From the Sill Plate to the Top Plate

Disclaimer:

All of the following information is based on the 2006 International Residential Code with Kentucky Amendments. As some of the information has been paraphrased, article numbers are listed for reference to the actual code article. The visual aids used are pulled from the 2006 IRC. They are not created by OMPC. This information is presented to answer or clarify common questions and is not intended to be a complete review of all code requirements. A permit holder is required to comply with all building codes pertinent to the construction undertaken.

Minimum Ceiling Height:

R305.1 All habitable rooms, hallways, corridors, bathrooms, toilet rooms, laundry rooms and basements shall have a ceiling height of at least seven feet (7'). The ceiling height is measured from the finished floor to the lowest projection of the ceiling. There are four (4) exceptions to the minimum seven foot (7') ceiling height.

1) Beams and girders spaced not less than four feet (4') apart on center may project a maximum of six inches (6") below the ceiling.

2) Ceilings in uninhabitable spaces in basements may be reduced to six feet eight inches (6'-8"), and girders, ducts and beams may project to within six feet four inches (6'-4").

3) If the ceiling of a room is sloped, fifty percent (50%) of the total area of the room must be at least seven feet (7') in height. The total area of the room will be determined by the area of the space having a minimum ceiling height of five feet (5') or greater. Areas of the rooms that have a ceiling height of less than five feet (5') are allowed to be used by the homeowner, but cannot be used to calculate the area of the room for the purposes of determining the amount of the area that must meet the seven foot (7') height requirement.

4) Bathrooms shall have a minimum ceiling height of six foot eight inches (6'-8") over plumbing fixtures and over a tub or shower where a shower head is located.

Emergency Escape and Rescue Openings:

R310.1 Every sleeping room shall have a means of emergency escape to the exterior of the building. When framing in windows in bedrooms, at least one window must meet this requirement. If the room has an exterior exit door, the door may serve as the emergency egress and a window meeting minimum egress size would not be required. The bottom of window opening must be a maximum of forty-four inches (44") above the finished floor of the room. If the window is a required exit from a basement room below grade, exit into a window well is required. The window well must contain at least nine square feet (9sf) measuring a minimum of thirty-six inches (36") in either direction. If the bottom of the well is more than

forty-four inches (44”) below the adjacent grade, steps or a ladder must be installed in the well to allow exit.

Minimum Opening Area:

R310.1.1 All emergency escape opening must have a net clear opening of at least five and seven tenths square feet (5.7sf). There is an exception provided for first floor grade level egress windows, which are allowed to have a reduced window opening size opening of five square feet (5sf). The requirement is based on the size necessary for a fireman with an air pack to enter the residence. The framed openings must accommodate windows of with the minimum required opening size. To check the windows for egress compliance, open the window and measure the net open area in width and height, multiplying these two measurements to determine the area of the opening. All projections into the window such as trim and channels reduce the net clear opening and must be accounted for when measurements are taken. Measurements in inches would be multiplied and divided by one hundred forty four (144) to give you the square footage of the net clear opening available for the windows. For example, a thirty inch (30”) by thirty inch (30”) window opening would equal nine hundred square inches (900”). Dividing that by one hundred and forty four inches (144”) would give you six and one quarter square feet (6.25’), which is acceptable.

Minimum Opening Height:

R310.1.2 The minimum net clear opening height of the required emergency exit window shall not be less than twenty-four inches (24”).

Minimum Opening Width:

R310.1.3 The minimum net clear opening width of the required emergency exit window shall not be less than twenty inches (20”).

Warning: Please note that a twenty-four inch (24”) tall by twenty inch (20”) wide window opening **DOES NOT** equal the required minimum square footage listed above. An acceptable five point seven square foot (5.7’) egress window, using a minimum required height would measure twenty-four inches (24”) high by thirty-four and one quarter inches (34.25”) wide. Using a minimum required width, the window would measure forty-one inches (41”) high by twenty inches (20”) wide. Either one is fine. These are all minimum measurements.

Hallways:

R311.3 The minimum width of a hallway shall be not less than three feet (3’). This is measured to the surface of the finished dry wall, so that additional thickness of the drywall must be allowed for when framing the walls.

End-Jointed Lumber:

R602.1.1 Approved end-jointed lumber identified by a grade mark conforming to section R602 may be used interchangeably with solid sawn lumber of the same grade and species for installations of vertically compressed members. These members are usually straighter and less likely to bow than current solid sawn lumber. DO NOT USE them in any situation other than vertically compressed as a stud is. They will fail in a tensile or bending situation such as a top plate or rafter.

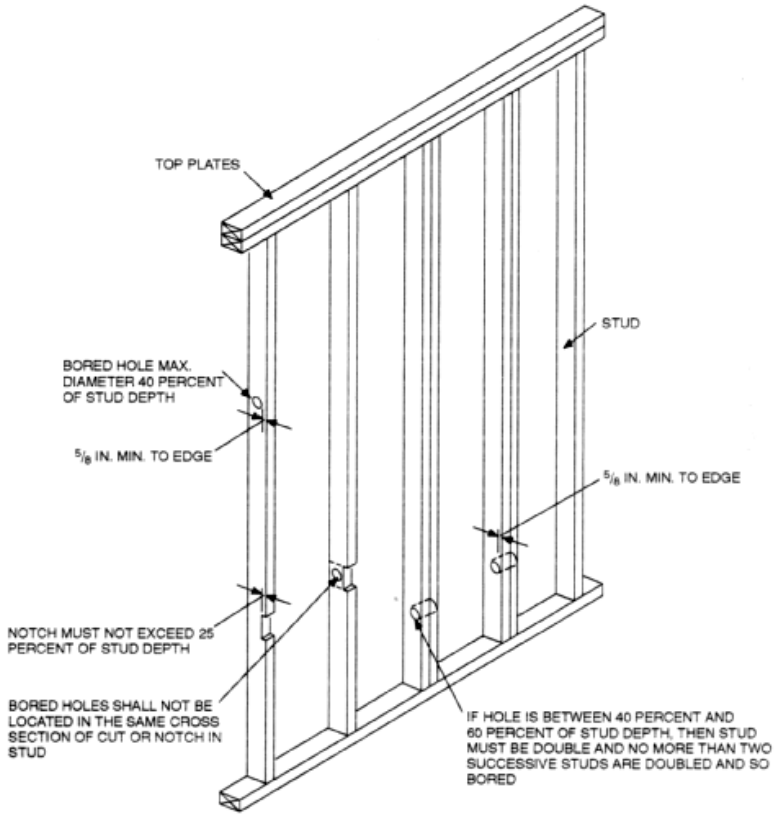
Top Plates:

R602.3.2 There shall be a double top plate installed at the top of the studs to allow for overlapping of corners and intersections to tie the walls together. End joints in the top plates shall be offset at least twenty-four inches (24") and need not occur over studs.

Drilling and Notching Studs:

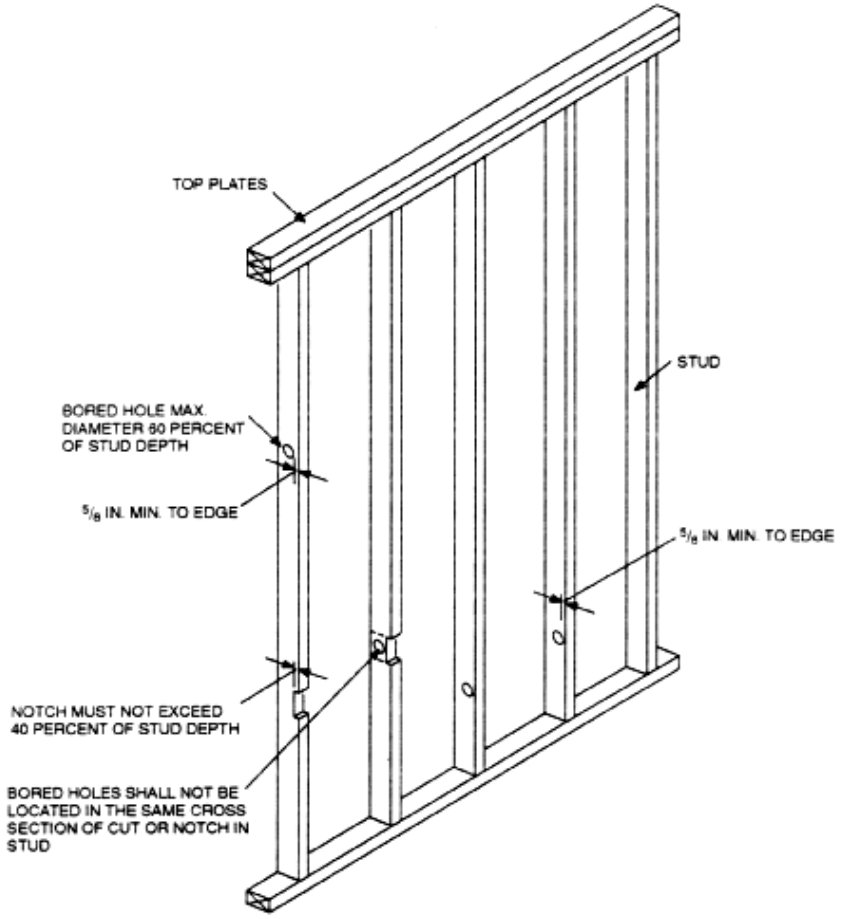
R602.6 **Notching:** Any stud in an exterior wall or bearing partition may be cut or notched to a depth twenty-five percent (25%) of its depth. A stud in nonbearing walls may be cut or notched up to forty percent (40%) of its depth.

Drilling: Any stud may be bored or drilled provided that the diameter of the hole is no more than sixty percent (60%) of the stud depth, the edge of the hole is no closer than five-eights inch (5/8") to the side of the stud, and the hole is not located in the same section as a notch. Studs located in exterior or bearing walls drilled over forty percent (40%) and up to sixty percent (60%) shall be doubled and not more than two successive studs shall be bored.



For SI: 1 inch = 25.4 mm.
NOTE: Condition for exterior and bearing walls.

FIGURE R602.6(1)
NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS

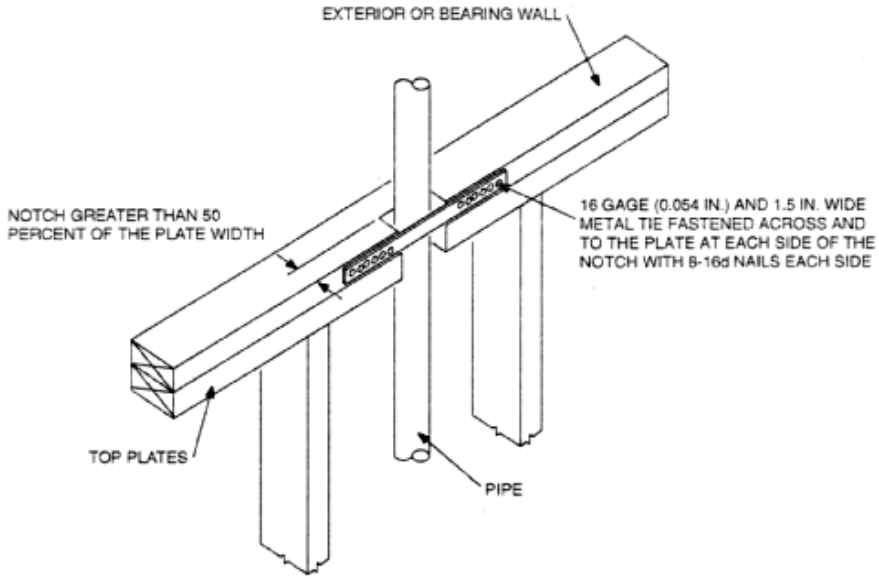


For SI: 1 inch = 25.4 mm.

FIGURE R602.6(2)
NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS

Drilling and Notching the Top Plate:

R602.6.1 If the top plate is drilled or notched greater than fifty percent (50%) of its depth to allow for duct, pipe, or electric wire a sixteen gauge (16ga) one and one half inch (1 ½") wide galvanized metal tie shall be installed from stud to stud across the altered area.



For SI: 1 inch = 25.4 mm.

FIGURE R602.6.1
TOP PLATE FRAMING TO ACCOMMODATE PIPING

Headers and Jack Studs:

R602.7 Headers shall be sized according to table R502.5 (1) and R502.5 (2). This table also shows the number of jack studs required for each header. If a header chart is not available, as a rule of thumb if the header is six feet (6') wide or more, two jack studs should be placed on each side of the header. Beyond that, there should be one and one-third (1 1/3) jack studs for every truss supported on the header rounded to the nearest even number of studs. Five (5) trusses on a nine foot (9') header would need six and one half (6 ½) jack studs, rounded to six (6) total studs divided between both ends of the header. Nine (9) trusses on an eighteen foot (18') garage header should have twelve jack studs total, six on each side. This method gives you the same support ratio as the plane sixteen inch (16") stud wall with trusses spaced every two feet (2').

TABLE R502.5(1)
GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf)[c]																	
		30						50						70					
		Building width[c] (feet)																	
		20		28		36		20		28		36		20		28		36	
		Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]
Roof and ceiling	2-2x4	3-6	1	3-2	1	2-10	1	3-2	1	2-9	1	2-6	1	2-10	1	2-6	1	2-3	1
	2-2x6	5-5	1	4-8	1	4-2	1	4-8	1	4-1	1	3-8	2	4-2	1	3-8	2	3-3	2
	2-2x8	6-10	1	5-11	2	5-4	2	5-11	2	5-2	2	4-7	2	5-4	2	4-7	2	4-1	2
	2-2x10	8-5	2	7-3	2	6-6	2	7-3	2	6-3	2	5-7	2	6-6	2	5-7	2	5-0	2
	2-2x12	9-9	2	8-5	2	7-6	2	8-5	2	7-3	2	6-6	2	7-6	2	6-6	2	5-10	3
	3-2x8	8-4	1	7-5	1	6-8	1	7-5	1	6-5	2	5-9	2	6-8	1	5-9	2	5-2	2
	3-2x10	10-6	1	9-1	2	8-2	2	9-1	2	7-10	2	7-0	2	8-2	2	7-0	2	6-4	2
	3-2x12	12-2	2	10-7	2	9-5	2	10-7	2	9-2	2	8-2	2	9-5	2	8-2	2	7-4	2
	4-2x8	9-2	1	8-4	1	7-8	1	8-4	1	7-5	1	6-8	1	7-8	1	6-8	1	5-11	2
	4-2x10	11-8	1	10-6	1	9-5	2	10-6	1	9-1	2	8-2	2	9-5	2	8-2	2	7-3	2
	4-2x12	14-1	1	12-2	2	10-11	2	12-2	2	10-7	2	9-5	2	10-11	2	9-5	2	8-5	2
Roof, ceiling and one center-bearing floor	2-2x4	3-1	1	2-9	1	2-5	1	2-9	1	2-5	1	2-2	1	2-7	1	2-3	1	2-0	1
	2-2x6	4-6	1	4-0	1	3-7	2	4-1	1	3-7	2	3-3	2	3-9	2	3-3	2	2-11	2
	2-2x8	5-9	2	5-0	2	4-6	2	5-2	2	4-6	2	4-1	2	4-9	2	4-2	2	3-9	2
	2-2x10	7-0	2	6-2	2	5-6	2	6-4	2	5-6	2	5-0	2	5-9	2	5-1	2	4-7	3
	2-2x12	8-1	2	7-1	2	6-5	2	7-4	2	6-5	2	5-9	3	6-8	2	5-10	3	5-3	3
	3-2x8	7-2	1	6-3	2	5-8	2	6-5	2	5-8	2	5-1	2	5-11	2	5-2	2	4-8	2
	3-2x10	8-9	2	7-8	2	6-11	2	7-11	2	6-11	2	6-3	2	7-3	2	6-4	2	5-8	2
	3-2x12	10-2	2	8-11	2	8-0	2	9-2	2	8-0	2	7-3	2	8-5	2	7-4	2	6-7	2
	4-2x8	8-1	1	7-3	1	6-7	1	7-5	1	6-6	1	5-11	2	6-10	1	6-0	2	5-5	2
	4-2x10	10-1	1	8-10	2	8-0	2	9-1	2	8-0	2	7-2	2	8-4	2	7-4	2	6-7	2
	4-2x12	11-9	2	10-3	2	9-3	2	10-7	2	9-3	2	8-4	2	9-8	2	8-6	2	7-7	2
Roof, ceiling and one clear span floor	2-2x4	2-8	1	2-4	1	2-1	1	2-7	1	2-3	1	2-0	1	2-5	1	2-1	1	1-10	1
	2-2x6	3-11	1	3-5	2	3-0	2	3-10	2	3-4	2	3-0	2	3-6	2	3-1	2	2-9	2
	2-2x8	5-0	2	4-4	2	3-10	2	4-10	2	4-2	2	3-9	2	4-6	2	3-11	2	3-6	2
	2-2x10	6-1	2	5-3	2	4-8	2	5-11	2	5-1	2	4-7	3	5-6	2	4-9	2	4-3	3
	2-2x12	7-1	2	6-1	3	5-5	3	6-10	2	5-11	3	5-4	3	6-4	2	5-6	3	5-0	3
	3-2x8	6-3	2	5-5	2	4-10	2	6-1	2	5-3	2	4-8	2	5-7	2	4-11	2	4-5	2
	3-2x10	7-7	2	6-7	2	5-11	2	7-5	2	6-5	2	5-9	2	6-10	2	6-0	2	5-4	2
	3-2x12	8-10	2	7-8	2	6-10	2	8-7	2	7-5	2	6-8	2	7-11	2	6-11	2	6-3	2
	4-2x8	7-2	1	6-3	2	5-7	2	7-0	1	6-1	2	5-5	2	6-6	1	5-8	2	5-1	2
	4-2x10	8-9	2	7-7	2	6-10	2	8-7	2	7-5	2	6-7	2	7-11	2	6-11	2	6-2	2
	4-2x12	10-2	2	8-10	2	7-11	2	9-11	2	8-7	2	7-8	2	9-2	2	8-0	2	7-2	2
Roof, ceiling and two center-bearing floors	2-2x4	2-7	1	2-3	1	2-0	1	2-6	1	2-2	1	1-11	1	2-4	1	2-0	1	1-9	1
	2-2x6	3-9	2	3-3	2	2-11	2	3-8	2	3-2	2	2-10	2	3-5	2	3-0	2	2-8	2
	2-2x8	4-9	2	4-2	2	3-9	2	4-7	2	4-0	2	3-8	2	4-4	2	3-9	2	3-5	2
	2-2x10	5-9	2	5-1	2	4-7	3	5-8	2	4-11	2	4-5	3	5-3	2	4-7	3	4-2	3
	2-2x12	6-8	2	5-10	3	5-3	3	6-6	2	5-9	3	5-2	3	6-1	3	5-4	3	4-10	3
	3-2x8	5-11	2	5-2	2	4-8	2	5-9	2	5-1	2	4-7	2	5-5	2	4-9	2	4-3	2
	3-2x10	7-3	2	6-4	2	5-8	2	7-1	2	6-2	2	5-7	2	6-7	2	5-9	2	5-3	2
	3-2x12	8-5	2	7-4	2	6-7	2	8-2	2	7-2	2	6-5	3	7-8	2	6-9	2	6-1	3
	4-2x8	6-10	1	6-0	2	5-5	2	6-8	1	5-10	2	5-3	2	6-3	2	5-6	2	4-11	2
	4-2x10	8-4	2	7-4	2	6-7	2	8-2	2	7-2	2	6-5	2	7-7	2	6-8	2	6-0	2
	4-2x12	9-8	2	8-6	2	7-8	2	9-5	2	8-3	2	7-5	2	8-10	2	7-9	2	7-0	2

(continued)

Water Resistive Barrier:

R703.6.3 A vapor barrier shall be installed on the outer side of the sheathing under the siding or brick. It shall be installed from the bottom and lapped as the wall is ascended. All products shall be installed per installation instructions. If the manufacturer permits staples, then staples may be used. If the manufacturer calls for a particular cap nail, then that is what will be required. At window frame openings, the paper is allowed to be wrapped inside the window jam and fastened to the sides and bottom only. The top of the window jam must be left long and free to allow the window flashing to be installed over the window frame skirt and under the vapor barrier. Once this is done the barrier should lap on top of the window flashing and be fastened down. If the house is to have a brick veneer then brick flashing is required at the elevation where the weep holes will be located. The bottom of the vapor barrier should be left loose to allow the brick flashing to be installed under the barrier. When complete, the wall should look just as a shingled roof does, as you travel up the wall the layers should be on top.

Flashing:

R703.8 Approved corrosion-resistant flashing shall be applied shingle-fashion in such a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. The flashing shall extend to the surface of the exterior finish. Approved corrosion-resistant flashings shall be installed at all of the following locations:

1) Exterior window and door openings. Flashing at exterior openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for drainage.

2) At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.

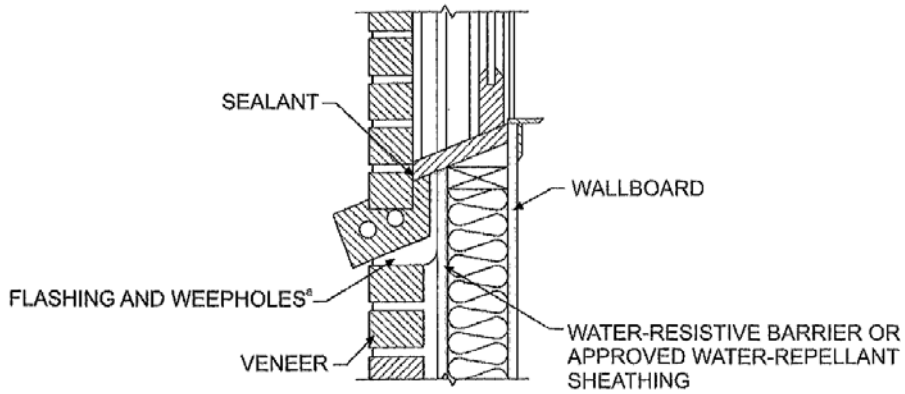
3) Under and at the ends of masonry, wood or metal copings and sills

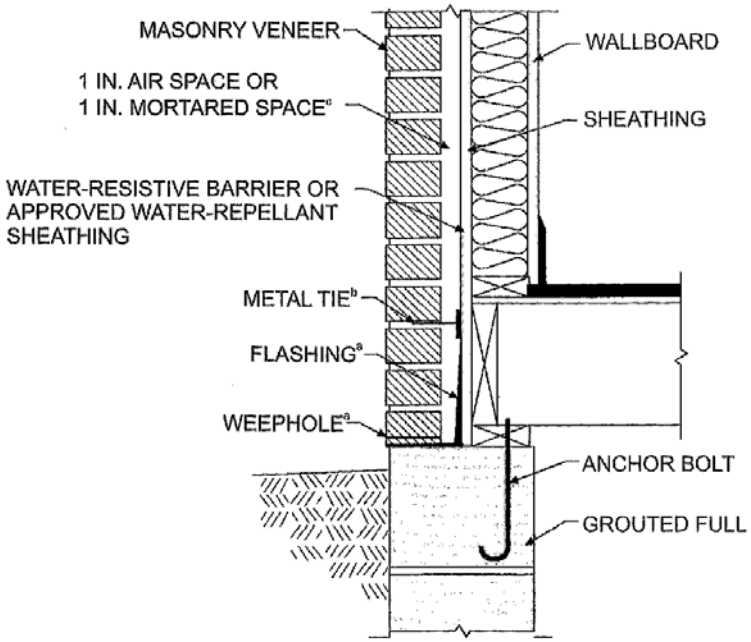
4) Continuously above all projecting wood trim.

5) Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.

6) At wall and roof intersections.

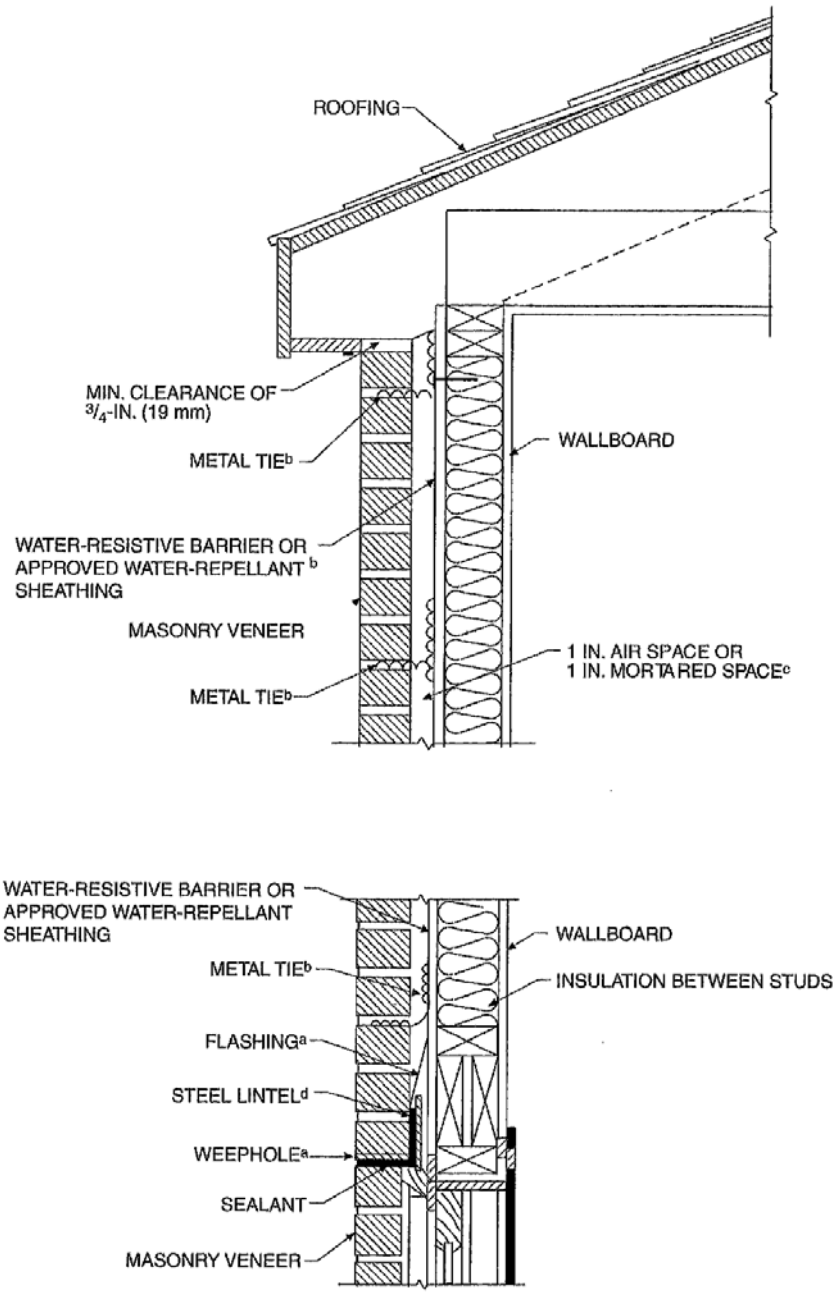
7) At built-in gutters.





For SI: 1 inch = 25.4 mm.

FIGURE R703.7
MASONRY VENEER WALL DETAILS
(continued)



For SI: 1 inch = 25.4 mm.
a. See Sections R703.7.5, R703.7.6 and R703.8.
b. See Sections R703.2 and R703.7.4.
c. See Sections R703.7.4.2 and R703.7.4.3.
d. See Section R703.7.3.

FIGURE R703.7—continued
MASONRY VENEER WALL DETAILS