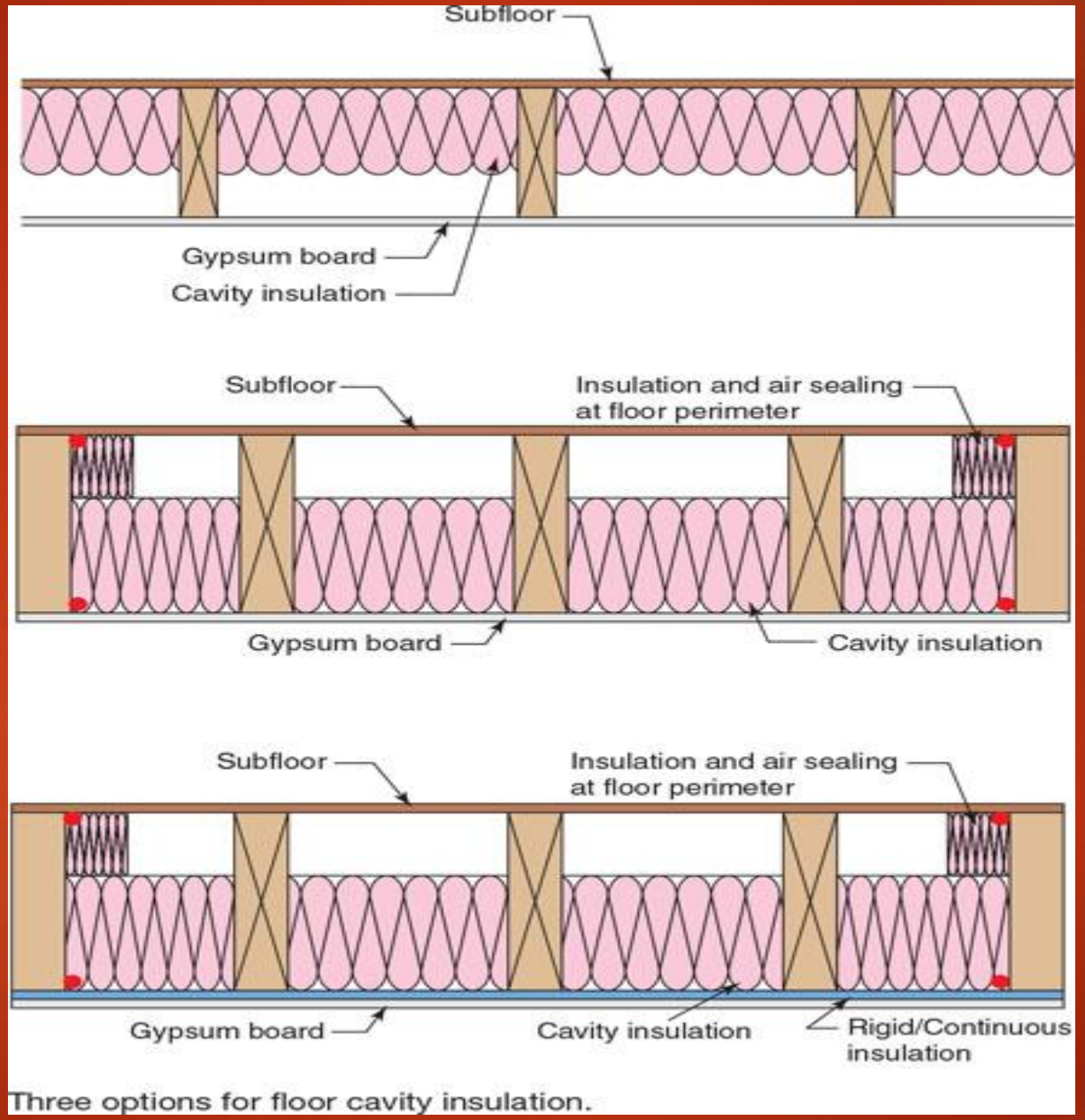
N1102.2.7 - Floor Insulation

N1102.2.7 (R402.2.7) Floors. Floor cavity insulation shall comply with one of the following:

1. **1.** Insulation shall be installed to **maintain permanent contact with the underside of the subfloor decking** in accordance with manufacturer instructions to maintain required *R*-value or readily fill the available cavity space.
2. **2.** Floor framing cavity insulation shall be permitted to be **in contact with the top side of sheathing separating the cavity and the unconditioned space below**. Insulation shall extend from the bottom to the top of all perimeter floor framing members and the framing members shall be air sealed.

N1102.2.7 - Floor Insulation

3. A combination of cavity and continuous insulation shall be installed so that the cavity insulation is **in contact with the top side of the continuous insulation that is installed on the underside of the floor framing from the bottom to the top of all perimeter floor framing members and the framing members shall be air sealed.**



Three options for floor cavity insulation.

N1102.2.8 - Unconditioned Basement

N1102.2.8 (R402.2.8) Basement Walls. Basement walls shall be insulated in accordance with Table N1102.1.3.

Exception: Basement walls associated with unconditioned basements where all of the following requirements are met:

1.The floor overhead, including the underside stairway stringer leading to the basement, is insulated in accordance with Section N1102.1.3 and applicable provisions of Sections N1102.2 and N1102.2.7.

2.There are no uninsulated duct, domestic hot water, or hydronic heating surfaces exposed to the basement.

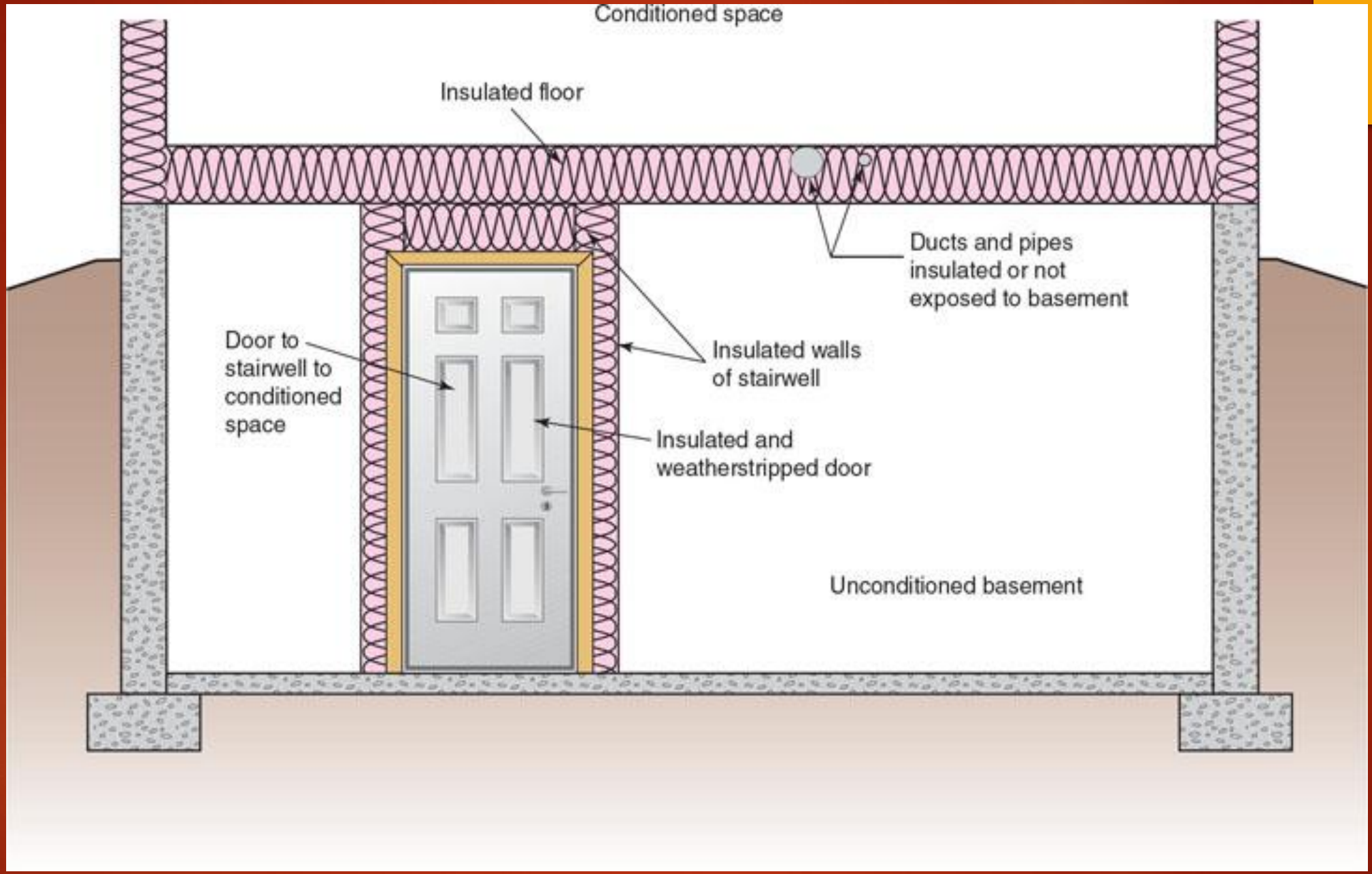
3.There are no HVAC supply or return diffusers serving the basement.

4.The walls surrounding the stairway and adjacent to conditioned space are insulated in accordance with Section N1102.1.3 and applicable provisions of Section N1102.2.

N1102.2.8 - Unconditioned Basement

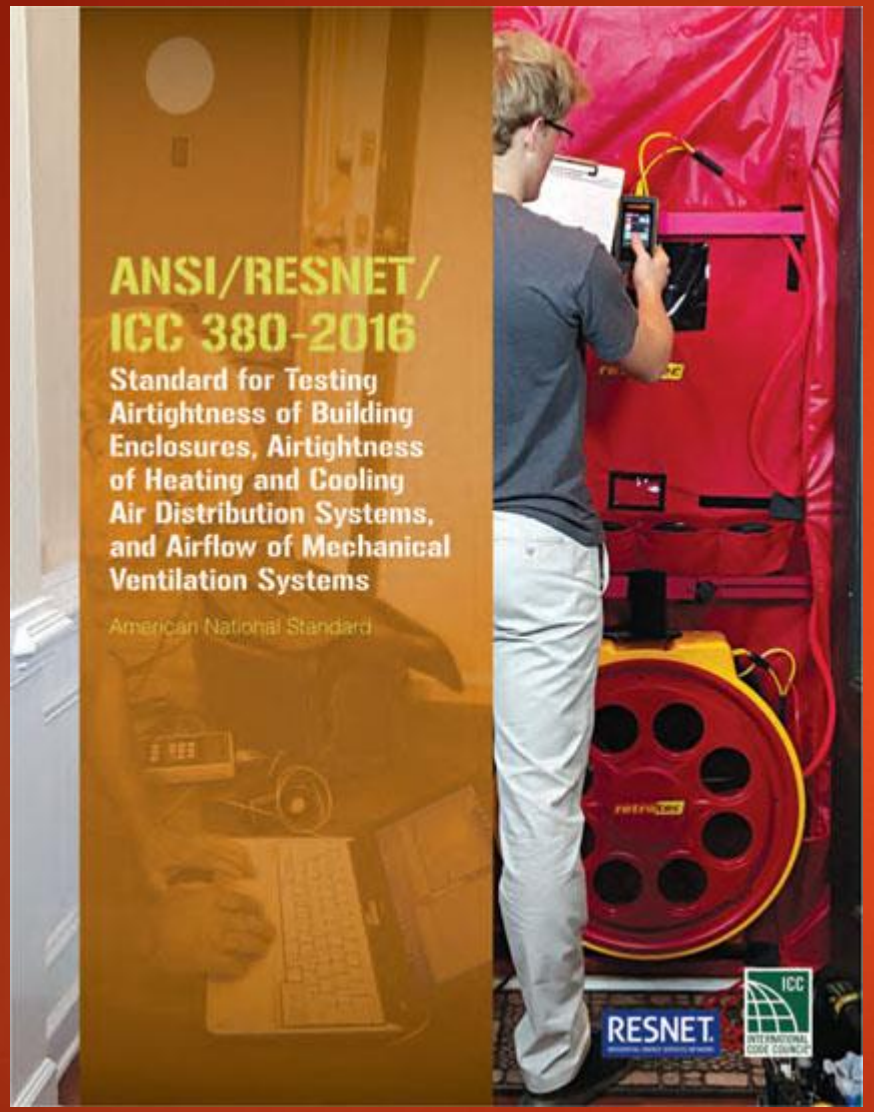
5.The door(s) leading to the basement from conditioned spaces are insulated in accordance with Section N1102.1.3 and applicable provisions of Section N1102.2, and weather-stripped in accordance with Section N1102.4.

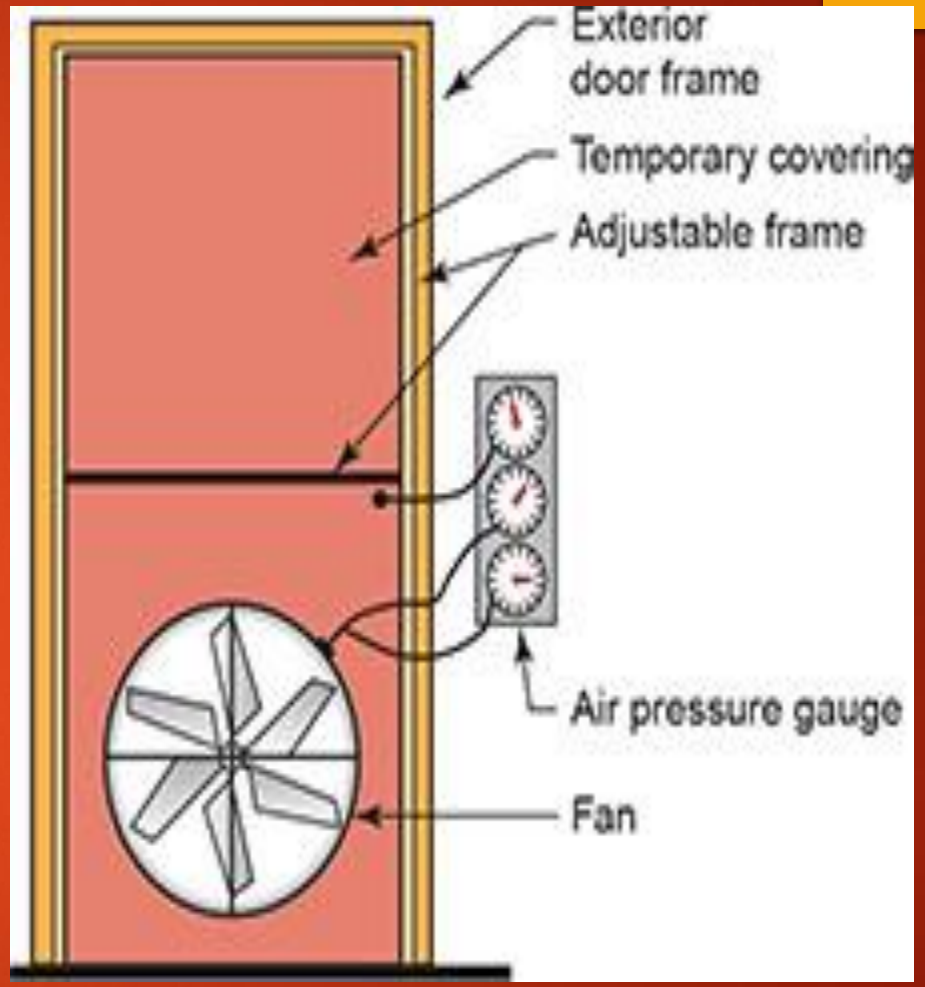
6.The building thermal envelope separating the basement from adjacent conditioned spaces complies with Section N1102.4.


Conditioned space
Insulated floor
Ducts and pipes
insulated or not
exposed to basement
Door to
stairwell to
conditioned
space
Insulated walls
of stairwell
Insulated and
weatherstripped door
Unconditioned basement

N1102.4 and TableN1102.4.1.1 Building Air Leakage and Testing

N1102.4.1.2 (R402.4.1.2)Testing. The building or dwelling unit shall be tested for air leakage. The maximum air leakage rate for any building or dwelling unit under any compliance path shall not exceed 5.0 air changes per hour or **0.28 cubic feet per minute (CFM) per square foot** [0.0079 $m^3/(s \times m^2)$] of dwelling unit enclosure area. Testing shall be conducted in accordance with ANSI/RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the building official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the building official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope have been sealed.


ANSI/RESNET/
ICC 380-2016
Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems
American National Standard
RESNET
ICC


Exterior door frame
Temporary covering
Adjustable frame
Air pressure gauge
Fan

N1102.4 and TableN1102.4.1.1
Building Air Leakage and Testing

Exception: When testing individual dwelling units, an air leakage rate **not exceeding 0.30 cubic feet per minute per square foot** [0.008 $m^3/(s \times m^2)$] of the dwelling unit enclosure area tested in accordance with RESNET/ICC 380, ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals), shall be permitted in all climate zones for:

1. Attached single- and multiple-family building dwelling units.
2. Buildings or dwelling units that are 1,500 square feet (139.4 m^2) or smaller.

Mechanical ventilation shall be provided in accordance with Section M1505 of this code or Section 403.3.2 of the *International Mechanical Code*, as applicable, or with other approved means of ventilation.

N1102.4.1.3 (R402.4.1.3)Leakage Rate. Where complying with Section N1101.13.1, the building or dwelling unit shall have an air leakage rate not exceeding 5.0 air changes per hour in Climate Zones 0, 1 and 2, **and 3.0 air changes per hour in Climate Zones 3 through 8, when tested in accordance with Section N1102.4.1.2.**

Several significant changes have been made to the building air leakage and testing provisions. For testing, the maximum air leakage rate has been set at five air changes per hour (ACH) for any compliance path. However, when following the prescriptive compliance path, the maximum leakage rate remains at 3 ACH for dwellings in Climate Zones 3 through 8. An exception was added for heated attached and detached garages that are field verified for air barrier and insulation installation criteria in the revised Table N1102.4.1.1. The ACH requirements for buildings and dwelling units following the prescriptive compliance path are relocated to new Section N1102.4.1.3.

An exception to using ACH to quantify air leakage in attached and small volume dwelling units was added because ACH is biased against small volume and attached dwellings. Although it is not difficult to get a single-family median size home to pass 3 or 5 ACH as required by the code, it is significantly more difficult to get a small volume home or an attached dwelling unit to pass. The alternative more accurately reflects leakage through the exterior enclosure area which removes built in volu-metric bias while continuing to ensure a tight structure.

Changes also occur throughout Table N1102.4.1.1 Air Barrier and Insulation Installation. In many cases, the changes are editorial: redundant text has been removed and other provisions have been clarified. The component section of the table has been amended to include other obstructions besides wiring and plumbing piping. There are a number of obstructions in insulated building cavities that insulation must be split around so that it fully encloses the obstruction. For example, gas piping or HVAC duct work now can be included as obstructions. New references in the table point to specific sections of the code to clarify the details of installations. For example, recessed lighting fixture air leakage requirements are described in Section N1102.4.5.

N1103.6 – Mechanical Ventilation

N1103.6 (R403.6) Mechanical ventilation Buildings and dwelling units shall be provided with mechanical ventilation that complies with the requirements of Section M1505 or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

N1103.6.1 (R403.6.1) Heat or energy recovery ventilation. ***Dwelling units shall be provided with a heat recovery or energy recovery ventilation system in Climate Zones 7 and 8***. The system shall be balanced with a minimum sensible heat recovery efficiency of 65 percent at 32°F (0°C) at a flow greater than or equal to the design airflow.

N1103.6.2 (R403.6.2) Wholedwelling mechanical ventilation system fan efficacy. Fans used to provide wholedwelling mechanical ventilation shall meet the efficacy requirements of Table N1103.6.2 at one or more rating points. Fans shall be tested in accordance with HVI 916 and listed. The airflow shall be reported in the product listing or on the label. Fan efficacy shall be reported in the product listing or shall be derived from the input power and airflow values reported in the product listing or on the label. Fan efficacy for fully ducted HRV, ERC, balanced, and in-line fans shall be determined at a static pressure of not less than 0.2 inch w.c. (49.82 Pa). Fan efficacy for ducted range hoods, bathroom, and utility room fans shall be determined at a static pressure of not less than 0.1 inch w.c. (24.91 Pa).

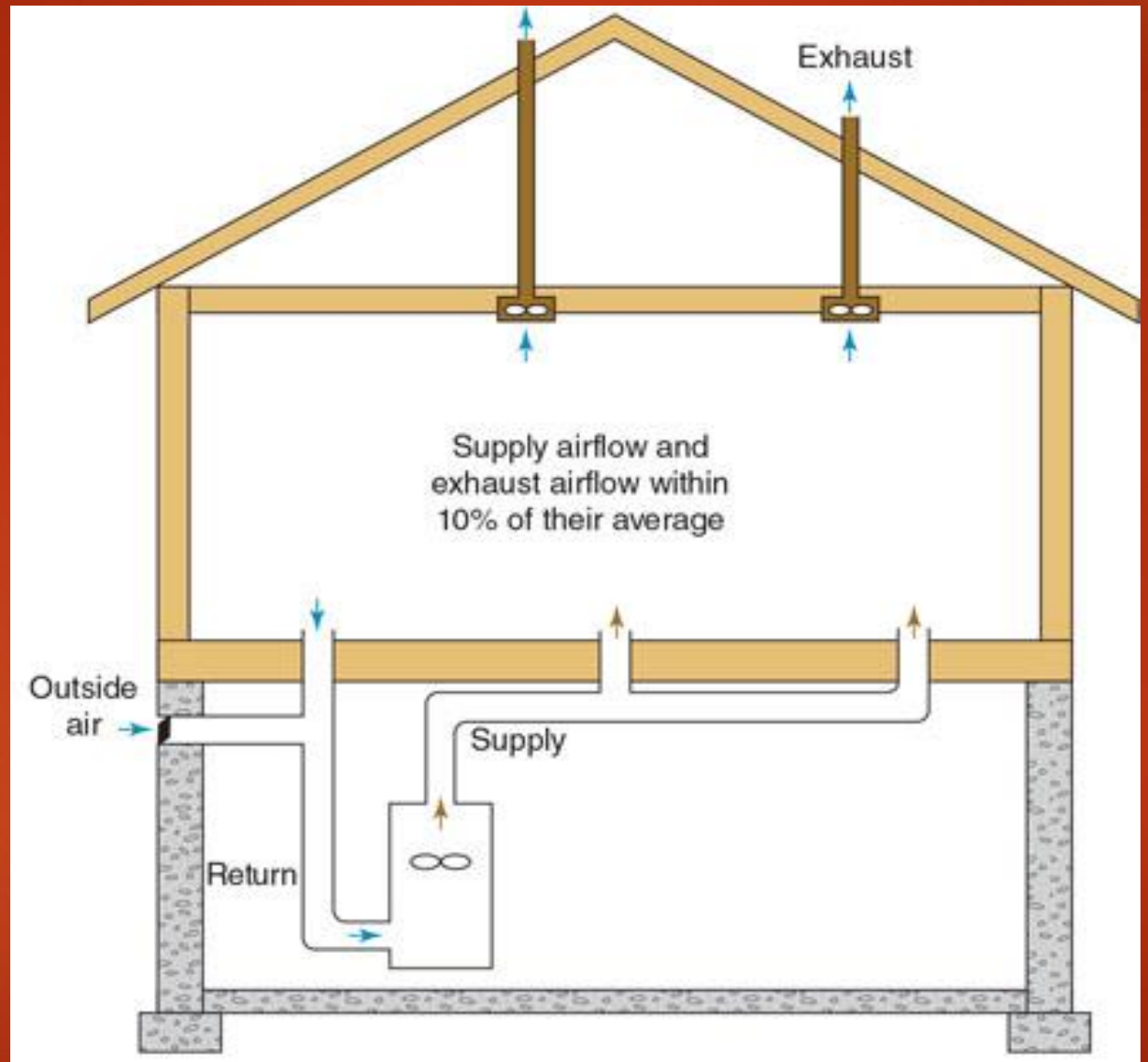
M1505 - Balanced Ventilation System Credit

R202 Definitions.
BALANCED VENTILATION SYSTEM. A ventilation system where the total supply airflow and total exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the supply and exhaust airflows.

M1505.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the ventilation system shall be **designed in accordance with this section.**

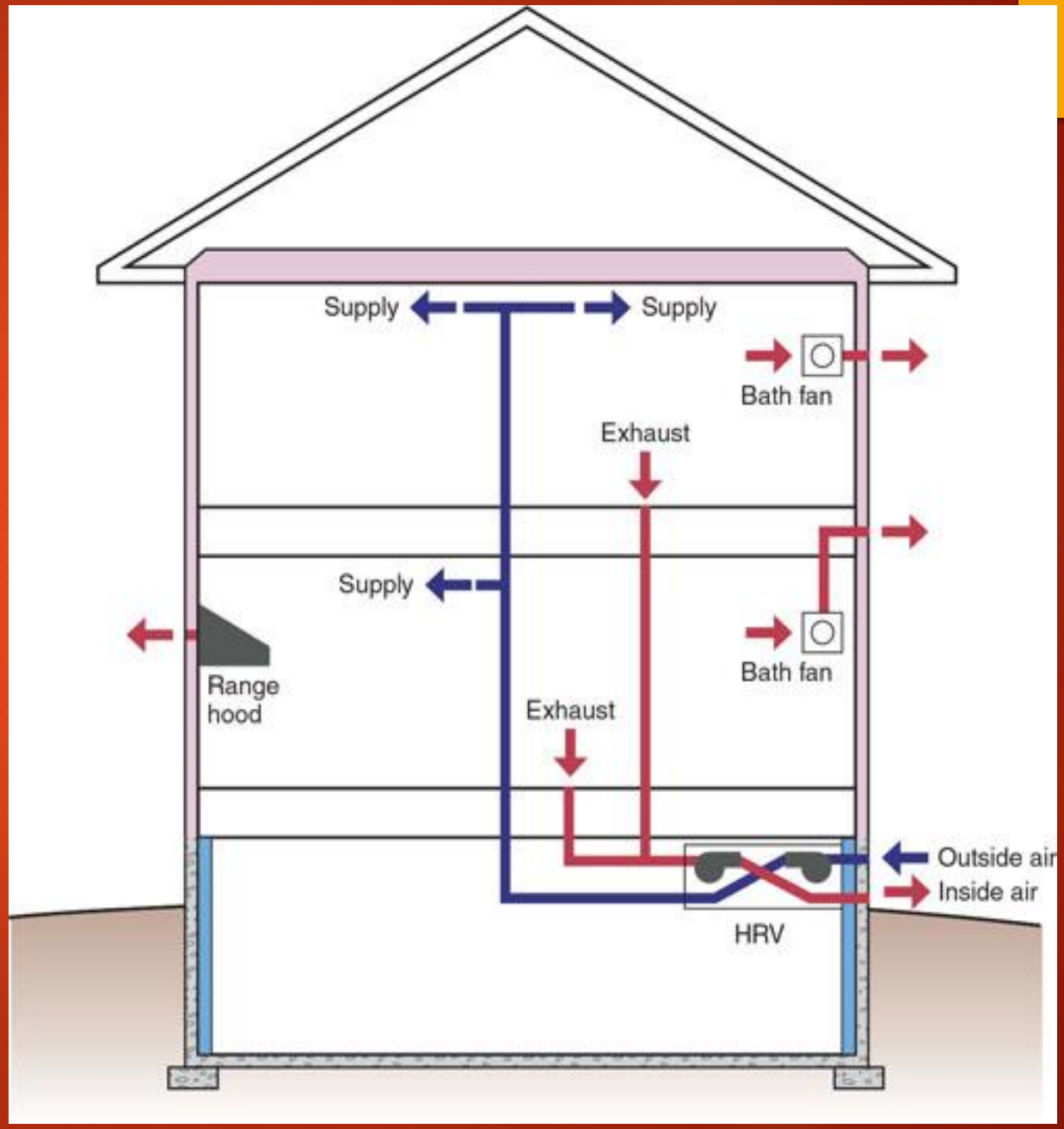
M1505.3 Exhaust equipment. Exhaust fans and whole-house mechanical ventilation fans shall be **listed and labeled as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51**.

M1505.4.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Controls shall include text or a symbol indicating their function.



Balanced ventilation system.

An HRV or ERV is required in Climate Zones 7 and 8.



M1505.4.3 Mechanical ventilation rate.

The whole house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1.

[Equation 15-1]

Ventilation rate in cubic feet per minute = (0.01 x total square foot area of house) + [7.5 x (number of bedrooms + 1)]

Exceptions:

1. 1.Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30%, provided that both of the following conditions apply:
    1. **1.1.** A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:
        1. **1.1.1.** Living room
        2. **1.1.2.** Dinning room
        3. **1.1.3.** Kitchen
    2. **1.2.** The whole-house ventilation system is a balanced ventilation system.
2. 2.Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1), by Equation 15-1, or by Exception 1 is multiplied by the factor determined in accordance with Table M1505.4.3(2).

TABLE M1505.4.4
Minimum Required Local Exhaust Rates for One- and Two-Family Dwellings

Area to be exhausted	Exhaust rates[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms—Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

TABLE M1505.4.4
Minimum Required Local Exhaust Rates for One- and Two-Family Dwellings
For SI: 1 cubic foot per minute = 0.0004719 m^3/s. 1 inch water column = 0.2488 kPa
a.The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch wc in accordance with Section M1505.3

Thank You!!

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R311.7 Stairways.

R311.7.1 Width.
R311.7.2 Headroom.
R311.7.3 Vertical Rise.
R311.7.4 Walkline.
R311.7.5 Stair Treads and Risers.
R311.7.6 Landings for Stairways.
R311.7.7 Stairway Walking Surface.
R311.7.8 Handrails.
R311.7.9 Illumination.
R311.7.10 Special Stairways.
R311.7.11 Alternating Tread Devices.
R311.7.12 Ship's Ladders.