RUTHERFORD COUNTY CODES OFFICIAL ASSOCIATION PRESENTS

SIGNIFICANT CHANGES TO THE 2018 INTERNATIONAL RESIDENTIAL CODE

WHAT TO EXPECT

- We will discuss most of the significant changes that are in the 2018 IRC. What is significant to you may not be significant to others, we did our best select what most would think are significant changes.
- Due to time constraints we will not be able to cover all the changes.

- The new codes will take effect:
  - 1) Murfreesboro Permits issued February 1st or after.

The 2018 IRC applies to a certain types of buildings:

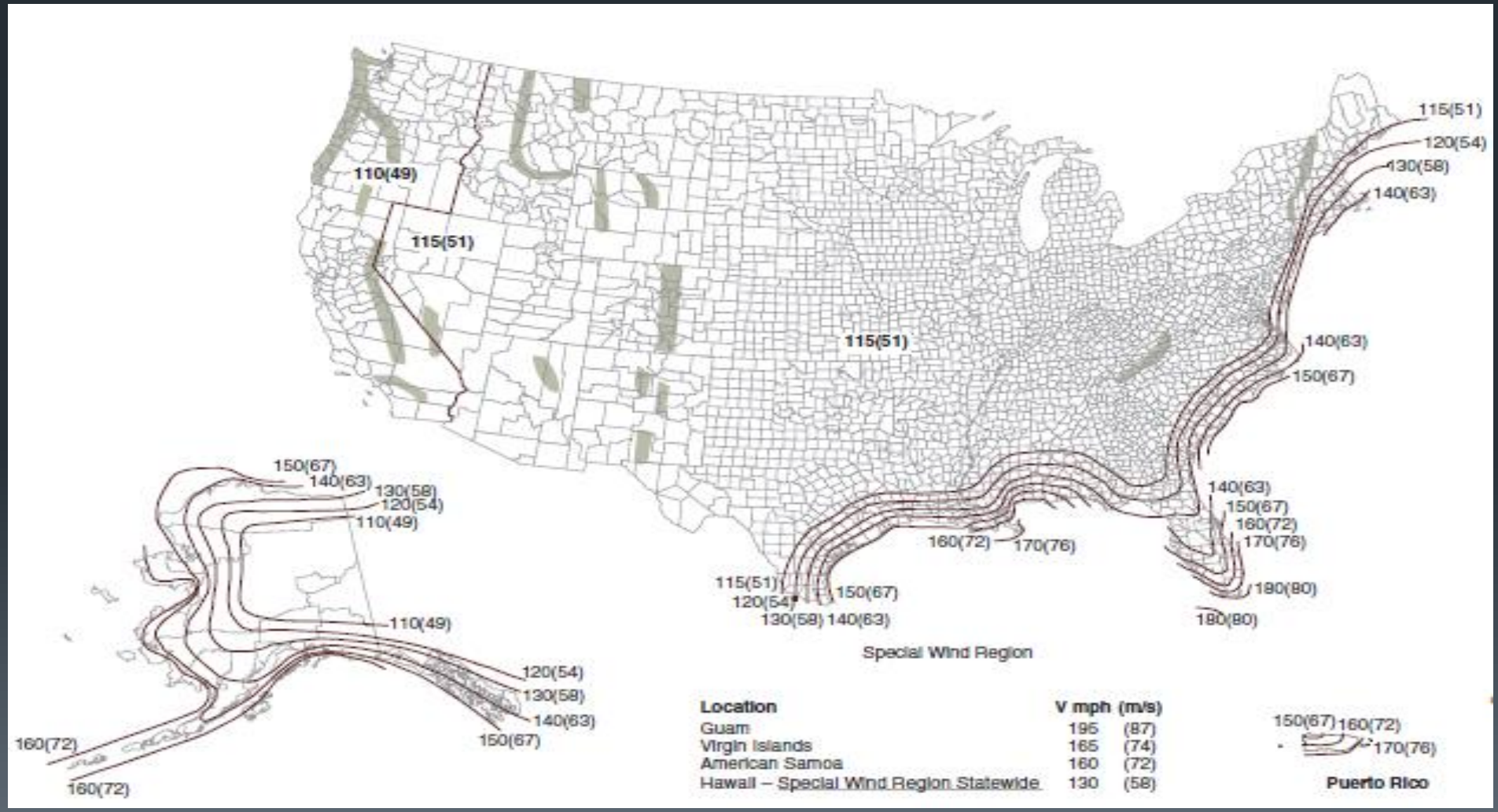
>Single Family and Two Family Dwellings that are 3 stories or less.
> Townhomes that are 3 stories or less.
> Most uses in the above structures that have a limited occupant load such as Bed and Breakfasts, Daycares, Group Homes, and similar uses.

State law exempts single family dwellings, duplexes or townhomes from being sprinkled unless required by the local jurisdiction.

Administration

Wind Speed

- The design wind speed has been increased to 115 mph.



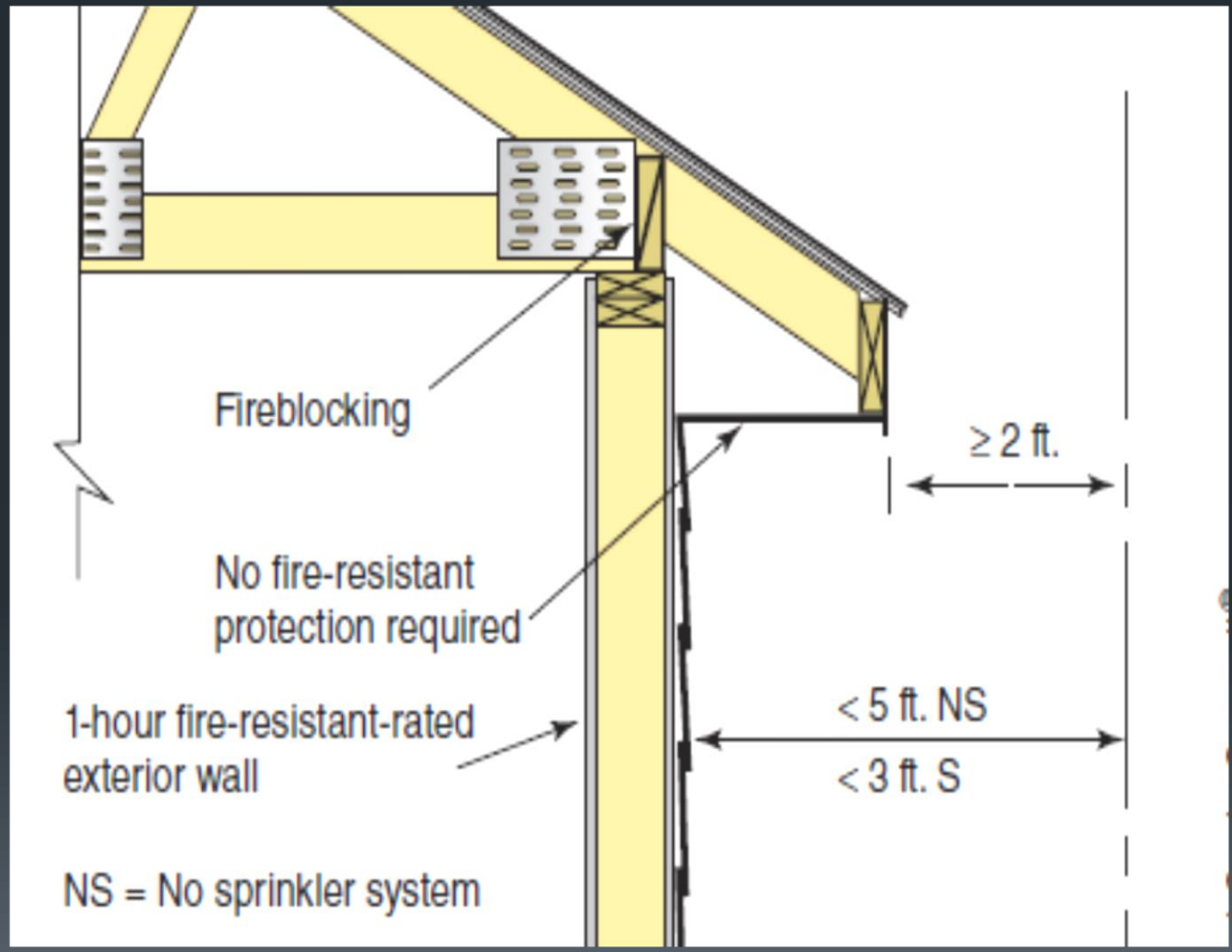
ROOF OVERHANGS

Roof overhangs less than 5’-0” from the property line must have:

1) The underside of the soffit one hour rated or;
2) Fire blocking is installed from the top of the wall to the underside of the roof deck.

Exterior walls within 2 feet cannot have projections or overhangs.

Murfreesboro does not all exterior walls within 5 foot of the property line



GABLE ENDS

The fire protection of the rake at the gable end of the house is not required where a gable vent is not installed.

TABLE R302.1(1) Exterior Walls

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119, ~~or~~ UL 263 or Section 703.3 of the *International Building Code* with exposure from both sides	~~< 5~~ 0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	N/A	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber or fire-retardant-treated wood[a, b]	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Openings in walls	Not allowed	N/A	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable

a. ~~Roof eave~~ The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fire blocking is provided from the wall top plate to the underside of the roof sheathing.
b. ~~Roof eave~~ The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the ~~eave~~ rake overhang where ~~provided that~~ gable vent openings are not installed.

FLOOR ASSEMBLIES

Floor assemblies that are not required elsewhere in the code to be fire-resistance rated, shall be provided with ½-inch gypsum… on the underside of Wood I's or Open Web Trusses used as floor framing members where the intended use is for storage or has an electric or gas heating appliance.

Modified in the 2018 code, is the addition of electric-powered heating appliances in addition to fuel-fired heating appliances.

FLOOR ASSEMBLIES

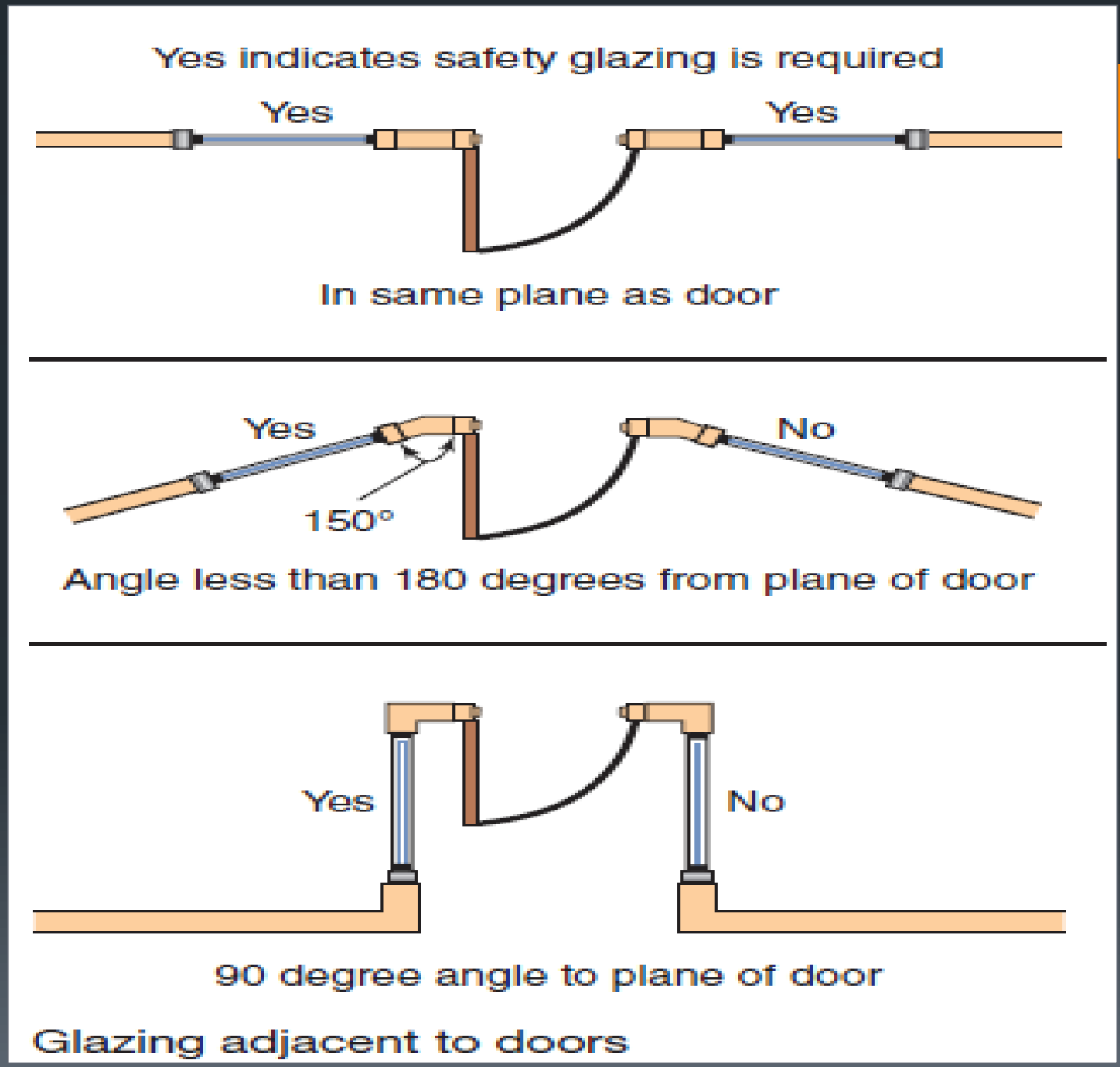
- Exceptions:
  - 1) Crawl spaces not intended to be used for storage or installation of heating equipment.
  - 2) Rooms or spaces 80 sf or less and separated with ½” sheetrock or 5/8” wood structural panels with fire blocking installed between floor joists.
  - Wood I’s treated to comply with this section.

- ***LP® FlameBlock® I-Joist Advantages is one of many that comply.***

GLAZING REQUIREMENTS

- 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 ~~perpendicular to~~ less than 180 degrees from the plane of the door in a closed position and within 24 inches of the hinge side of an in-swinging side of a door.
- Exceptions:
- 1. Decorative glazing.
- 2. Where 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 door.

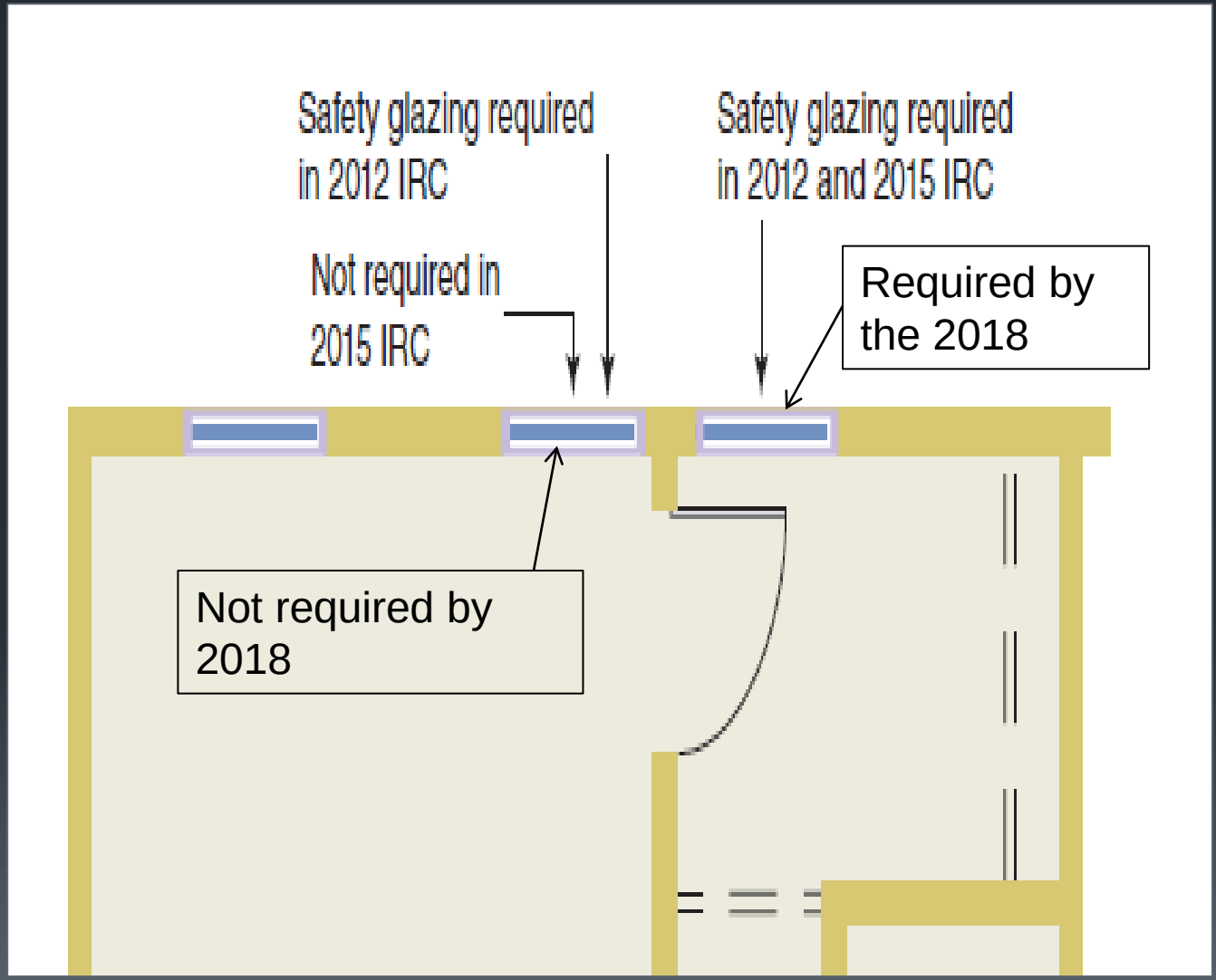
GLAZING AT DOORS



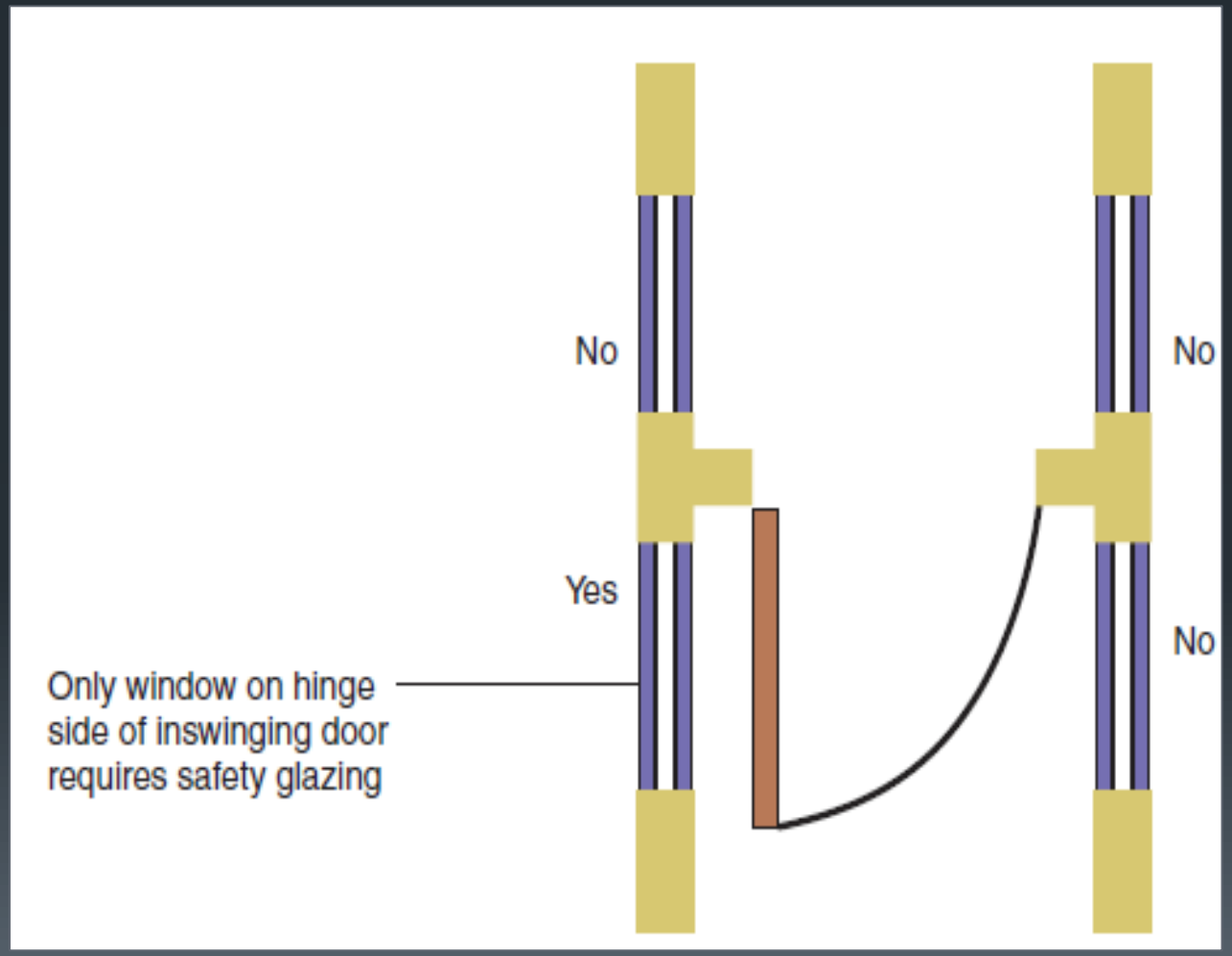
SAFETY GLAZING AT DOORS

Window is in a wall that is with 180 degrees of the plane of the door in the closed position.

One window on side of door in swing the other is not.



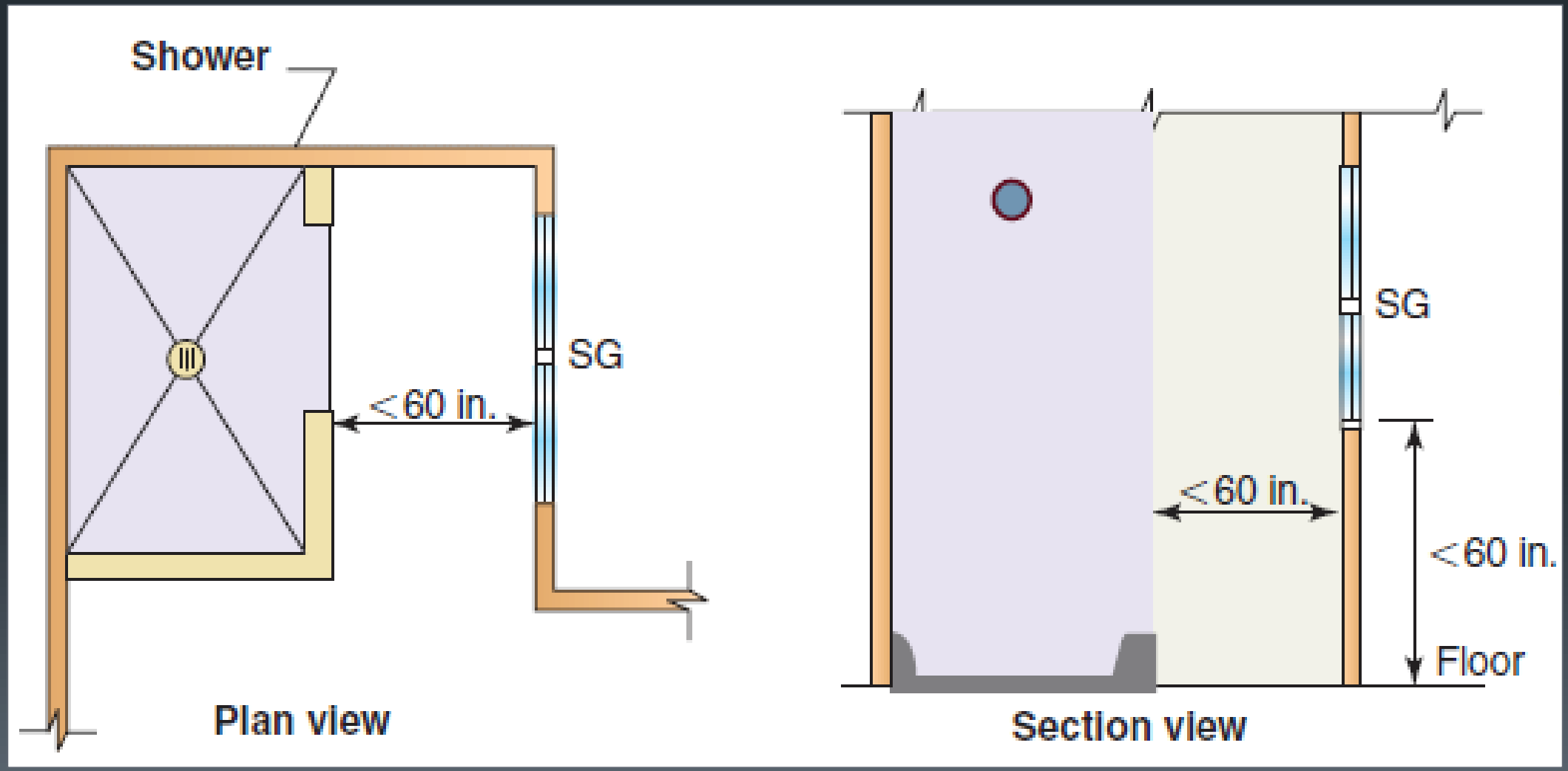
GLAZING AT DOORS



GLAZING AT WET LOCATIONS

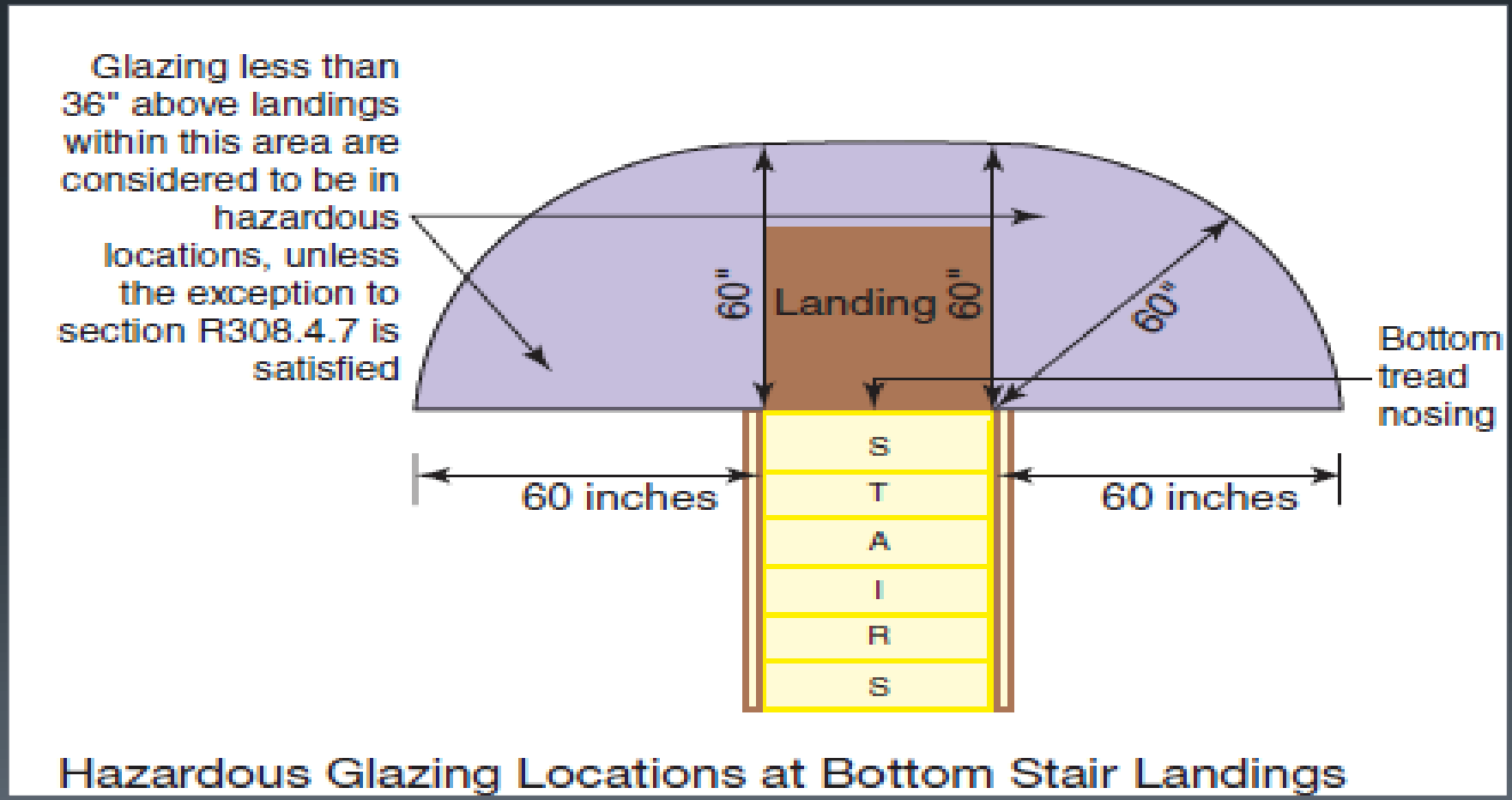
- Glazing in walls, enclosures, or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers, and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches measured vertically above any standing or walking surface shall be considered to be a hazardous location. This shall apply to single glazing and all panes in multiple glazing.
- Exception: Glazing that is more than 60 inches, 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.

SAFETY GLAZING AT SHOWERS, HOT TUBS AND SAUNAS



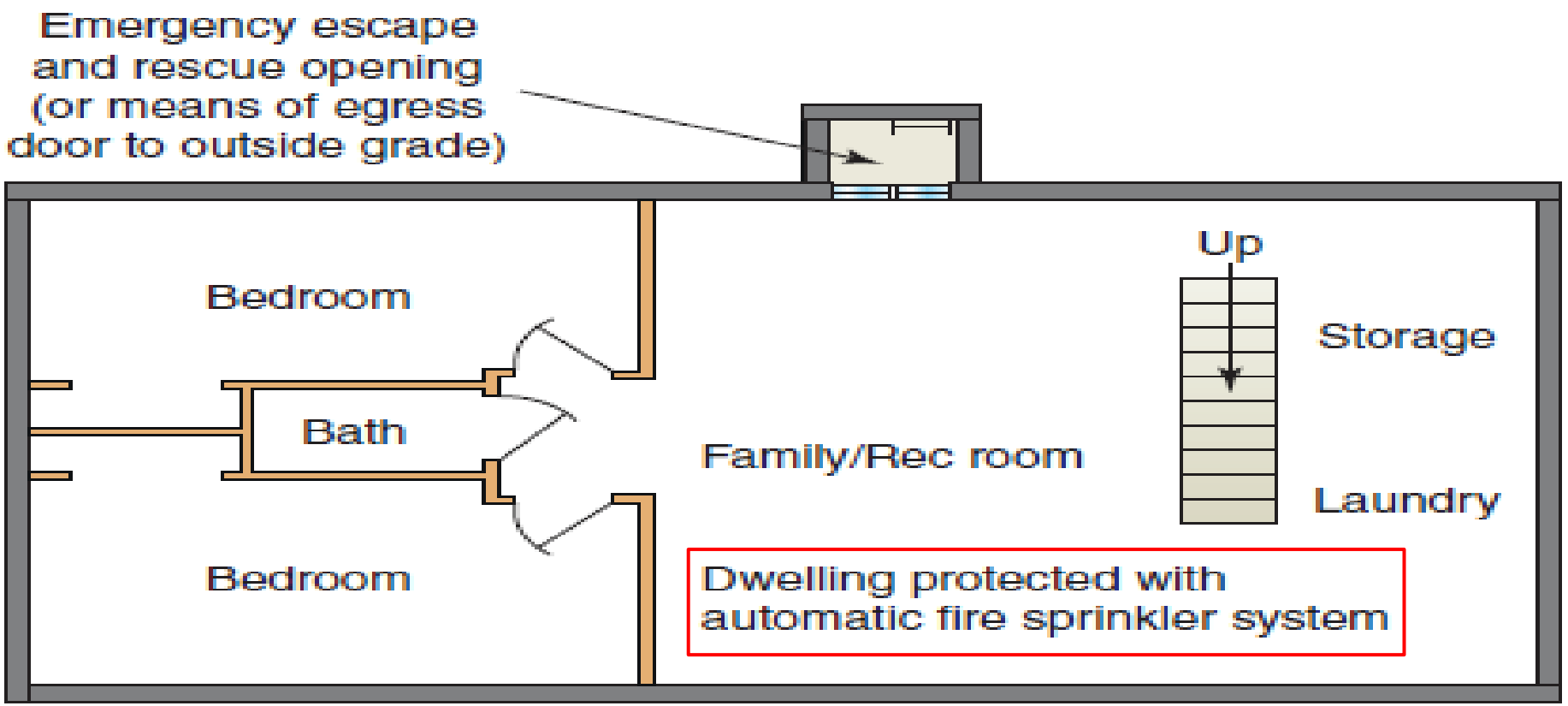
GLAZING AT STAIR LANDING

Only glazing within 36” above the landing and in front of or in plane of the bottom tread must be safety glazing.
A guard 18” from the glazing can be installed in lieu of the safety glazing.



Hazardous Glazing Locations at Bottom Stair Landings

DWELLINGS WITH SPRINKLER SYSTEMS BASEMENT RESCUE OPENINGS



Basement floor plan

2018 IRC does not require emergency escape and rescue openings in basement bedrooms when meeting conditions

STAIRWAY CHANGES

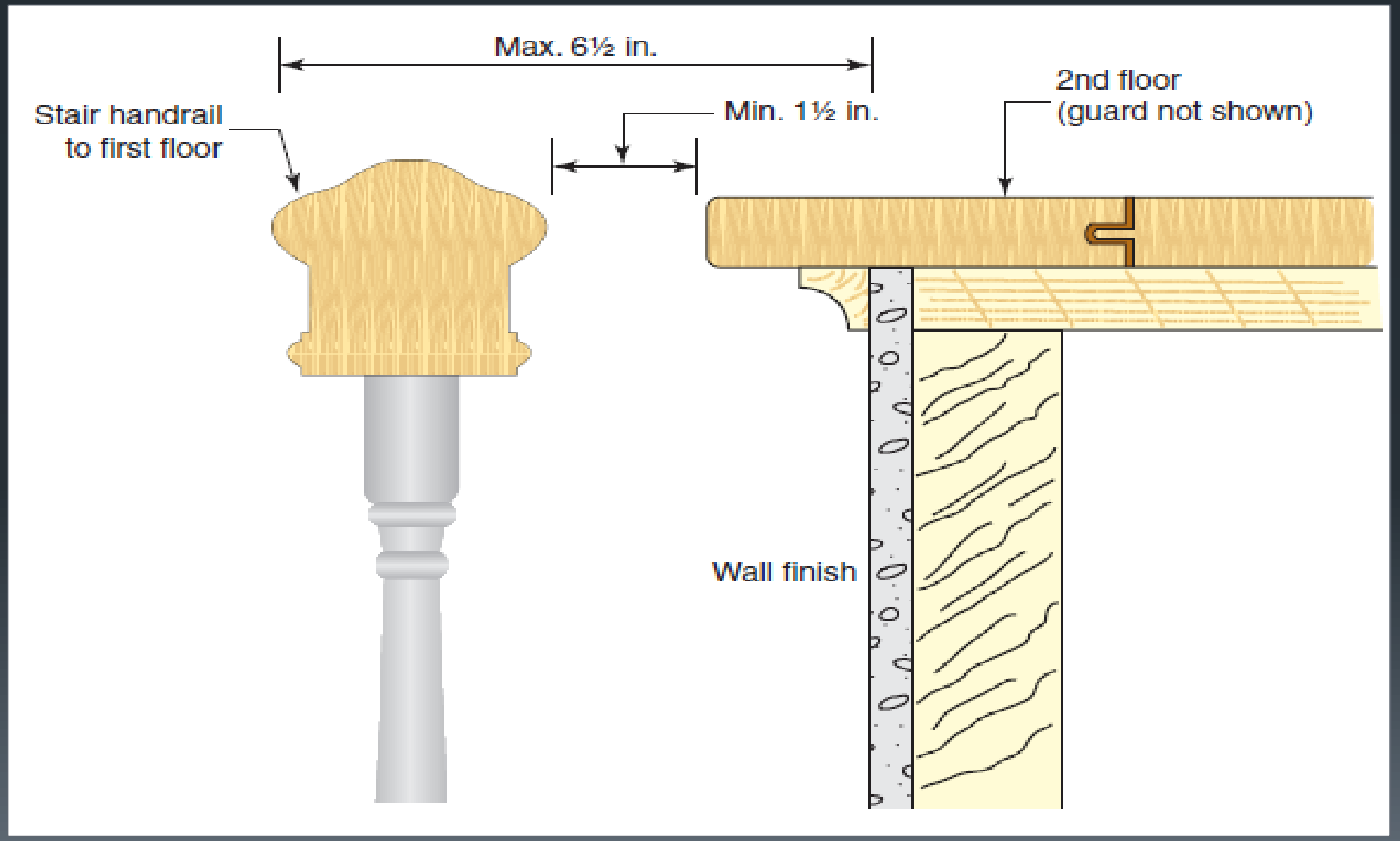
- Changes to stairways include:
  - 1) A handrail can project up to 6 ½” into the stairway width at an adjacent stair tread, nosing or landing. Must maintain required clearances, 36” above handrail and 31 ½” below handrail.
  - 2) Ships ladders and alternating tread devices are allowed to serve as a means of egress for a loft that is 200 sf or less. A new section specifies tread, riser and handrail requirements of these devices.
  - 3) The maximum rise of a stairway without an intermediate landing as been increased from 12’-0” to 12’-7”.
  - Nosing are required on all landings, floors and treads. If tread depth is 11” or greater, a nosing is not required. This change is to promote a more consistent step pattern on stairways.
  - Open risers are permitted on spiral stairs and stairs that are not more than 30” above grade.
  - Guard height are no longer measured from the seat of fixed seating. Guard height is measured from the walking surface.

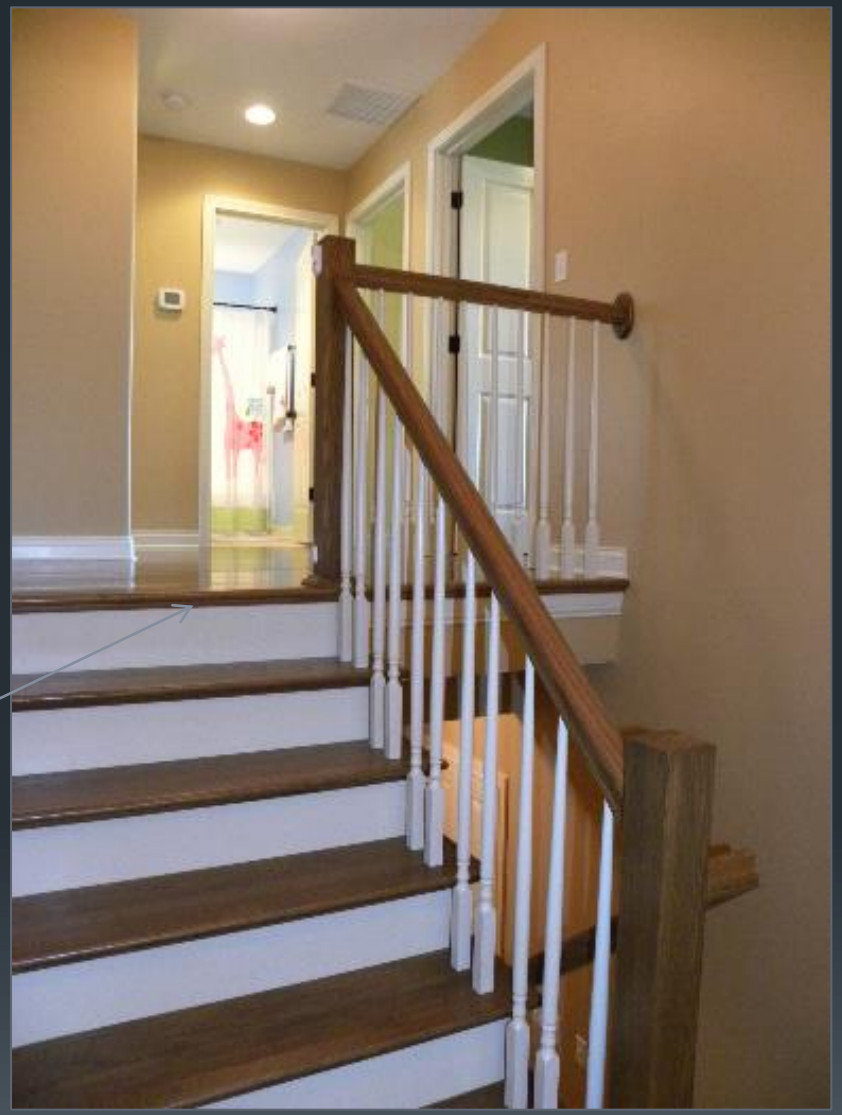
A 6 ½” projection is allowed as long as the required width of 32 ½” for a handrail on one side and 27” on two sides is maintained.

The 1 ½ clearance behind the handrail must also be maintained.

Building Planning

HANDRAIL PROJECTIONS





Nosing required at landings

Building Planning

SMOKE DETECTORS

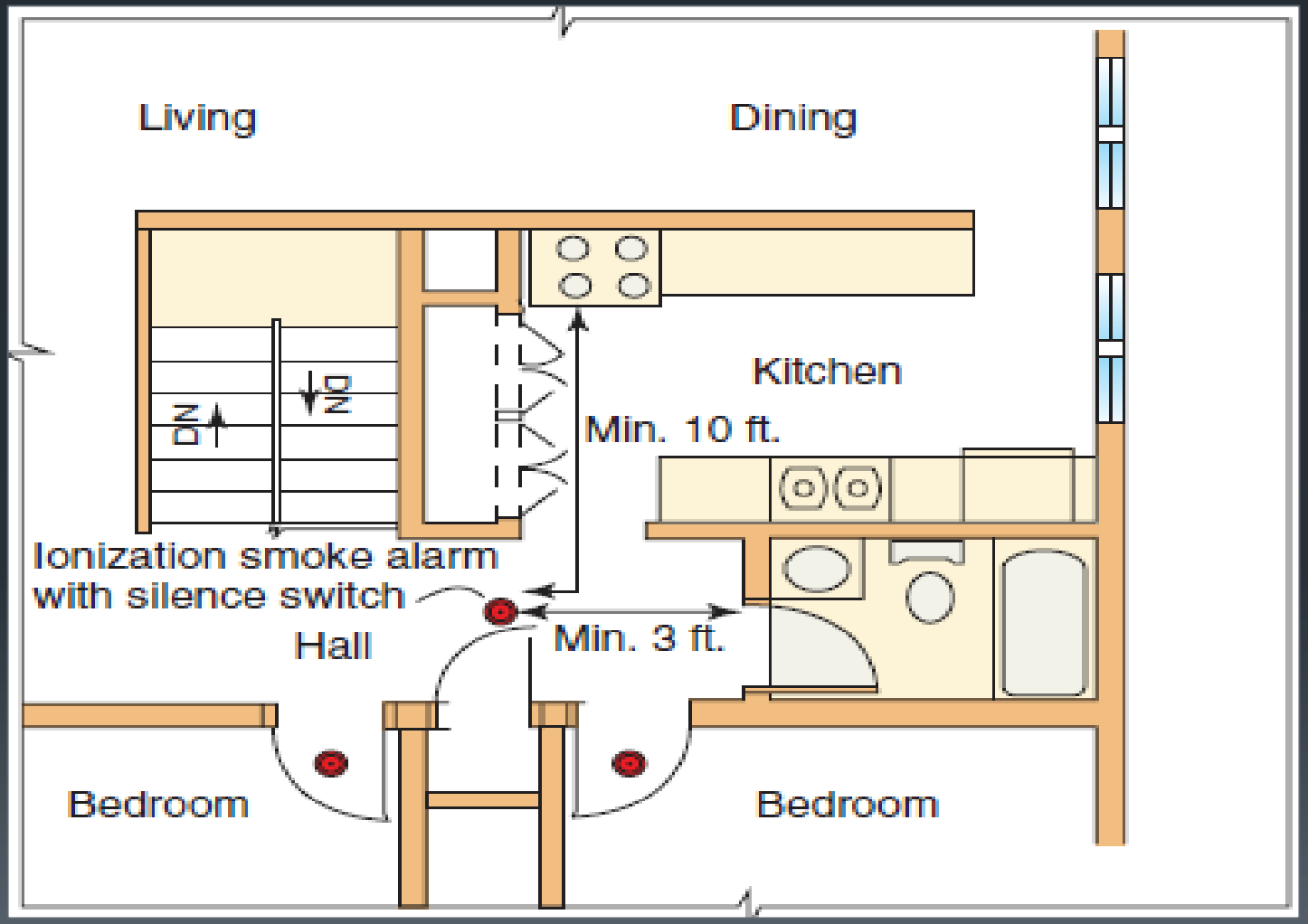
- Smoke detector section has been reworked to include the following:
  - 1) Ionization smoke detectors must be 20 feet from cooking appliances or 10 feet if equipped with an alarm silencing switch.
  - 2) Photoelectric must be 6 feet from cooking appliances
  - 3) Smoke detectors cannot be installed within 3 feet of a door to a bathroom that has a tub or shower.
  - If either of the above locations result in a smoke detector not being installed, the above requirements shall be waived.
  - If a home owner has a fire alarm system installed; it does not have to be monitored by a central station, however it must preform the same as interconnected smoke detectors and must be owned the home owner.
  - In alterations, smoke detectors must be interconnected regardless if wall or ceiling finishes are removed.

SMOKE DETECTOR LOCATIONS

Ionization detectors must be 20 feet from permanent cooking equipment.

Photoelectric detectors must be installed at least 6 feet from permanent cooking equipment.

All smoke detectors must be installed at least 3 feet from a door that serves a bathroom with a tub or shower.



CARBON MONOXIDE DETECTORS

- This section has been reworked to mimic smoke detector requirements:
  - 1) Required in dwelling units that have either an attached garage with an opening into the dwelling unit; or fuel fired appliance in the dwelling unit.
  - 2) Required outside each sleeping room or sleeping room group and in each sleeping room that has a fuel fired appliance or a fuel fired appliance in the sleeping rooms attached bathroom.
  - 3) Carbon monoxide detectors shall be connected to a permanent power supply with battery back-up and where multiple detectors are required they shall be interconnected.
  - 4) Alterations; that are interior and require a permit to a dwelling unit that has conditions as listed in item 1 above shall have carbon monoxide detectors installed as in new construction. Battery operated is permitted and interconnection is not required.
  - 5) Combination smoke and carbon monoxide detectors are permitted where listed with UL for such use.

MEZZANINES

MEZZANINES

- Mezzanines that comply with the following will not be counted as a story:
  - 1) Shall have a clear ceiling height above and below of 7’-0” minimum.
  - 2) Have a means of egress that complies with the IRC.
  - 3) Shall not be more than 1/3 of the area which it is in. Mezzanines in dwelling units that are sprinkled can be ½ the area of the room it is in if the only enclosed spaces are closets and bathrooms and the mezzanine is not above the 2nd floor.
  - 4) Shall be open to the room it is in except for walls or guards no more than 42” tall; except that rooms no more than 10% of the mezzanine floor area.
  - 5) Mezzanines can be fully enclosed if it is not more than 2 stories above grade, has 2 means of egress and is sprinkled.

HABITABLE ATTICS

HABITABLE ATTICS

- A habitable attic (finished or unfinished) 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.
- 2. The occupiable floor area has a ceiling height as required for habitable spaces.
- 3. The occupiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides and the floor-ceiling assembly below.
- 4. The floor of the occupiable space shall not extend beyond the exterior walls of the floor below.

Building Planning

R507.3.1 The minimum size of concrete footings shall be in accordance with Table R507.3.1, based on the tributary area. This is the actual area of the deck supported by the column footing.

TABLE R507.3.1
MINIMUM FOOTING SIZE FOR DECKS

LIVE OR GROUND SNOW LOAD[b] (psf)	TRIBUTARY AREA (sq. ft.)	LOAD BEARING VALUE OF SOILS [a, c, d] (psf)							
		1500[e]			2000[e]			2500[e]	
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)
40	20	12	14	6	12	14	6	12	14
	40	14	16	6	12	14	6	12	14
	60	17	19	6	15	17	6	13	15
	80	20	22	7	17	19	6	15	17
	100	22	25	8	19	21	6	17	19
	120	24	27	9	21	23	7	19	21
	140	26	29	10	22	25	8	20	23
	160	28	31	11	24	27	9	21	24
50	20	12	14	6	12	14	6	12	14
	40	15	17	6	13	15	6	12	14
	60	19	21	6	16	18	6	14	16
	80	21	24	8	19	21	6	17	19
	100	24	27	9	21	23	7	19	21
	120	26	30	10	23	26	8	20	23
	140	28	32	11	25	28	9	22	25
	160	30	34	12	26	30	10	24	27

Building Planning

DECK CONSTRUCTION

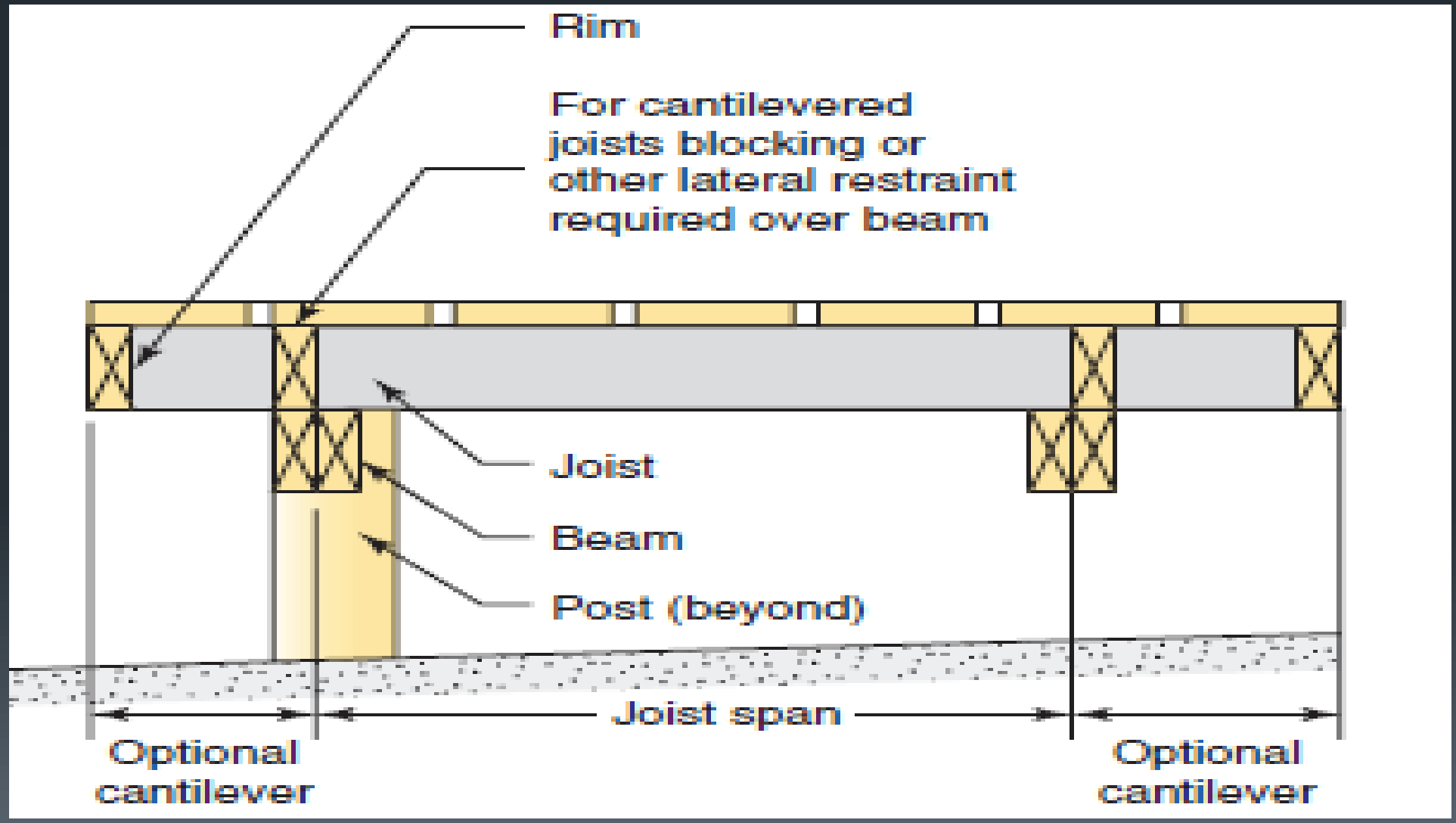


TABLE R507.5
DECK BEAM SPAN LENGTHS[a, b, g] (feet - inches)

SPECIES[c]	SIZE[d]	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	1 – 2 × 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1 – 2 × 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1 – 2 × 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1 – 2 × 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2 – 2 × 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 – 2 × 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 – 2 × 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 – 2 × 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 – 2 × 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 – 2 × 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 – 2 × 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3 – 2 × 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10

Building Planning

TABLE ~~R507.5~~ R507.6 Deck Joist Spans for Common Lumber Species (ft.-in.)

Species[a]	Size	Allowable Joist Span[b] — Spacing of Deck Joists[b] (inches)			Maximum Cantilever[c,f] — Spacing of Deck Joists with Cantilever (inches)		
		12	16	24	12	16	24
Southern pine	2 × 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 × 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 × 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 × 12	18-0	16-6	13-6	4-6	4-2	3-4
Douglas fir-larch[d] , hem-fir[d], spruce-pine-fir[d]	2 × 6	9-6	8-8	7-2	1-2	1-3	1-5
	2 × 8	12-6	11-1	9-1	1-11	2-1	2-3
	2 × 10	15-8	13-7	11-1	3-1	3-5	2-9
	2 × 12	18-0	15-9	12-10	4-6	3-11	3-3
Redwood, western cedars, ponderosa pine[e], red pine[e]	2 × 6	8-10	8-0	7-0	1-0	1-1	1-2
	2 × 8	11-8	10-7	8-8	1-8	1-10	2-0
	2 × 10	14-11	13-0	10-7	2-8	2-10	2-8
	2 × 12	17-5	15-1	12-4	3-10	3-9	3-1

Building Planning

MINIMUM BUILDING FOOTING SIZES

- Footing sizes are now in three different tables:
- 1. One, two, and three stories built on a slab on grade (without a first-floor load),
- 2. One, two, and three stories built over a crawl space (with a first floor load and foundation wall/footing load), and
- 3. One, two, and three stories built with basement (with a first-floor load and basement wall load—previously, the table was silent on how to handle the extra load from a masonry or concrete basement wall).

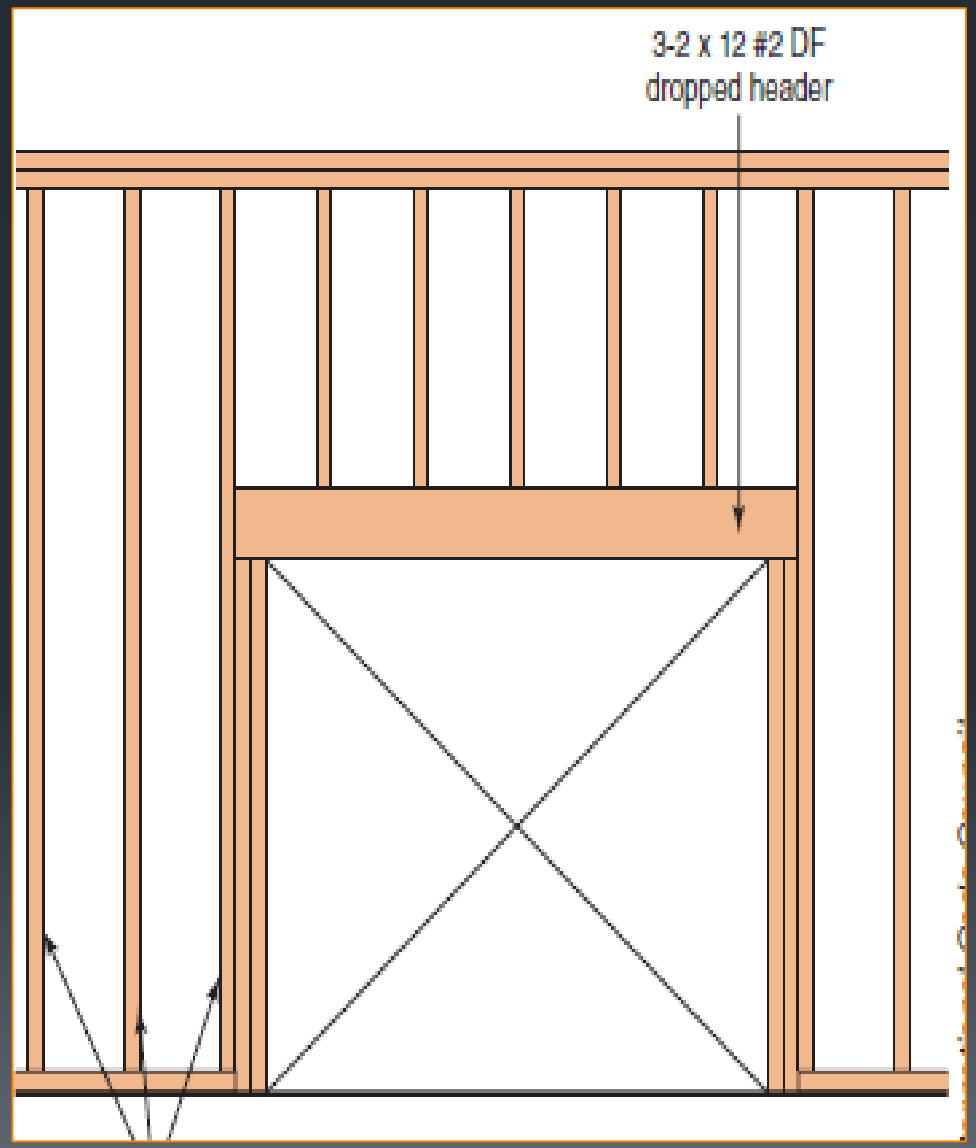
FOUNDATION ANCHOR BOLTS

- Foundation Anchor Bolts shall be:
  - ½” diameter; extend minimum 7” into concrete or grouted cell.
  - Spaced maximum 6’-0” on center.
  - Minimum 2 bolts per plate.
  - Shall be located in middle third of sill or bottom plate.

SOUTHERN YELLOW PINE
FLOOR AND CEILING JOIST AND GIRDER SPANS

- Girder and joist spans have been updated.
-
- Girder Spans have been reduced in some cases by more than 1 foot.
- Footnotes have been added to girder and header tables requiring lateral bracing of headers 2 X 8 and larger or the allowable span shall be multiplied by 0.7.
  - Example a 10’-1” span becomes a 7’-1” span if not laterally supported.

GIRDER BRACING



KING STUDS AT HEADERS

TABLE R602.7.5 Minimum Number of Full Height Studs at Each End of Headers in Exterior Walls[a]

Maximum Header Span (feet)	Ultimate Design Wind Speed and Exposure Category	
	≤ 115 mph, Exposure B[b]	< 140 mph, Exposure B or < 130 mph, Exposure C
4	1	1
6	1	2
8	1	2
10	2	3
12	2	3
14	2	3
16	2	4
18	2	4

RETAINING WALLS

- Retaining walls that are not laterally supported at the top and that retain in excess of 48 inches of unbalanced fill, or retaining walls exceeding 24 inches in height that resist lateral loads in addition to soil, shall be designed in accordance with accepted engineering practice to ensure stability against overturning, sliding, excessive foundation pressure, and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning. This section shall not apply to foundation walls supporting buildings.

UNVENTED CRAWL SPACE

- Unvented Crawl Spaces must have a dehumidifier capable of extracting 70 pints per day for ever 1,000 sf of crawl space.
- This is in lieu of the supply and/or return vent that is extended into the crawl space.

EFIS SYSTEMS & VINYL SIDING

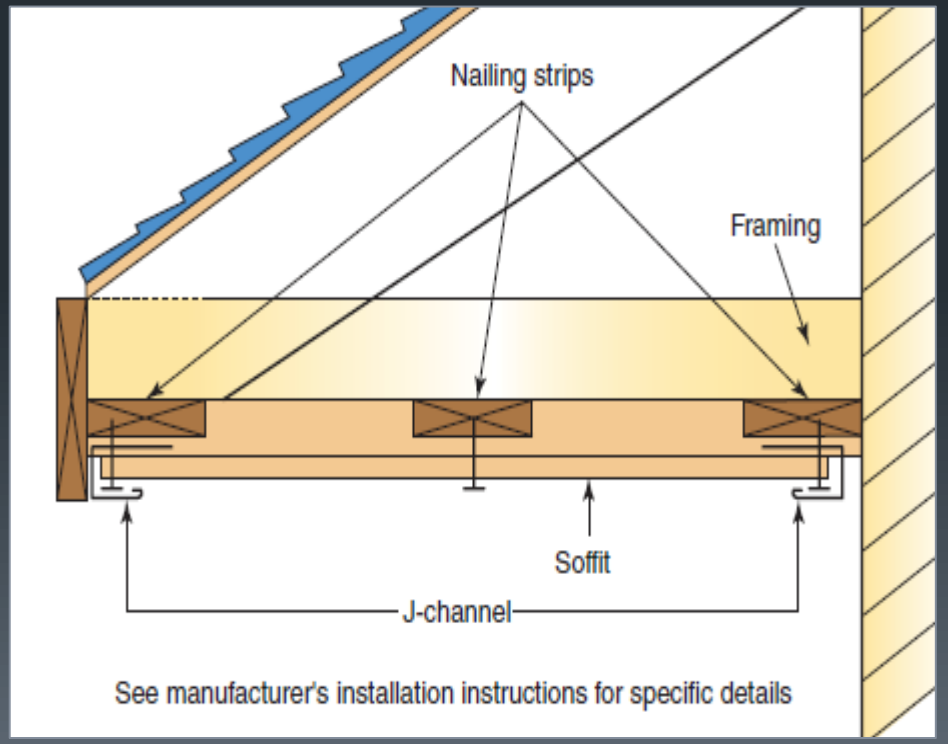
- EFIS without drainage backing installed on concrete block or concrete only.
- EFIS with drainage backing installed on all other backing.
- Drainage must provide 90% efficiency.
- All EFIS must stop minimum 6” above grade.
- EFIS must have a WRB.
- Decorative trim cannot be faced nailed through EFIS.

- Vinyl siding must have a WRB installed behind it.
- All accessory structures must have a water resistive barrier installed behind the exterior finish material.

VINYL AND WOOD PANEL SOFFITS

Wood panel soffits shall be minimum3/8” thick and fastened at 6” oc along the edge and 12” oc in the intermediate supports.

Vinyl soffit panels shall be attached so that no unsupported span shall exceed 16”.



ATTIC AND ACCESS DOORS

Access Hatches and Doors from conditioned to unconditioned spaces must be weather-stripped and insulated to the same R value as the surrounding walls.

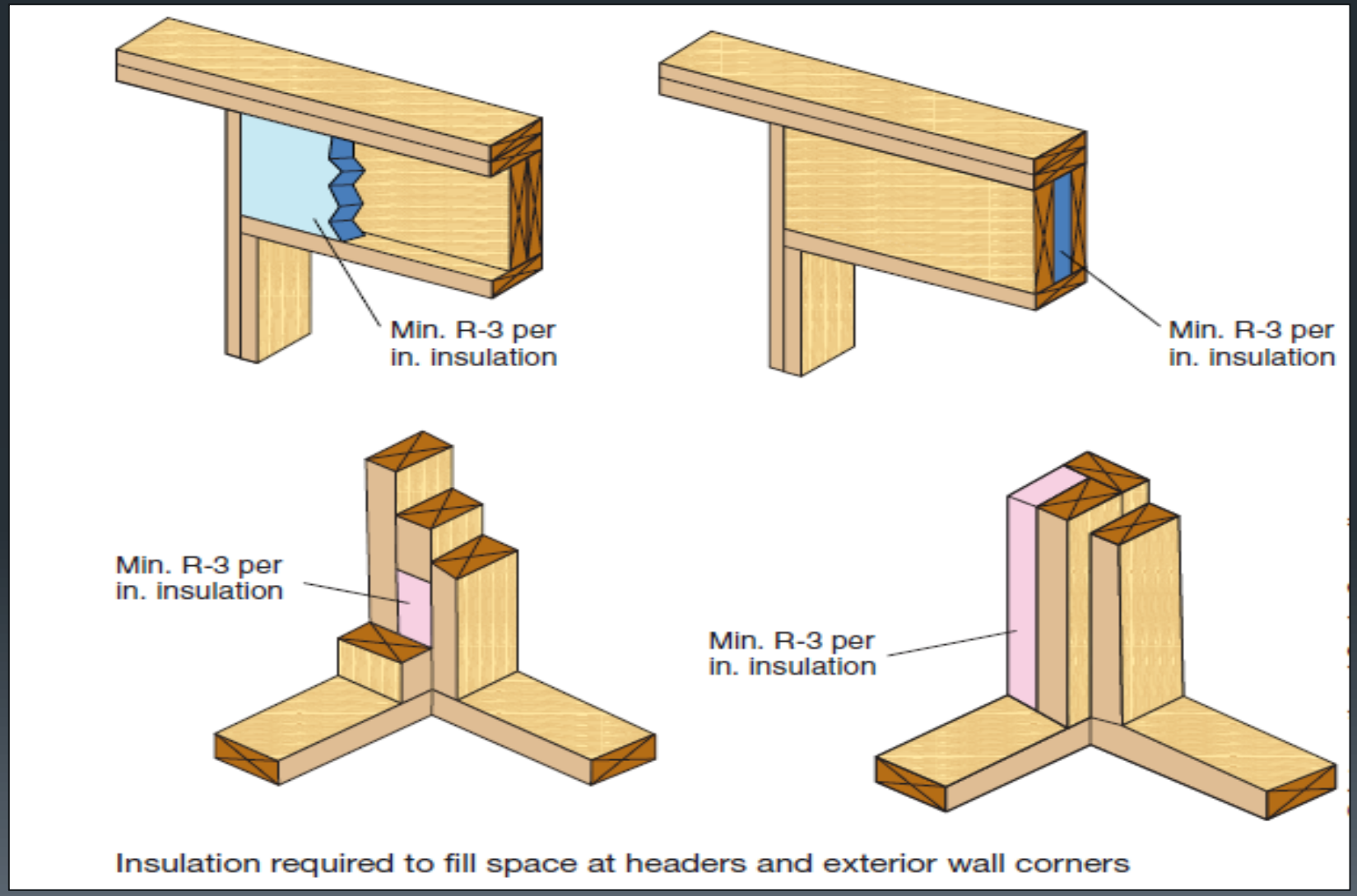
The access door construction must be such that the insulation will stay in place and the R value will not be reduced.

A door that has a listed fenestration rating as required for other openings must also be used.

Energy Conservation

INSULATION AT CORNERS AND HEADERS

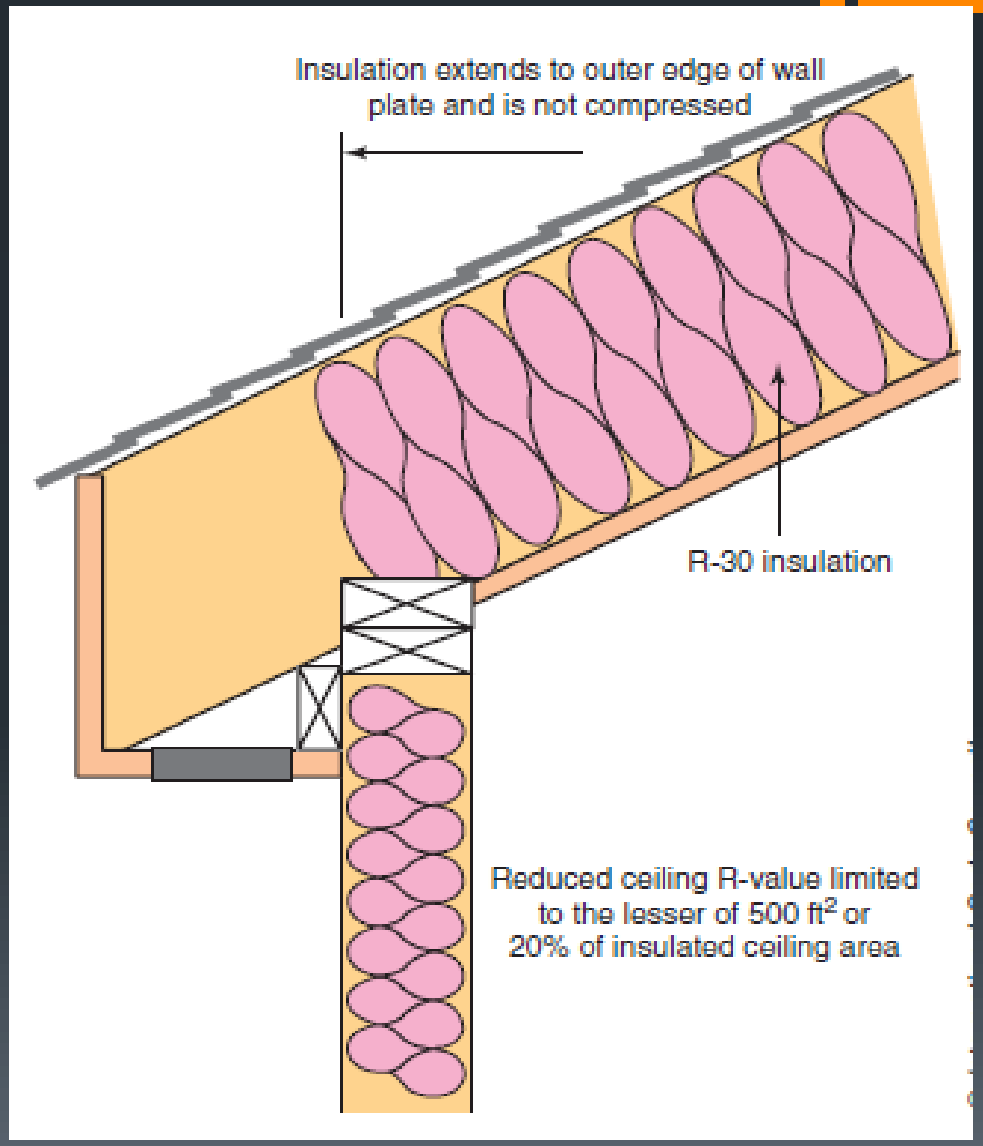
Insulation is required IF voids are present



Insulation required to fill space at headers and exterior wall corners

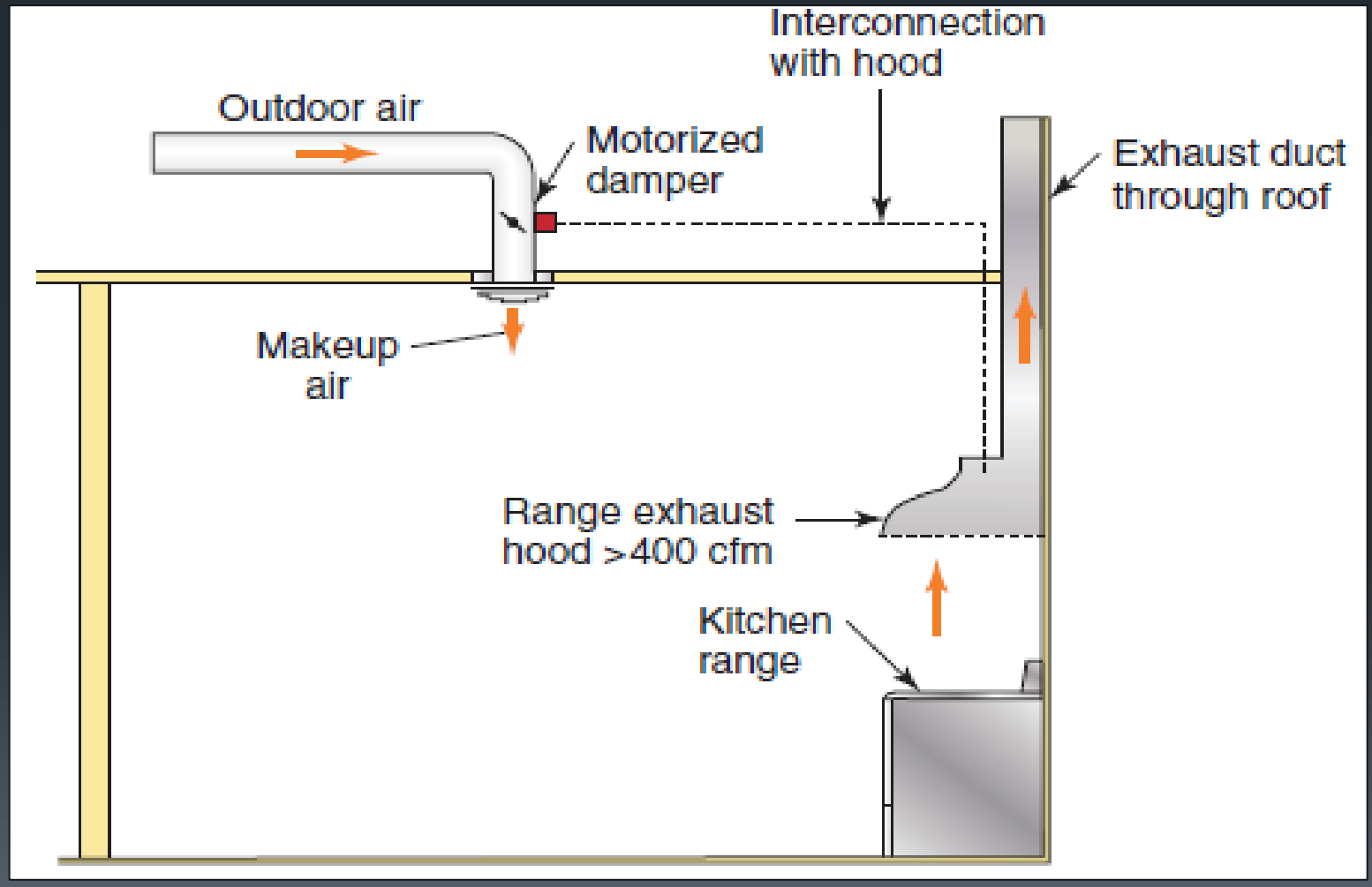
ATTIC INSULATION REDUCTION

- Ceilings without attic spaces.
- Where insulation R-values greater than R-30 in the ceiling are required 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 shall be limited to 500 square feet or 20 percent of the total insulated ceiling area, whichever is less.



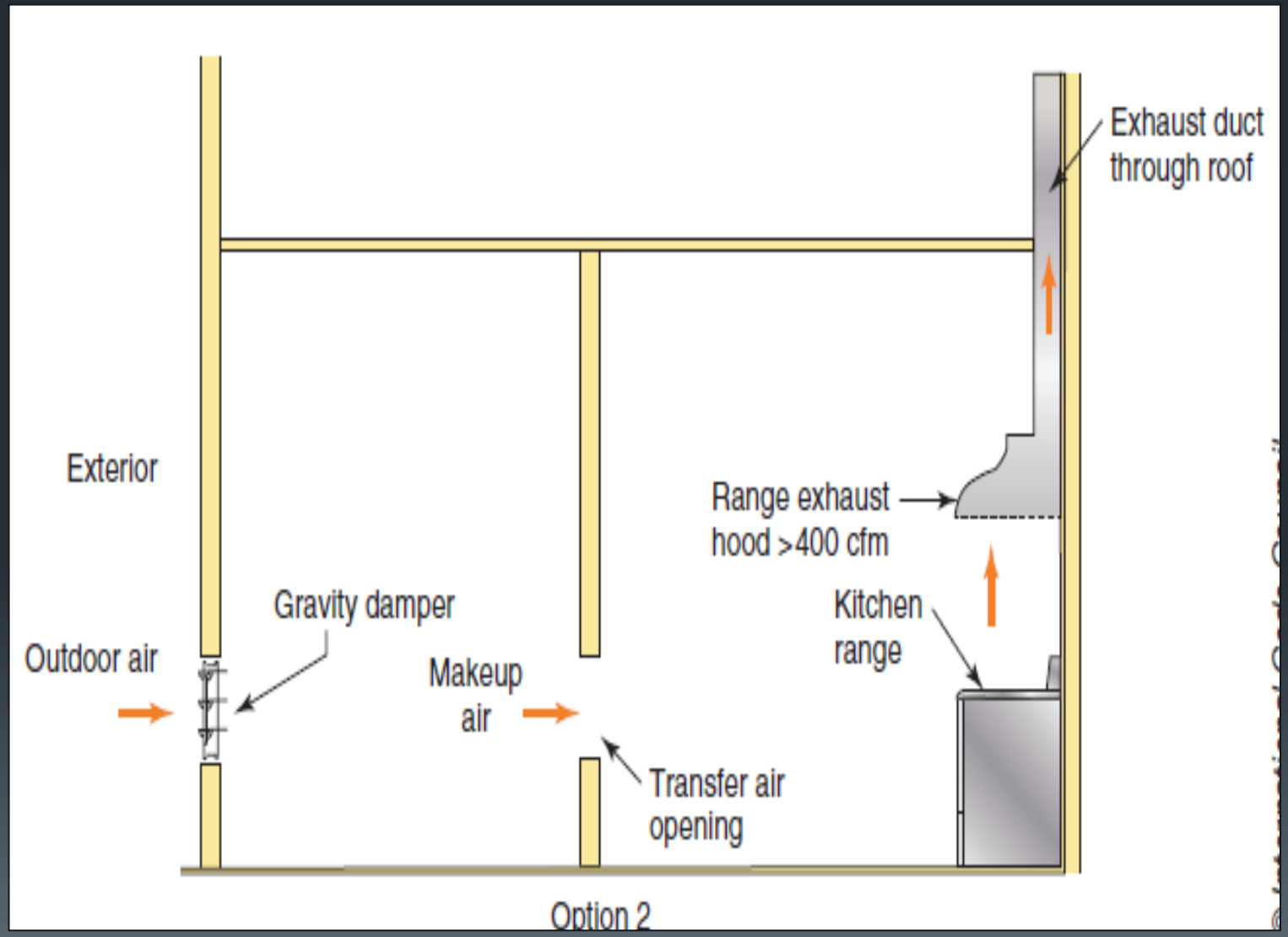
KITCHEN EXHAUST AND MAKE-UP AIR

Kitchen exhaust hoods that exhaust more than 400 cfm, shall have a natural or mechanical make-up air system. Dampers shall automatically open when the exhaust hood is activated.



KITCHEN EXHAUST AND MAKE-UP AIR

Inlet from the make-up air can be in another room as long as there is a permanent opening between the kitchen and the room where the outside air damper is located.



KITCHEN COOKING EQUIPMENT

- Overhead and downdraft exhaust systems must be listed for such use.
- Open top broiler units must have an overhead exhaust hood or downdraft hood.
- Kitchen exhaust systems must discharge to the exterior unless listed for recirculating exhaust air.
- Ducts for domestic kitchen cooking appliances equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
- 1. The duct is installed under a concrete slab poured on grade.
- 2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel.
- 3. The PVC duct extends not more than 1 inch above the indoor concrete floor surface.
- 4. The PVC duct extends not more than 1 inch above grade outside of the building.
- 5. The PVC ducts are solvent cemented.

DRYER EXHAUST DUCTS

The passageway of dryer exhaust duct terminals shall be undiminished in size and shall provide an open area of not less than 12.5 square inches

Mechanica

DRYER EXHAUST DUCTS

Length Identification.
Where the exhaust duct equivalent length exceeds 35 feet, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet of the exhaust duct connection.

Dryer ducts installed in wall cavities shall be provided with sufficient space that the wall cavity does not compress or change the natural shape of the duct.

Mechanical

DRYER DUCTS

Dryer duct joints are to be connected with mechanical fasteners.
In lieu of mechanical fasteners, approved tape for duct work that can withstand 140 degree can be used as long as each section is rigidly supported

MAXIMUM BATH / KITCHEN EXHAUST DUCT LENGTH

- Exhaust duct length shall determined by the following chart.

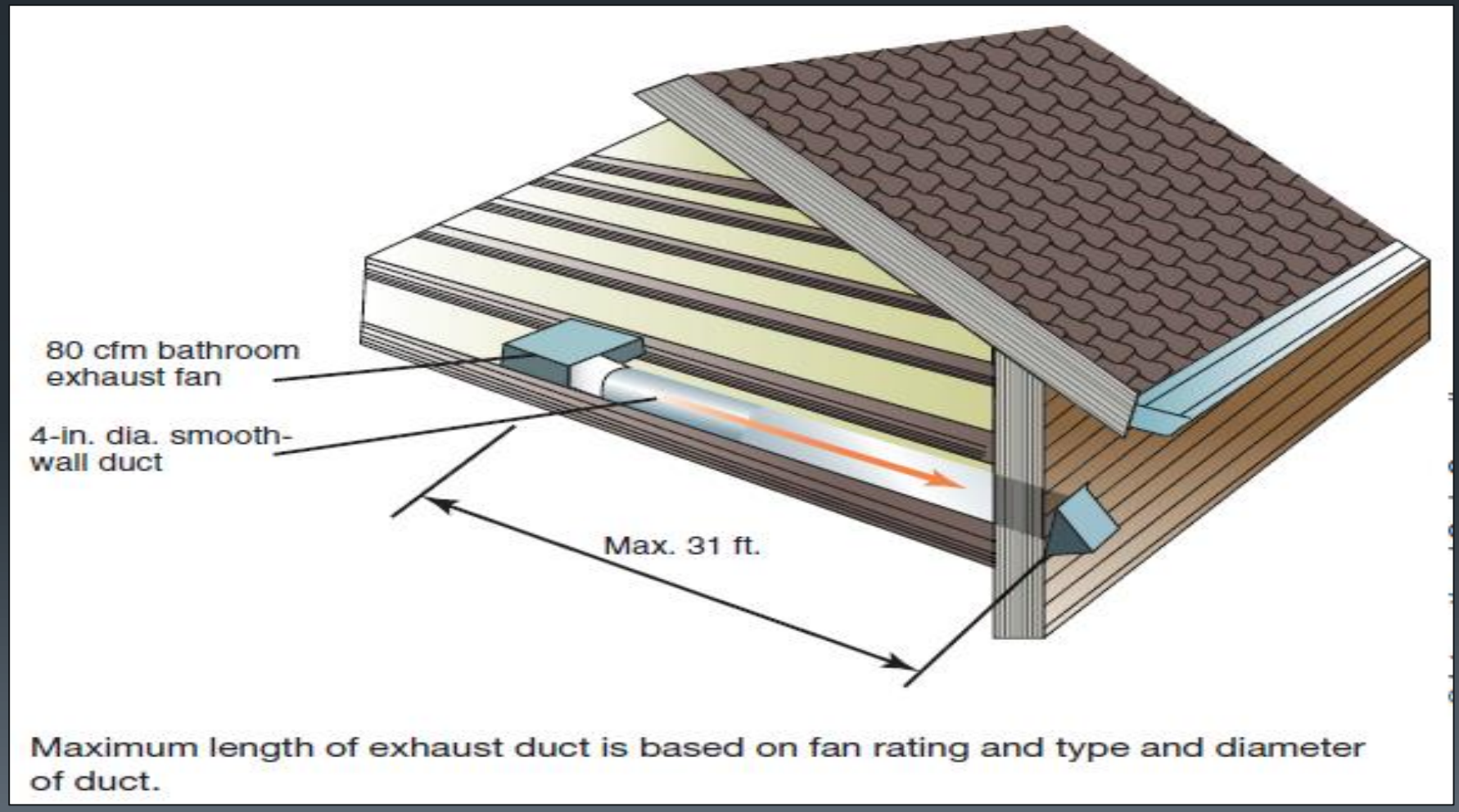
TABLE M1506.2 Duct Length

Duct Type	Flex Duct								Smooth-Wall Duct							
Fan airflow rating (CFM @ 0.25 inch wc[a])	50	80	100	125	150	200	250	300	50	80	100	125	150	200	250	300
Diameter[b] (inches)	Maximum length[c, d, e] (feet)															
3	X	X	X	X	X	X	X	X	5	X	X	X	X	X	X	X
4	56	4	X	X	X	X	X	X	114	31	10	X	X	X	X	X
5	NL	81	42	16	2	X	X	X	NL	152	91	51	28	4	X	X
6	NL	NL	158	91	55	18	1	X	NL	NL	NL	168	112	53	25	9
7	NL	NL	NL	NL	161	78	40	19	NL	NL	NL	NL	NL	148	88	54
8 and above	NL	NL	NL	NL	NL	189	111	69	NL	NL	NL	NL	NL	NL	198	133

a. Fan airflow rating shall be in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.
b. For non-circular ducts, calculate the diameter as four times the cross-sectional area divided by the perimeter.
c. This table assumes that elbows are not used. Fifteen feet (5 m) of allowable duct length shall be deducted for each elbow installed in the duct run.
d. NL = no limit on duct length of this size.
e. X = not allowed. Any length of duct of this size with assumed turns and fittings will exceed the rated pressure drop.

MAXIMUM EXHAUST DUCT LENGTH

- Duct length that exceeds the chart can be approved if verified using an air flow test using a flow hood or flow grid or other approved equipment.



Maximum length of exhaust duct is based on fan rating and type and diameter of duct.

DUCT JOINT SEALING

Joints, Seams and Connections. Snap-lock and button-lock have previously been exempt from the requirement of tapes and mastics, no more, however.

Mechanical

Snap Lock Duct

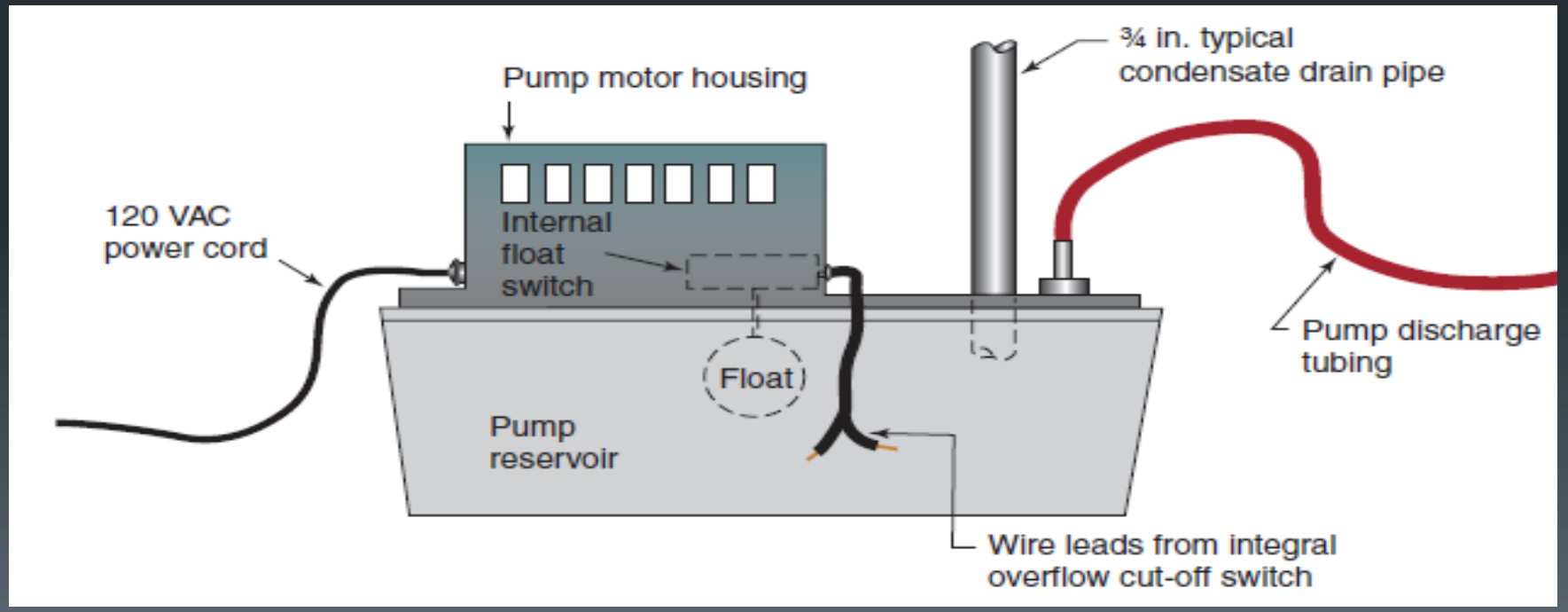
Mechanical

RETURN AIR OPENINGS

- 1. Openings shall not be located less than 10 feet measured in any direction from an open combustion chamber or draft hood located in the same room
- 2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
- 3. Return shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the registered design professional.
- 4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.
- Exceptions:
- 1. Return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet from the cooking appliances.
- 3. Taking return air from an unconditioned crawl space shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.

CONDENSATE PUMPS

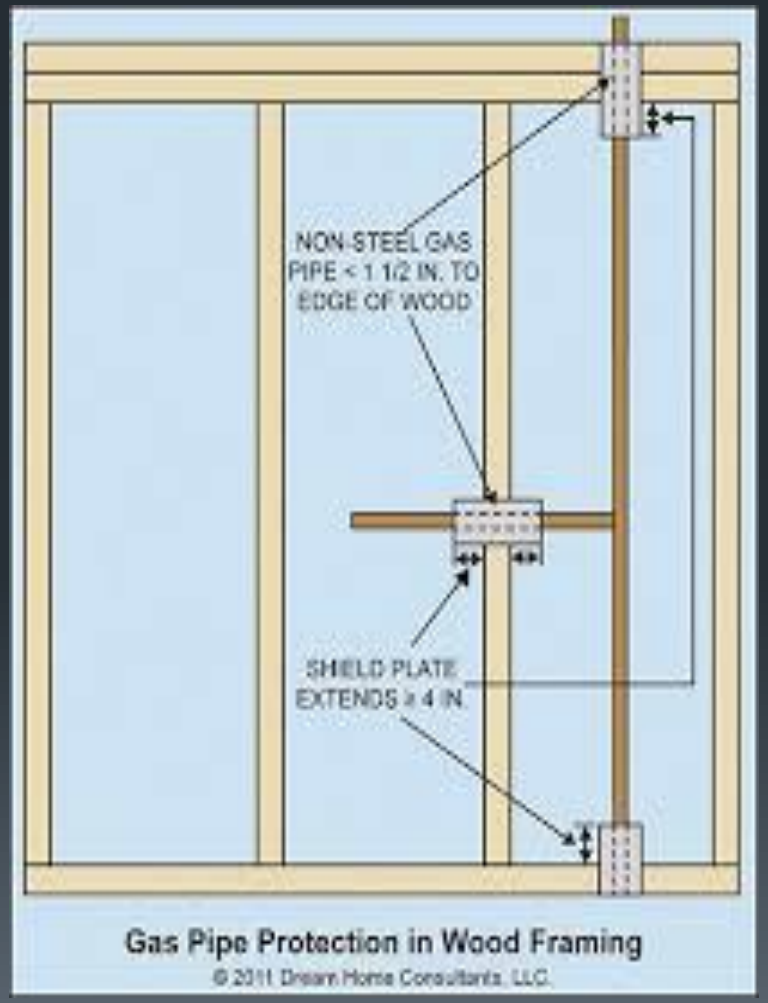
- Condensate pumps located in uninhabitable spaces, such as attics and crawl spaces, shall be connected to the appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating. Pumps shall be installed in accordance with the manufacturer's instructions.



PROTECTION OF CONCEALED GAS PIPING AGAINST PHYSICAL DAMAGE

- Notches or Bored Holes: Gas piping in bored holes or notches and the piping is within 1 ½” of the face to which sheetrock will be attached, the entire width of the stud plus 4” beyond each side of the stud shall be protected with a plate.
- Piping Installed in Other Locations. Where the piping is located within a framing member and is less than 1 ½” inches from the framing member face to which wall, ceiling or floor membranes will be attached, the piping shall be protected by shield plates that cover the width and length of the piping. Where the piping is located outside of a framing member and is located less than 1 ½” inches from the nearest edge of the face of the framing member to which the membrane will be attached, the piping shall be protected by shield plates that cover the width and length of the piping
- Black Iron or Galvanized Steel piping is not required to be protected.

Gas Piping Protection



Where pipe is within 1 ½” of stud, continuous protection is required if pipe is within 1 ½” of face of stud where drywall will be attached

MISCELLANEOUS FUEL GAS CHANGES

Plastic Pipe. Polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) plastic pipe, tubing and fittings shall not be used to supply fuel gas.

Fuel shut off valves attached to tubing shall be rigidly secured independent from the tubing.

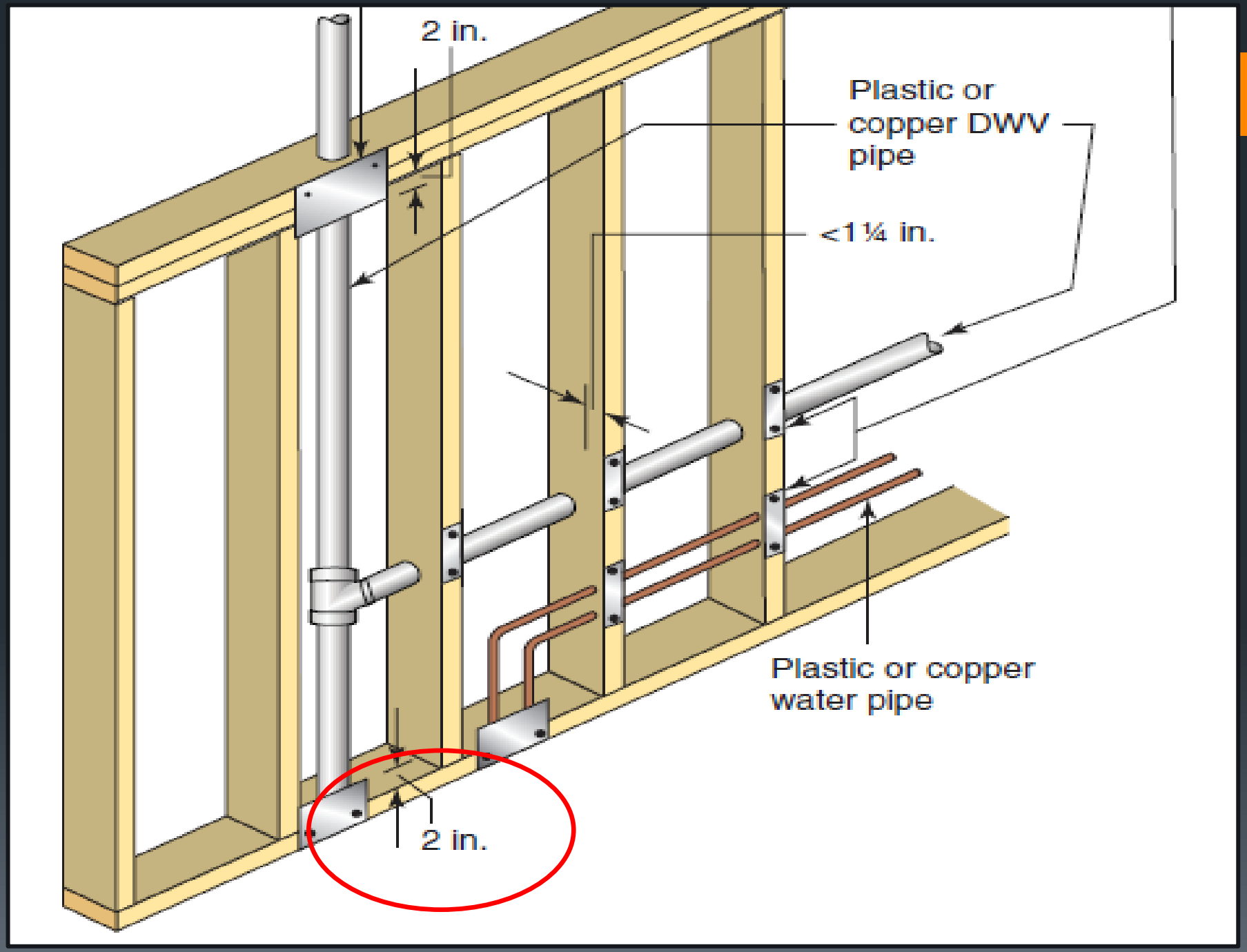
Shutoff valves serving movable appliances, such as cooking appliances and clothes dryers, shall be considered to be provided with access where installed behind such appliances.

Fuel Gas

COMMERCIAL COOKING EQUIPMENT

- Commercial cooking equipment is permitted in a dwelling when the installation is designed by a licensed professional or the cooking equipment is listed for commercial and domestic uses.

M2603.2.1 Protection Against Physical Damage. Steel shield plates are required where piping is within 1 1/4” instead of 1 1/2”.



Sink and Dishwasher.

The dishwasher discharge pipe or tubing shall rise to the underside of the counter and be secured to remain in place.

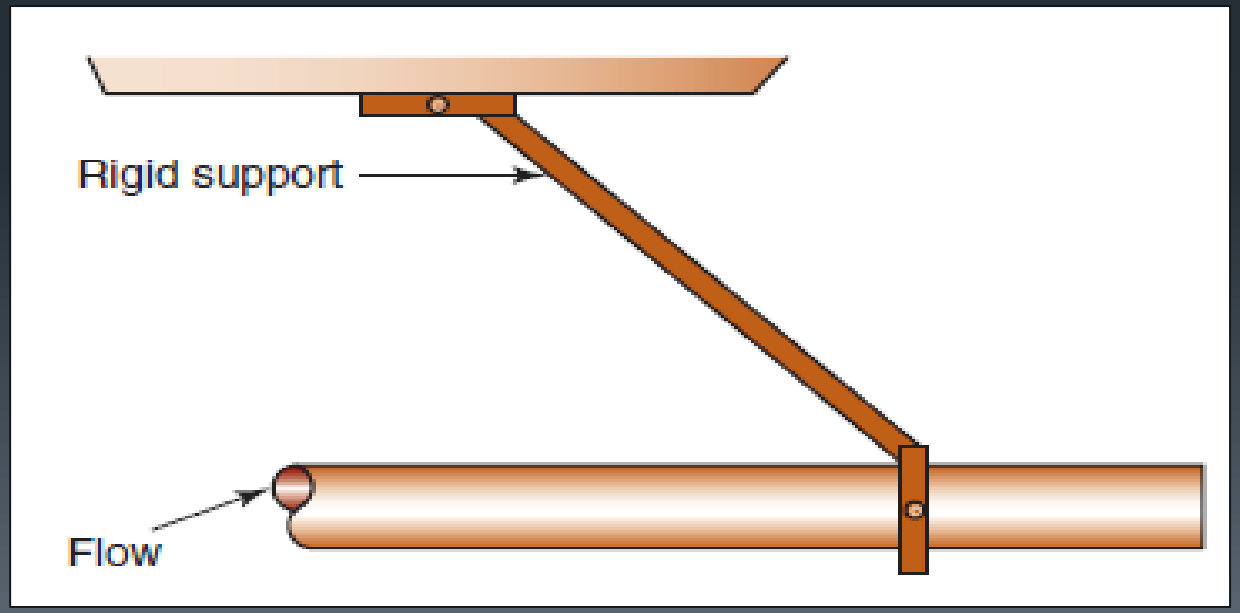
Plumbing

TRAP SEALS

- Trap seals for emergency floor drains or floor drains subject to evaporation shall be protected by:
  - 1) Potable water trap primer.
  - 2) Reclaimed or gray water trap primer.
  - 3) Waste water trap primer
  - 4) Barrier Type Trap Seal Protective Device

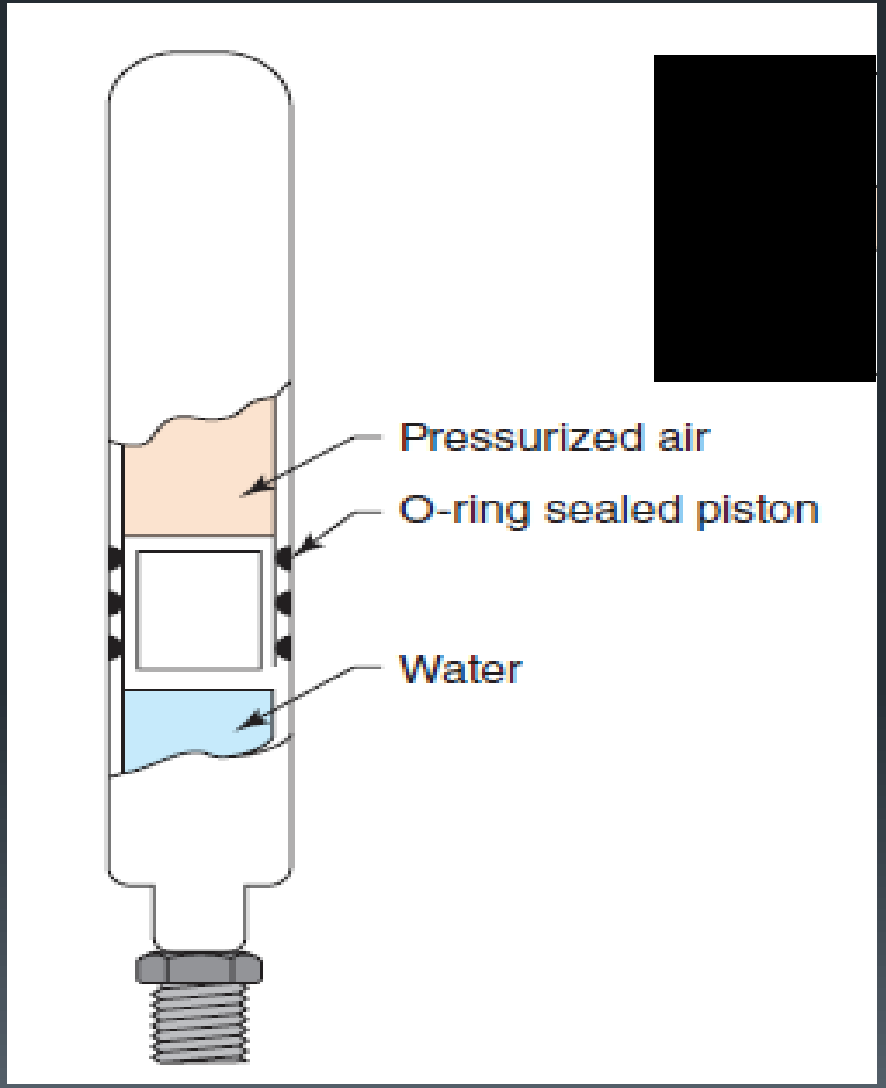
SWAY BRACING

- Where horizontal pipes 4 inches and larger convey drainage or waste, and where a pipe fitting changes in the flow direction greater than 45 degrees for, rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe sizes 4 inches and larger. In the direction of flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.



WATER HAMMER ARRESTOR

- The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. A water hammer arrestor shall be installed where quick closing valves are utilized. Water- hammer arrestors shall be installed in accordance with the manufacturer's instructions. Water-hammer arrestors shall conform to ASSE 1010.
- Quick closing valves can be at dishwashers, clothes washer and water closets.
- Installing a water hammer arrestor on the hot and cold water line in the vanity under each sink will satisfy this requirement.



AIR ADMITTANCE VALVES

- Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer. Air admittance valves shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity or mechanical air intakes.