UDC Wall Bracing Provisions quiz and updates part 2

Instructions

1. Print these pages.
2. Answer the **Simple questions** that follow mini sections of the code language.
3. Circle the correct answers and transfer the answers to the answer sheets (see last 3 pages).
4. After answering the simple questions you will become familiar with the new code changes.
5. Page down to the last page for the verification form, answer sheets and mailing instructions.
6. Optional: watch this video http://www.youtube.com/watch?v=MHaPb1ieAHo

6 hour course for:
1. Dwelling Contractor Qualifier Certification.
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UDC Wall Bracing Provisions
Emergency Rules tentative effective date 4/1/2014
A 'How To' guide for use of the new provisions

Summary: Forget what you knew about the previous wall bracing provisions- this method is a different concept. The provisions are generally based on the 2012 IRC Simplified Wall Bracing Provisions. In a nut shell, the new prescriptive Tables provide, depending on the method used, intermittent braced wall panels or continuously sheathed, the number of braced wall panels required in a braced wall line OR the prescriptive total length of braced wall required in wood frame walls parallel to the wind direction being considered.

What hasn't changed? Generally the bracing materials and fastening in Table 321.25-G (with the exception of Portland Cement Plaster as a newly allowed bracing material) remain unchanged.

Major Assumptions:
• Interior side of exterior walls are sheathed with ½" gypsum board.
• 10' wall heights
• Wind Exposure category B
• For intermittent bracing method roof eave to ridge height is 10'

1. The tables depend on the_____ method(s) used, which defines the number of braced wall panels required in a braced wall line OR the prescriptive total length of braced wall required in wood frame walls parallel to the wind direction being considered.
    a. optional bracing concepts
    b. intermittent braced wall panels
    c. continuously sheathed
    d. both b & c
2. Major Assumptions: Interior side of exterior walls are sheathed with ___" gypsum board.
    a. 3/8
    b. 1/2
    c. 1/4
    d. none of the above
3. The provisions are generally based on the 2014 UDC Simplified Wall Bracing Provisions.
    a. true
    b. false
4. Major assumptions: ____ wall heights.

a. 8’
b. 9’
c. 10’
d. 12’

5. Major Assumptions: Wind Exposure category ____
a. A
b. B
c. C
d. all of the above

6. Major Assumptions: For intermittent bracing method roof eave to ridge height is ___'
a. 8’
b. 9’
c. 10’
d. 12’

Starting with the topmost story ...

STEP 1: Define the braced wall locations by circumscribing the outermost extents of the building at each floor level with a rectangle. The maximum length of any side of the rectangle is 75' for intermittent bracing and 80' for continuously sheathed bracing. For either method the maximum length to width ratio is 3: 1. If the length of the building exceeds the prescriptive limit of the respective table or the length to width ratio exceeds 3: 1 the building must be circumscribed or divided with more than one rectangle. See examples below from the rules -Figure 321.25-B.

7. The maximum length of any side of the rectangle is ____ for intermittent bracing.
a. 70’
b. 75’
c. 80’
d. any of the above

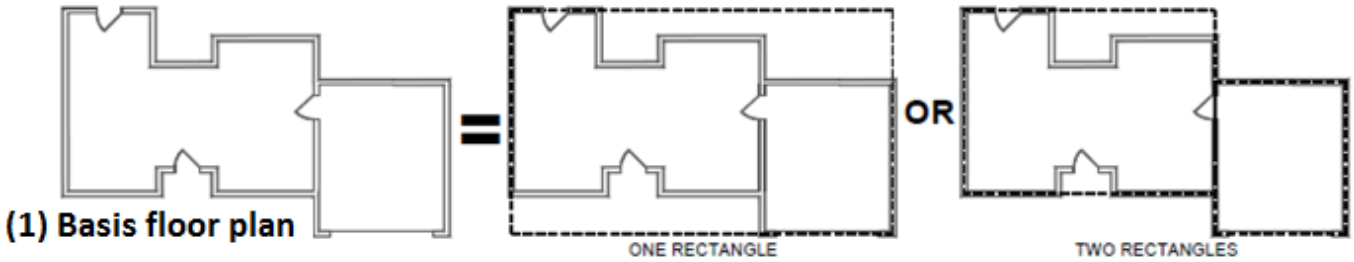
8. The maximum length of any side of the rectangle is ____ for continuously sheathed bracing.
a. 70’
b. 75’
c. 80’
d. none of the above

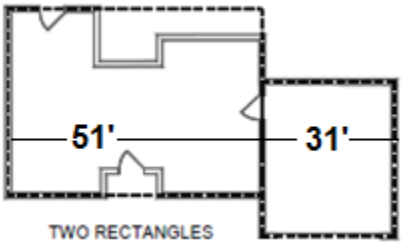
9. For either of the above methods the maximum length to width ratio is _____.
a. 1: 1
b. 2: 1
c. 3: 1
d. 4: 1

10. If the length of the building exceeds the prescriptive limit of the respective table or the length to width ratio the building must be circumscribed or divided with more than one _____.
a. area
b. circle
c. rectangle
d. all of the above

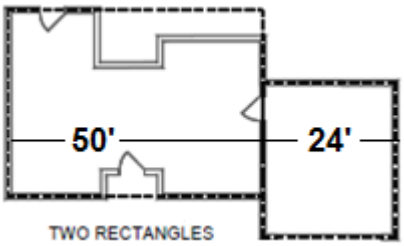
11. Define the braced wall locations by circumscribing the outermost extents of the building at each _____ with a rectangle.
a. wall area
b. building area
c. floor level
d. none of the above

Figure 321.25–B
DEFINING BUILDING SIDES AND LENGTHS WITH A CIRCUMSCRIBED RECTANGLE[a,b,c]

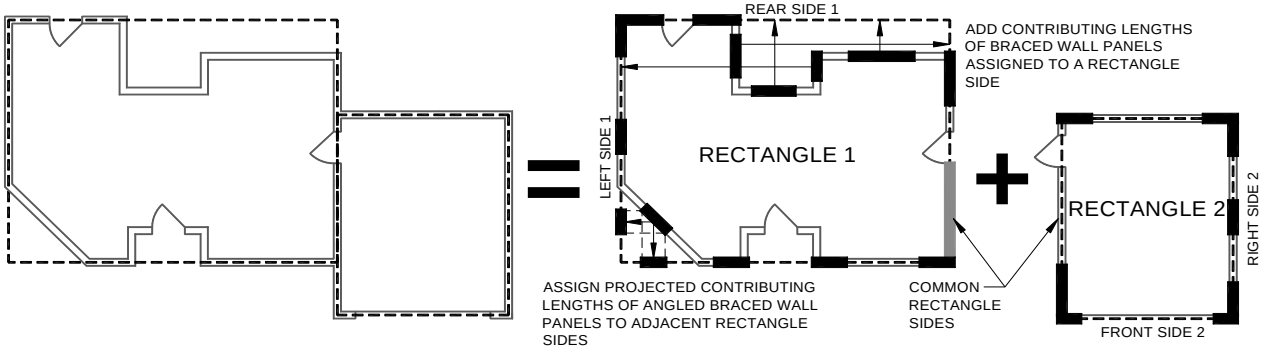


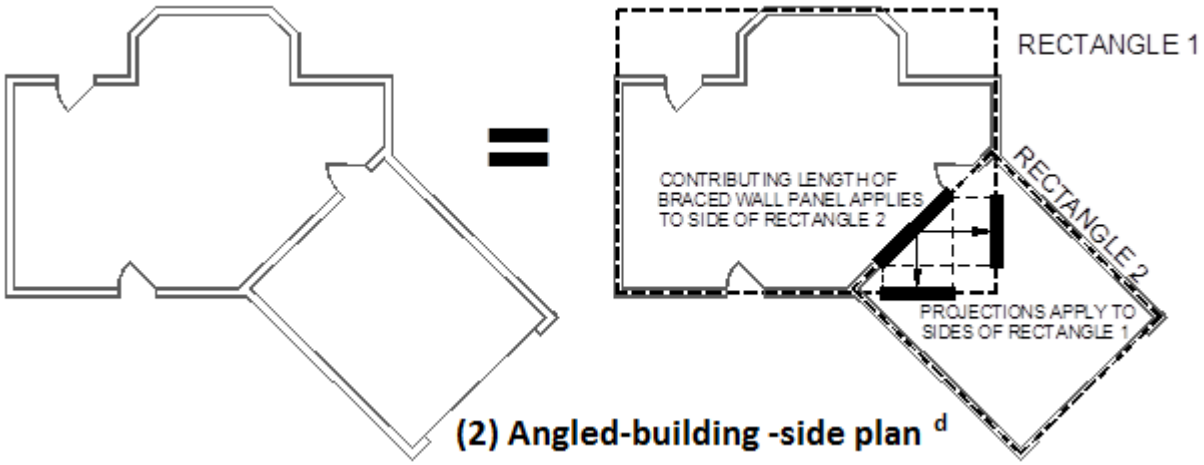


12. The above diagram is required to be divided into two rectangles because _____.
    a. the buildings length of any side of the rectangle exceeds 75’ for intermittent bracing
    b. the buildings length of any side of the rectangle exceeds 80’ for continuously sheathed bracing
    c. the buildings length of any side of the rectangle exceeds 80’ for intermittent bracing
    d. both a & b



13. The above diagram is not required to be divided into two rectangles because _____.
    a. the buildings length of any side of the rectangle is less than 75’ for intermittent bracing
    b. the buildings length of any side of the rectangle is less than 80’ for continuously sheathed bracing
    c. the buildings length of any side of the rectangle is less than 80’ for intermittent bracing
    d. both a & b





(2) Angled-building -side plan [d]

a. Each floor plan level shall be circumscribed with one or more rectangles around the entire floor plan at the floor level under consideration as shown. When multiple rectangles are used, each side shall be braced as though it were a separate building and the bracing amount added together along the common wall where adjacent rectangles overlap or abut.
b. Rectangles shall surround all enclosed plan offsets and projections. **Chimneys**, partial height projections, and open structures, such as carports and decks, **shall be excluded** from the rectangle.
c. Each rectangle shall have a maximum rectangle length-to-width ratio of 3:1.
d. Projected contributing lengths of angled braced wall panels shall be assigned to the closest rectangle sides, as shown for the angled corner in the angled-building-side-plan shown above.
e. Braced wall panels located on a common wall where angled rectangles intersect, as shown in Figure 321.25-B(3), shall have their contributing length applied towards the required length of bracing for the parallel rectangle side and its projected contributing lengths towards the adjacent angled rectangle sides. Where the common side of rectangle 2 as shown in Figure 321.25-B(3) has no physical wall, the portion shall be designed in accordance with s. SPS 321.25 (8) (a).

14. When multiple rectangles are used, each side shall be braced as though it were _____ building.
    a. the same
    b. part of the
    c. a separate
    d. none of the above
15. When multiple rectangles are used, each side shall have the bracing amount added together along the common wall where adjacent rectangles _____.
    a. connect
    b. touch
    c. overlap
    d. none of the above
16. Rectangles shall surround all enclosed plan _____.
    a. offsets
    b. carports
    c. decks
    d. both a & b
17. Chimneys, partial height projections, and open structures, such as carports and decks, shall be _____ from the rectangle.
    a. included
    b. excluded
    c. independent
    d both a or b

18. Each rectangle shall have a _____ rectangle length-to-width ratio of 3:1.
    a. minimum
    b. maximum
    c. both a or b
    d. none of the above
19. Chimneys shall be included from the rectangle.
    a. true
    b. false

STEP 2: Select the wall bracing method (intermittent or continuous), materials, and panel width from Table 321.25-G. If using intermittent braced wall panels, in general most of the bracing methods are considered equivalent and the method simply tells you the NUMBER of panels required in a braced wall line. For continuously sheathed braced walls the method yields the total LENGTH of braced wall required in each braced wall line.

20. For continuously sheathed braced walls the method yields the total _____ of braced wall required in each braced wall line.
    a. number
    b. length
    c. both a or b
    d none of the above
21. If using intermittent braced wall panels, in general most of the bracing methods are considered equivalent and the method simply tells you the _____ of panels required in a braced wall line.
    a. number
    b. length
    c. both a or b
    d none of the above
22. If using intermittent braced wall panels, in general _____ of the bracing methods are considered equivalent.
    a. all
    b. most
    c. none
    d. none of the above

SPS 321.25 (8) (b) *Bracing materials and methods.* Wall bracing shall use the materials and methods listed in Table 321.25–G or approved alternatives capable of providing the required wind load resistance as determined in accordance with SPS 321.02 (1) (c). Alternative bracing methods that are an approved as equivalent to one of the bracing methods listed in Table 321.25–G shall be permitted to use the requirements for that bracing method contained herein.

23. Alternative bracing methods that are approved as equivalent to one of the bracing methods listed in _____ shall be permitted to use the requirements for that bracing method contained herein.
    a. Table 321.25–H
    b. Table 321.25–G
    c. Table 321.25–I
    d. Table 321.25–J
24. The required wind load resistance is determined in accordance with _____.
    a. the local authorities
    b. the highest recorded wind loads
    c. SPS 321.02 (1) (c)
    d. all of the above

Table 321.25–G
BRACING METHODS[a]

Method	Minimum Brace Material Thickness or Size	Maximum Nominal Wall Height[b]	Minimum Braced Wall Panel Width or Brace Angle	Connection Criteria	
				Minimum Fasteners	Maximum Spacing
Intermittent Bracing Methods					
LIB[c] Let-in bracing	1x4 wood brace (or approved metal brace installed per manufacturer instructions)	10'	45° angle and maximum 16" o.c. stud spacing[b]	2-8d common nails or 3-8d box nails (2-1/2" long x 0.113" diameter)	Per stud and top and bottom plates[e]
DWB Diagonal wood boards	¾" (1" nominal) for maximum 24" o.c. stud spacing	10'	48"	2-8d box nails (2-1/2" long x 0.113" diameter) or 2 – 1-3/4" long 16 gage staples	Per stud and top and bottom plates[e]
WSP Wood structural panel	3/8" for maximum 16"o.c. stud spacing; 7/16" for maximum 24" o.c. stud spacing	10'	48"	6d common nail or 8d box nail (2-1/2" long x 0.113" diameter) or 7/16" crown 16 gage staples, 1-1/4" long	6" edges, 12" field (nails) 3" edges, 6" field (staples)
SFB Structural fiberboard sheathing	½" for maximum 16" o.c. stud spacing	10'	48"	1-1/2" long x 0.120" diameter galvanized roofing nails or 1" crown 16 gage staples, 1-1/4" long	3" edges, 6" field
GB Gypsum board (installed on both sides of wall)	½" for maximum 24" o.c. stud spacing	10'	96"	5d cooler nails, or #6 screws	7" edges, 7" field (including top and bottom plates)
PCP Portland cement plaster	¾" for maximum 16" o.c. stud spacing	10'	48"	1-1/2" long, 11 gage, 7/16" diameter head nails or 7/8" long, 16 gage staples	6" o.c. on all framing members
Continuous Sheathed Bracing Methods					
CS-WSP[d] Continuous sheathed WSP	3/8" for maximum 16"o.c. stud spacing; 7/16" for maximum 24" o.c. stud spacing	12'	Refer to Table 321.25-H	Same as WSP	Same as WSP
CS-SFB[d] Continuous sheathed SFB	½" for maximum 16" o.c. stud spacing			Same as SFB	Same as SFB
Narrow Panel Bracing					
PF Portal frame	7/16"	12'	Refer to Figure 321.25–A	Refer to Figure 321.25–A	Refer to Figure 321.25–A

a. The interior side of all exterior walls shall be sheathed with minimum ½" gypsum wall board. All edges of panel-type wall bracing, except horizontal joints in GB bracing, shall be attached to framing or blocking.
b. The actual measured wall height shall include stud height and thickness of top and bottom plates. The actual wall height shall be permitted to exceed the listed nominal values by not more than 4 inches. Tabulated bracing amounts in s. SPS 321.25 (8) (c) are based on a 10-foot nominal wall height for all bracing methods and shall be permitted to be adjusted to other nominal wall heights not exceeding 12 feet in accordance with footnotes to Table 321.25–I or Table 321.25–J.
c. LIB is not be permitted for walls supporting a roof and two floors. Two LIB braces installed at a 60 degree angle from horizontal shall be permitted to be substituted for each 45 degree angle LIB brace.
d. Bracing with CS-WSP and CS-SFB shall have sheathing installed on all sheathable surfaces above, below, and between wall openings.
e. Shall be attached to the top and bottom plates and any intermediate studs, in one continuous length.
f. Each braced panel may contain no more than one hole, having a maximum dimension of no more than ten percent of the least dimension of the panel, and confined to the middle three-fourths of the panel.

25. **e**. Shall be attached to the top and bottom plates and any intermediate studs, in one continuous length is required for _____.
    a. LIB
    b. DWB
    c. GB
    d. both a & b
26. Method LIB may be permitted for walls supporting a roof and one floor.
    a. true
    b. false
27. Minimum fastener size for a CS-WSP would be _____.
    a. 6d common nail
    b. 8d box nail
    c. same as WSP
    d. all of the above
28. Maximum fastener spacing for a CS-WSP would be _____.
    a. 6" edges, 12" field (nails)
    b. 3" edges, 6" field (staples)
    c. same as WSP
    d. all of the above
29. Maximum nominal wall height for LIB would be _____'.
    a. 10
    b. 12
    c. none of the above
    d. both a & b
30. **a**. The interior side of all exterior walls shall be sheathed minimum ½" gypsum wall board. All edges of panel-type wall bracing, except horizontal joints in GB bracing, shall be attached to framing or blocking is required for all BRACING METHODS.
    a. true
    b. false
31. **b**. The actual measured wall height shall include stud height and thickness of top and bottom plates. The actual wall height shall be permitted to exceed the listed nominal values by not more than ___ inches.
    a. 1
    b. 2
    c. 3
    d. 4

32. Tabulated bracing amounts in s. SPS 321.25 (8) (c) are based on a ___ foot nominal wall height for all bracing methods.
    a. 8
    b. 9
    c. 10
    d. 12
33. Tabulated bracing amounts in s. SPS 321.25 (8) (c) shall be permitted to be adjusted to other nominal wall heights not exceeding ___ feet in accordance with footnotes to Table 321.25–I or Table 321.25–J.
    a. 8
    b. 9
    c. 10
    d. 12
34. **c.** ____ LIB braces installed at a 60 degree angle from horizontal shall be permitted to be substituted for each 45 degree angle LIB brace.
    a. one
    b. two
    c. three
    d. none of the above
35. Bracing methods _____ shall have sheathing installed on all sheathable surfaces above, below, and between wall openings.
    a. CS-WSP
    b. CS-SFB
    c. none of the above
    d. both a & b
36. Braced wall panel width for GB would be _____.
    a. 48”
    b. 96”
    c. c. refer to table 321.25-H
    d. either a or b
37. Braced wall panel method for GB would be _____.
    a. installed on one side
    b. installed on both sides
    c. reduced to 50% if installed on both sides
    d. both a & c
38. Minimum thickness bracing material for CS-WSP 16” o.c. would be?
    a. ¼”
    b. 3/8”
    c. 7/16”
    d. ½”
39. Minimum thickness bracing material for CS-SFB 16” o.c. would be?
    a. ¼”
    b. 3/8”
    c. 7/16”
    d. ½”
40. Maximum nominal wall height for CS-WSP would be?
    a. 8
    b. 9
    c. 10
    d. 12
41 Minimum brace wall panel width for CS-WSP would be?

a. 48”
b. 96”
c. refer to table 321.25-H
d. all of the above

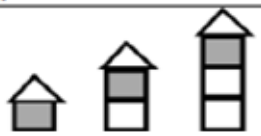
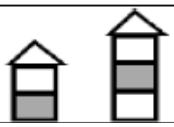
STEP 3: DETERMINE# OF PANELS OR REQUIRED LENGTH OF BRACING USING ONE OF THE FOLLOWING

A) Intermittent braced wall panels. Determine the NUMBER of braced panels in each braced wall line (rectangle side) using Table 321.25-1 based on the length of the perpendicular side. NOTE a minimum of 2 braced wall panels is required in each braced wall line.

42. A minimum of ___ braced wall panels is required in each braced wall line.
a. 1
b. 2
c. 3
d. 4

43. Intermittent braced wall panels. Determine the NUMBER of braced panels in each braced wall line (rectangle side) using Table 321.25-1 based on the length of the _____ side.
a. adjacent
b. parallel
c. perpendicular
d. farthest

Table 321.25–I
REQUIRED NUMBER OF INTERMITTENT BRACED WALL PANELS ON WALLS PARALLEL TO EACH RECTANGLE SIDE AT EACH FLOOR LEVEL[a,b,c,d,e,f,g,h]

Wall Supporting:		Required Number of Brace Panels on a Building Side — Length of Perpendicular Side (feet) ≤25’	50’	75’
Roof and ceiling only		1[i]	2	3
One floor, roof and ceiling		2	4	6
Two floors, roof and ceiling		3	6	9

a. Interpolation is permitted. Extrapolation is prohibited.
b. This table applies to wind exposure category B. For wind exposure category C or D, multiply the number of braced wall panels required by 1.3 or 1.6, respectively.

Wind exposure category B is comprised of urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.

Wind exposure category C is comprised of flat, open country and grasslands with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet extending more than 1,500 feet from the building site in any quadrant. This exposure also applies to any building

located within Exposure B type terrain where the building is directly adjacent to open areas of Exposure C type terrain in any quadrant for a distance of more than 600 feet.

Wind exposure category D is comprised of flat, unobstructed areas exposed to wind flowing over open water for a distance of at least 1 mile. This exposure applies only to those buildings and other structures exposed to the wind coming from over the water. Exposure D extends inland from the shoreline a distance of 1,500 feet or 10 times the height of the building or structure, whichever is greater.

c. Tabulated values are based on a nominal wall height of 10 feet. For nominal wall heights other than 10 feet and not more than 12 feet, multiply the required number of brace panels by the following factors: 0.9 for 8 feet, 0.95 for 9 feet, 1.15 for 11 feet, or 1.3 for 12 feet.

d. Tabulated values are based on a roof eave-to-ridge height of 10 feet. For roof eave-to-ridge heights other than 10 feet, multiply the required number of brace panels by the following factors for each floor level support condition:

Roof only – 0.7 for 5 feet, 1.3 for 15 feet, or 1.6 for 20 feet
Roof + 1 Floor – 0.85 for 5 feet, 1.15 for 15 feet, or 1.3 for 20 feet
Roof + 2 Floors – 0.9 for 5 feet or 1.1 for 15 feet.

e. Where minimum ½" gypsum wall board is not included on the interior side of the wall, multiply the number of braced wall panels by 1.7 for LIB bracing or 1.4 for all other bracing methods.

f. Adjustments in footnotes b to e apply cumulatively. Fractions of panels shall be rounded to the nearest one-half braced wall panel.

g. Perpendicular sides to the front and rear sides are the left and right sides. Perpendicular sides to the left and right sides are the front and rear sides. See Figure 321.25–B.

h. The following braced wall panel conditions shall be permitted to be counted as one-half a braced wall panel toward meeting the required number of panels: (1) one 60 degree LIB; (2) one 48" GB or one 96" GB with gypsum wall board on one side; (3) one 36" WSP or SFB braced wall panel for wall heights not more than 9 feet; (4) a 48" WSP or SFB braced wall panel where there is no more than one unblocked horizontal joint; or (5) one PF brace panel complying with Figure 321.25–A.

i. This value of less than 2 serves only as the beginning value for calculation purposes. The resulting value shall be 2 or greater, to be consistent with subd. 2.

44. All of the footnotes (a-i) below Table 321.25-I are applicable.
    a. true
    b. false

45. The required number of intermittent braced wall panels on exterior walls parallel to each rectangle side with a roof and ceiling only would be _____ with a length of 24' on the perpendicular side.
    a. 6
    b. 2
    c. 3
    d. 4

46. The required number of intermittent braced wall panels on exterior walls parallel to each rectangle side with a roof and ceiling only would be _____ with a length of 26' on the perpendicular side.
    a. 6
    b. 2
    c. 3
    d. 4

47. The required number of intermittent braced wall panels on exterior walls parallel to each rectangle side with two floors, roof and ceiling would be _____ with a length of 49' on the perpendicular side.
    a. 6
    b. 2
    c. 3
    d. 4

48. The required number of intermittent braced wall panels on exterior walls parallel to each rectangle side with two floors, roof and ceiling would be _____ with a length of 25’ on the perpendicular side.
    a. 6
    b. 2
    c. 3
    d. 4
49. Interpolation and extrapolation is permitted.
    a. true
    b. false
50. Table applies to wind exposure category B. For wind exposure category ____, multiply number of braced wall panels required by 1.3 or 1.6, respectively.
    a. B
    b. C
    c. D
    d. both C or D
51. Wind exposure category ___ is comprised of urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. This exposure shall be assumed unless the site meets the definition of another type exposure.
    a. B
    b. C
    c. D
    d. both C or D
52. Wind exposure category ____ is comprised of flat, open country and grasslands with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet extending more than 1,500 feet from the building site in any quadrant. This exposure also applies to any building located within Exposure B type terrain where the building is directly adjacent to open areas of Exposure C type terrain in any quadrant for a distance of more than 600 feet.
    a. B
    b. C
    c. D
    d. both C or D
53. Wind exposure category ___ is comprised of flat, unobstructed areas exposed to wind flowing over open water for a distance of at least 1 mile. This exposure applies only to those buildings and other structures exposed to the wind coming from over the water.
    a. B
    b. C
    c. D
    d. both C or D
54. Exposure ___ extends inland from the shoreline a distance of 1,500 feet or 10 times the height of the building or structure, whichever is greater.
    a. B
    b. C
    c. D
    d. both C or D
55. Tabulated values are based on a nominal wall height of ___ feet.
    a. 8
    b. 9
    c. 10
    d. 12

56. For nominal wall heights other than 10 feet and not more than 12 feet, multiply the required number of brace panels by the following factors:
    a. 0.8 for 8 feet
    b. 0.95 for 9 feet
    c. 1.10 for 10 feet
    d. none of the above
57. For nominal wall heights other than 10 feet and not more than 12 feet, multiply the required number of brace panels by the following factors:
    a. 1.15 for 11 feet
    b. 1.3 for 12 feet
    c. 1.5 for 13 feet
    d. both a & b
58. Tabulated values are based on a with a top-of-wall-to-ridge height of feet of __ feet.
    a. 8
    b. 9
    c. 10
    d. 12
59. For top-of-wall-to-ridge height other than 10 feet_____ the required number of brace panels by the following factors for each floor level support condition.
    a. divide
    b. add
    c. subtract
    d. multiply
60. The multiplier for Roof + 1 Floor would be _____.
    a. .85 for 5 feet
    b. 1.15 for 15 feet
    c. 1.3 for 20 feet
    d. all of the above
61. Where minimum ½" gypsum wall board is not included on the interior side of the wall, multiply the number of braced wall panels by 1.7 for _____.
    a. WSP
    b. DWB
    c. LIB
    d. GB
62. Where minimum ½" gypsum wall board is not included on the interior side of the wall, multiply the number of braced wall panels by 1.4 for _____.
    a. WSP
    b. DWB
    c. GB
    d. all of the above
63. Adjustments in footnotes b-d apply cumulatively. Fractions of panels shall be rounded to the nearest _____ braced wall panel.
    a. whole
    b. ¼
    c. ½
    d. all of the above
64. The following braced wall panel conditions shall be permitted to be counted as one-half a braced wall panel toward meeting the required number of panels:
    a. one 60 degree DWB
    b. one 48" GB

c. one 96" GB with gypsum wall board on one side
d. only b & c

65. The following braced wall panel conditions shall be permitted to be counted as one-half a braced wall panel toward meeting the required number of panels:
a. one 36" WSP or SFB braced wall panel for wall heights not more than 12 feet
b. 48" WSP or SFB braced wall panel where there is no more than 2 unblocked horizontal joint
c. one PF brace panel complying with Figure 321.25–A
d. all of the above

B) Continuously Sheathed braced walls. Determine the LENGTH of braced wall panels in each braced wall line (rectangle side) using Table 321.25-J based on the length of the perpendicular side.

Table 321.25–J
REQUIRED LENGTH OF CONTINUOUS BRACING ON WALLS PARALLEL TO EACH RECTANGLE SIDE AT EACH FLOOR LEVEL[a,b,c,d, e,g,h]

Top-of-Wall-to-Ridge Height (feet)	Wall Supporting:	Total Required Length (feet) of Full-Height Bracing on Any Side of Rectangle							
		Length of Perpendicular Side (feet)[f]							
		10	20	30	40	50	60	70	80
10	Roof and ceiling only	2.0[i]	3.5[i]	5.0	6.0	7.5	9.0	10.5	12.0
	One floor, roof and ceiling	3.5[i]	6.5	9.0	12.0	14.5	17.0	19.8	22.6
	Two floors, roof and ceiling	5.0	9.5	13.5	17.5	21.5	25.5	29.2	33.4
15	Roof and ceiling only	2.6[i]	4.6	6.5	7.8	9.8	11.7	13.7	15.7
	One floor, roof and ceiling	4.0	7.5	10.4	13.8	16.7	19.6	22.9	26.2
	Two floors, roof and ceiling	5.5	10.5	14.9	19.3	23.7	27.5	32.1	36.7
20	Roof and ceiling only	2.9[i]	5.2	7.3	8.8	11.1	13.2	15.4	17.6
	One floor, roof and ceiling	4.5	8.5	11.8	15.6	18.9	22.1	25.8	29.5
	Two floors, roof and ceiling	6.2	11.9	16.8	21.8	27.3	31.1	36.3	41.5

a. Interpolation is permitted; extrapolation shall be prohibited.
b. Table applies to wind exposure category B. For wind exposure category C or D, multiply the number of braced wall panels required by 1.3 or 1.6, respectively. Wind exposure categories are as defined in Table 321.25–I footnote b.
c. Tabulated values are based on a nominal wall height of 10 feet. For nominal wall heights other than 10 feet, multiply the required length of bracing by the following factors: 0.90 for 8 feet, 0.95 for 9 feet , 1.05 for 11 feet, or 1.10 for 12 feet.
d. Where minimum ½" gypsum wall board interior finish is not provided, the required bracing amount for the affected rectangle side shall be multiplied by 1.40.
e. Adjustments in footnotes b to d apply cumulatively.

f. Perpendicular sides to the front and rear sides are the left and right sides. Perpendicular sides to the left and right sides are the front and rear sides. See Figure 321.25–B.
g. Continuous sheathing shall be applied to all surfaces of the wall, including areas between brace panels and above and below wall openings.
h. When used on a wall line with continuous sheathing, each portal frame panel is counted for its actual length in contributing toward the length of continuous sheathing used on other portions of the same wall line, such as the building side at a given story level.
i. Any value of less than 4.0 in this table serves only as the beginning value for calculation purposes. The resulting value shall be 4.0 or greater, to be consistent with Table 321.25–H and subd. 2.

66. Table applies to wind exposure category __.
    a. B
    b. C
    c. D
    d. both b or c
67. For wind exposure category ___, multiply number of braced wall panels required by 1.3 or 1.6, respectively.
    a. B
    b. C
    c. D
    d. both b or c
68. Tabulated values are based on a nominal wall height of __ feet.
    a. 8
    b. 9
    c. 10
    d. 12
69. For nominal wall heights other than 10 feet, multiply the required length of bracing by the following factors:
    a. 0.90 for 8 feet
    b. 0.95 for 9 feet
    c. 1.05 for 10 feet
    d. both a & b
70. For nominal wall heights other than 10 feet, multiply the required length of bracing by the following factors:
    a. 1.00 for 11 feet
    b. 1.10 for 12 feet
    c. 1.15 for 13 feet
    d. 1.20 for 14 feet
71. Where minimum ½" gypsum wall board interior finish is not provided, the required bracing amount for the affected rectangle side shall be multiplied by_____.
    a. 1.20
    b. 1.30
    c. 1.40
    d. 1.50
72. Perpendicular sides to the front and rear sides are the _____ sides. See Figure 321.25–B
    a. left and right
    b. front and rear
    c. both a & b
    d. none of the above
73. Perpendicular sides to the left and right sides are the _____ sides. See Figure 321.25–B
    a. left and right

b. front and rear
c. both a & b
d. none of the above

74. Eave to ridge height is 10', length of perpendicular side is 30', and the wall is supporting one floor, roof, and ceiling. What is the required length of bracing on any side of rectangle?
a. 5'
b. 6.5'
c. 9'
d. 12'

75. Top-of-wall-to-ridge is 15', length of perpendicular side is 60', and the wall is supporting one floor, roof, and ceiling. What is the required length of bracing on any side of rectangle?
a. 22.9'
b. 16.7'
c. 19.6'
d. 11.7'

STEP 4: If desired or required, apply any adjustment factors (adjustments may decrease or increase the required bracing amount) per the footnotes to the Tables. For example wall heights taller than 10' and wind exposure category C or D would both increase the bracing amount. Absence of interior ½" gypsum board sheathing increases required bracing amount.

76. Wall heights taller than 10' and wind exposure category C or D would both _____the bracing amount.
a. increase
b. decrease
c. complicate
d. all of the above

77. Absence of interior ½" gypsum board sheathing will _____ the required bracing amount.
a. increase
b. decrease
c. complicate
d. all of the above

STEP 5: Repeat steps 2 through 4 considering wind in the perpendicular direction.

STEP 6: Determine the minimum required width of braced wall panels. For intermittent bracing method the minimum length of braced wall panel is given in Table 321.25-G. For continuously sheathed bracing method the minimum width is determined using Table 321.25-H dependent on the maximum opening height adjacent to the panel and the wall height. **PF Method:** For Intermittent bracing, per Table 321.25-1 footnote 'h', each PF panel (16-24" wide per Figure 321.25-A) counts as 1/2 of a braced wall panel when determining compliance with Table 321.25-1. For Continuously Sheathed bracing, the actual length of each PF panel (16-24" wide per Figure 321.15-A) in feet counts toward the required total length of bracing required.

78. For intermittent bracing method the minimum length of braced wall panel is given in Table _____.
a. 321.25-G
b. 321.25-H
c. both a & b
d. none of the above

79. For continuously sheathed bracing method the minimum width is determined using Table _____.
a. 321.25-G
b. 321.25-H

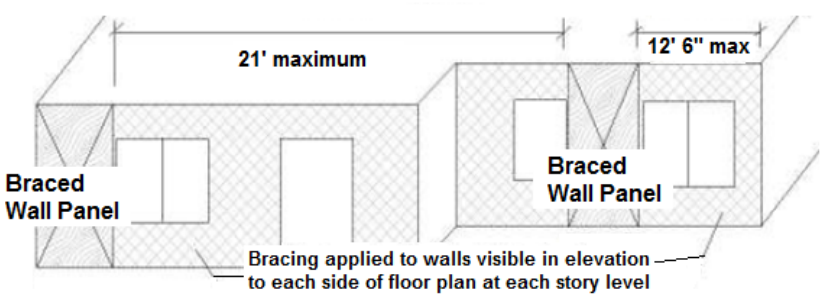
c. both a & b
d. none of the above

80. For Intermittent bracing, per Table 321.25-1 footnote 'h', each PF panel (16-24" wide per Figure 321.25-A) counts as _____of a braced wall panel when determining compliance with Table 321.25-1.
a. ¼
b. 1/3
c. ½
d. feet counts toward the required total length of bracing required

81. For Continuously Sheathed bracing, _____ (16-24" wide per Figure 321.15-A) in feet counts toward the required total length of bracing required.
a. ¼ of a braced wall panel
b. 1/3 of a braced wall panel
c. ½ of a braced wall panel
d. the actual length of each PF panel

STEP 7: Check that location of braced wall panels meets Figure 321.25-C ... start of a panel max 12 1/2' from the building comer and panels spaced maximum of 21' edge to edge along the building side/elevation. For intermittent or continuous methods, each PF panel meeting min. required width of Fig. 321.25-A counts as a braced wall panel when evaluating of Fig. 321.25-C.

FIGURE 321.25-C
LOCATION OF BRACED WALL PANELS ALONG A BUILDING SIDE a



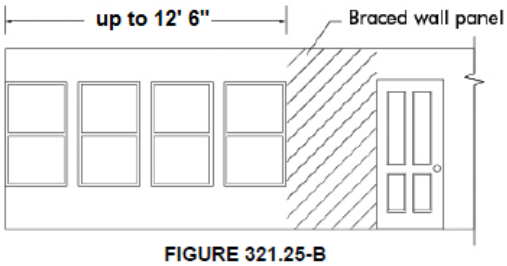


FIGURE 321.25-B
PERMITTED BRACED WALL PANEL DISTANCES
FROM ENDS OF A BRACED WALL LINE

a. A braced wall panel can be anything from one-half to one brace panel.

---

82. Panel maximum is ____ from the building comer.
a. 10’
b. 12 ½’
c. 21’
d. 25’

83. Panels spaced maximum of ____ edge to edge along the building side/elevation.
a. 10’
b. 12 ½’
c. 21’
d. 25’

84. For _____methods, each PF panel meeting min. required width of Fig. 321.25-A counts as a braced wall panel when evaluating of Fig. 321.25-C.
a. intermittent
b. continuous
c. both a & b
d. none of the above

STEP 8: Repeat steps 1 through 7 for additional stories.

Table 321.25–H[a, b]
MINIMUM WIDTHS OF CS-WSP AND CS-SFB BRACED WALL PANELS

Maximum Opening Height Adjacent to Braced Wall Panel	Minimum Length of Full-Height Braced Wall Panel (inches)			
	8' Tall Wall	9' Tall Wall	10' Tall Wall	12' Tall Wall
5'– 4"	24	27	30	36
6'– 8"	32	30	30	36
8'	48	41	38	36
9'	-	54	46	41
10'	-	-	60	48
12'	-	-	-	72

[a] Sheathing shall extend from the top of the top plate to the bottom of the bottom plate and may be multiple sheets. All joints shall be blocked.

[b] Interpolation is permitted.

85. The minimum width of method CS-WSP braced wall panels with a maximum opening height adjacent to brace wall panel of up to 8', with a 9' tall wall, what is the minimum length of the required braced wall panel?

a. 30"
b. 41"
c. 54"
d. 38"

86. The minimum width of method CS-SFB braced wall panels with a maximum opening height adjacent to brace wall panel of up to 8', with a 10' tall wall, what is the minimum length of the required braced wall panel?

a. 30"
b. 41"
c. 54"
d. 38"

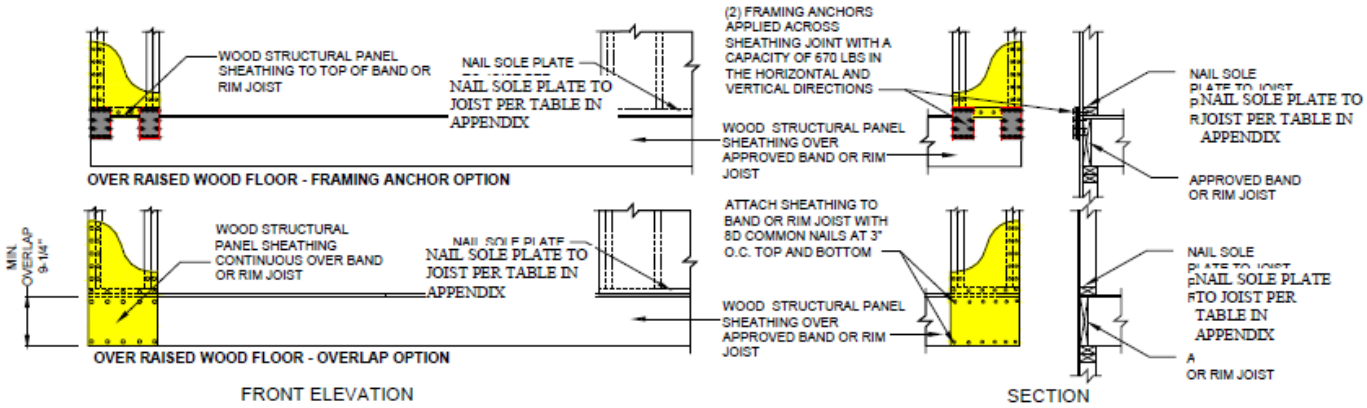
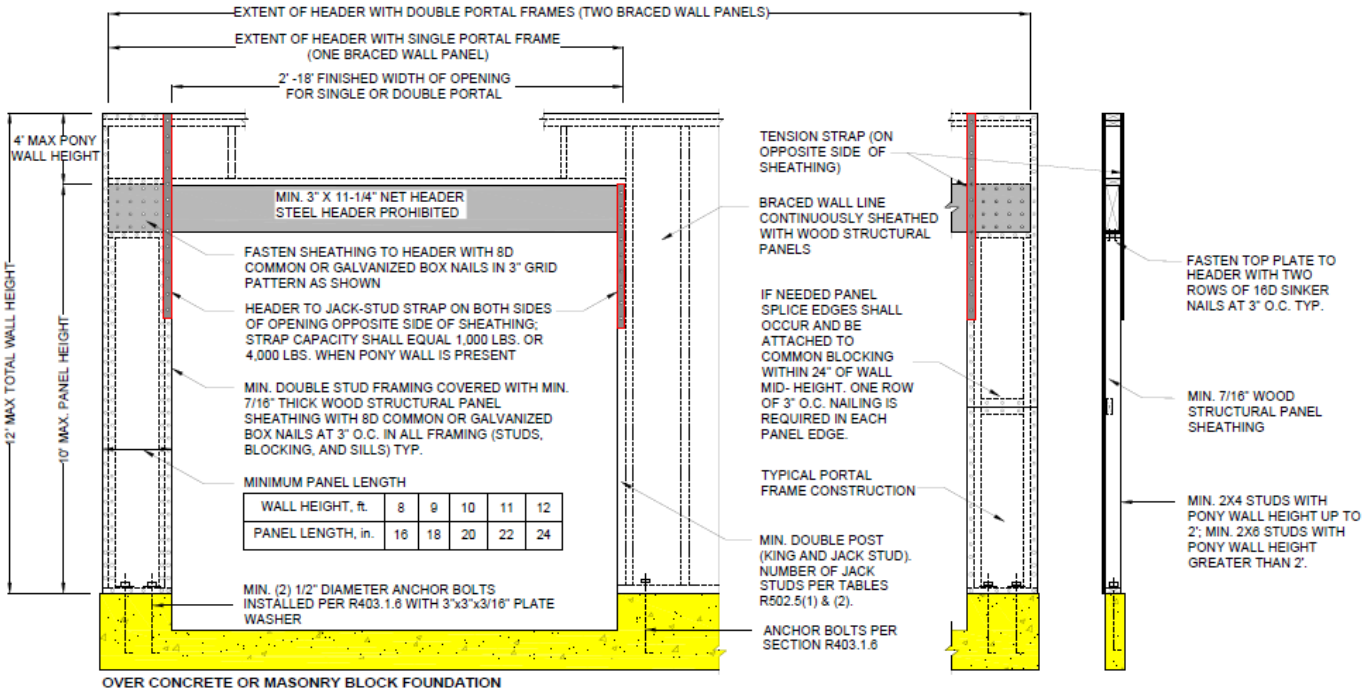


Figure 321.25-A
PF - PORTAL FRAME BRACE CONSTRUCTION



87. EXTENT OF HEADER WITH DOUBLE PORTAL FRAMES equals _____.
    a. one braced wall panel
    b. two braced wall panels
    c. ½ a braced wall panel
    d. none of the above

8. FASTEN SHEATHING TO HEADER WITH 8D COMMON OR GALVANIZED BOX NAILS IN ____ GRID PATTERN AS SHOWN
    a. 2”
    b. 3”
    c. 4”
    d. 6”

89. HEADER TO JACK-STUD STRAP ON BOTH SIDES AT 3" O.C. TYP. OF OPENING OPPOSITE SIDE OF SHEATHING; STRAP CAPACITY SHALL EQUAL _____ LBS.
    a. 500
    b. 1,000
    c. 3000
    d. 4000

90. HEADER TO JACK-STUD STRAP ON BOTH SIDES AT 3" O.C. TYP. OF OPENING OPPOSITE SIDE OF SHEATHING; _____ LBS. WHEN PONY WALL IS PRESENT
    a. 500
    b. 1,000
    c. 3000
    d. 4000

91. Method PF has a wall height of 10’ would require a minimum panel length of ____.
    a. 16”
    b. 18”
    c. 20”
    d. 22”

(c) *Bracing amount.* Bracing methods and materials complying with Table 321.25–G shall be applied to exterior walls in accordance with all of the following requirements:
1. For the purpose of determining bracing amounts, the outermost extents of the building plan at each floor level shall be circumscribed with a rectangle to define the overall length of each building side as shown in Figure 321.25–B.
2. In no case may the amount of bracing be less than two braced wall panels on exterior walls parallel to each rectangle side for each floor level of the building.
3. Where used, the number of intermittent brace panels applied to walls parallel to each rectangle side shall comply with Table 321.25–I.
4. Where used, the total length of continuous sheathed brace panels applied to walls parallel to each building side shall comply with Table 321.25–J.
5. The location of brace panels applied to walls parallel to each building side shall comply with Figure 321.25–C.
6. The interior side of exterior walls shall be sheathed with minimum ½" gypsum board interior finish unless otherwise permitted to be excluded by this subsection.
7. Balloon-frame walls shall have a maximum height of two floors unless constructed in accordance with an approved design. Wall framing shall be continuous from the lowest floor to the wall top plate at the roof. All edges of sheathing shall be supported on and fastened to blocking or framing. Braced wall panels may not be required on the balloon-frame wall portion provided the bracing amount and brace spacing requirement are satisfied for the building side. Where brace panels must be located on the balloon-frame wall portion to satisfy bracing requirements for the building side containing the balloon-frame wall portion, brace wall panels shall extend to the full height of the balloon-frame wall.

92. Balloon-frame walls shall have a maximum height of ____ floors unless constructed in accordance with an approved design.
    a. 1
    b. 2
    c. 3
    d. 4
93. Balloon-frame walls shall have all edges of sheathing supported on and fastened to _____.
    a. blocking
    b. framing
    c. both a & b
    d. none of the above
94. Where brace panels must be located on the balloon-frame wall portion to satisfy bracing requirements for the building side containing the balloon-frame wall portion, brace wall panels **may** extend to the full height of the balloon-frame wall.
    a. true
    b. false

SECTION 1. SPS 321.02 (1) (c) is amended to read:
SPS 321.02 (1) (c) *Wind loads.* 1. Dwellings shall be designed and constructed to withstand a horizontal and uplift pressure of 20 pounds per square foot acting over the surface area, except wind loads may be determined in accordance with ASCE 7–05, *Minimum Design Loads for Buildings and Other Structures*.
2. No wind load reduction may be permitted for the shielding effect of other buildings.
3. Compliance with the prescriptive construction requirements of this chapter shall be deemed to be compliance with this paragraph.
SECTION 2. SPS 321.23 is amended to read: Walls shall comply with the design requirements of s. SPS 321.02. Compliance with the prescriptive construction requirements of s. SPS 321.25 shall be deemed to be compliance with this section.

95. *Wind loads.* 1. Dwellings shall be designed and constructed to withstand a horizontal and uplift pressure of ___ pounds per square foot acting over the surface area.

a. 10
b. 15
c. 20
d. 25

96. Wind load reduction may be permitted for the shielding effect of other buildings.

a. true
b. false

SPS 321.02 (1) (c) *Wind loads.* Dwellings shall be designed and constructed to withstand either a horizontal and uplift pressure of 20 pounds per square foot acting over the surface area or the wind loads determined in accordance with ASCE 7–05, *Minimum Design Loads for Buildings and Other Structures*.
SPS 321.02 (1) (c) **Note:** ASCE 7–05 allows for substantial reduction from 20 psf as applied to the surface area.

Wall Bracing Compliance Worksheet

Complete this worksheet or provide equivalent information on the plans submitted with the permit application.

Sketch and dimension the building plan and the wall bracing rectangle(s) per 321.25(8)(c)1. and Figure 321.25-B. Provide and label additional sketches if the building plan/rectangles change at different floor levels.

Indicate applicable Wall Bracing Method for each level (see Table 321.25-G), each labeled rectangle if more than one [see 321.25(8)(c)], and amount of bracing (# of braced panels or length of braced wall required) per the respective table (provide additional worksheets for additional rectangles as needed):

Rectangle:____ Wall Ht. = ____ Eave to Ridge Ht. = ____ Max. Opening Ht. = ____ Wind Exp. = ____

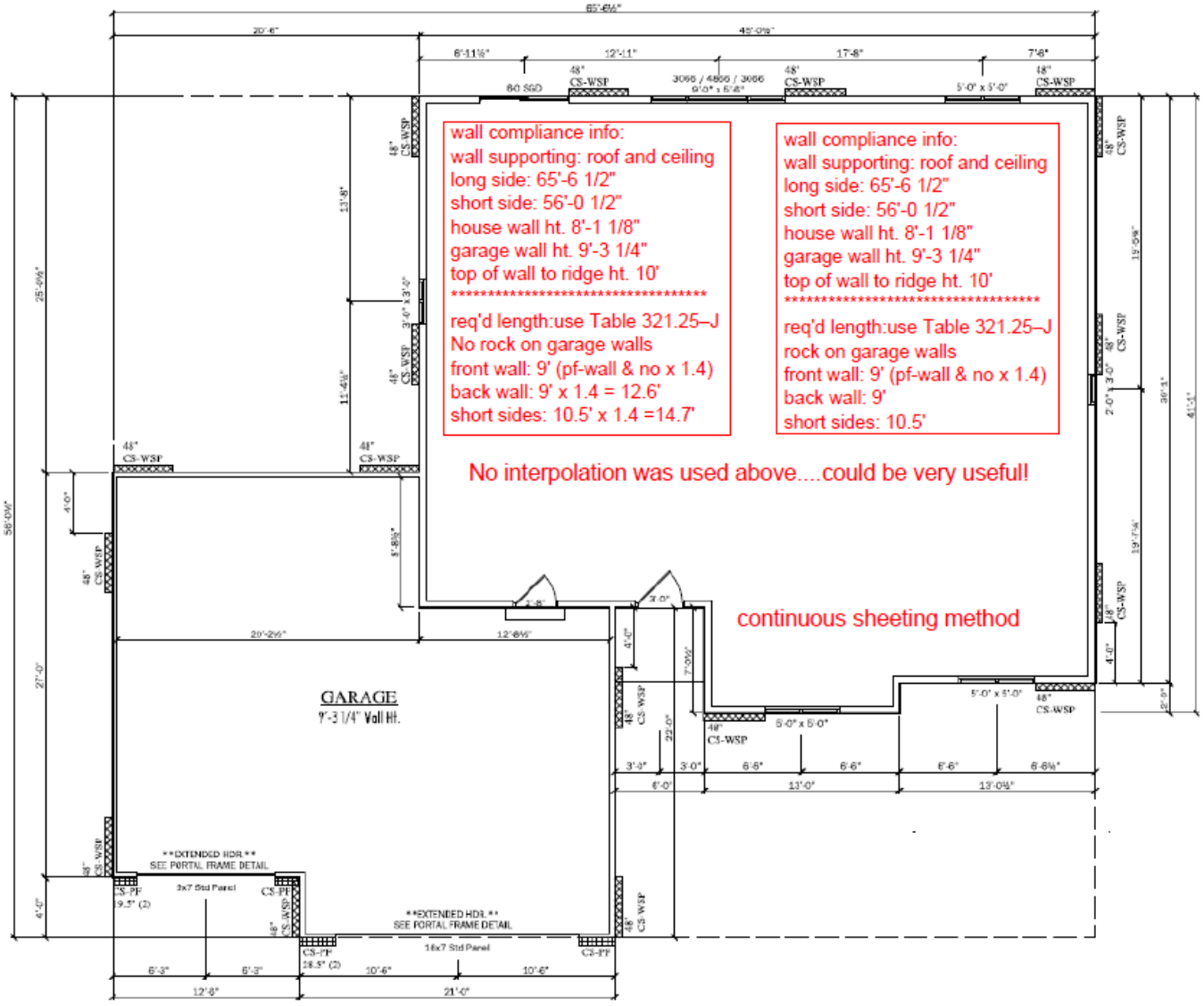
Walls Supporting:	Intermittent method (LIB, DWB, WSP, SFB, GB, PCP) and # of panels per Table 321.25-I Min. panel width (Table 321.25-G) =_____		Continuous method (CS-WSP, CS-SFB) and total length required per Table 321.25-J Min. panel width (Table 321.25-H) = _____		PF Method (see Figure 321.25-A). Indicate number of PF panels 16-24" wide provided. Min. PF width (Fig. 321.25-A) = _____	
	Long side	Short side	Long side	Short side	Long side	Short side
Roof and ceiling only						
One floor, roof and ceiling						
Two floors, roof and ceiling						

Rectangle:____ Wall Ht. = ____ Eave to Ridge Ht. = ____ Max. Opening Ht. = ____ Wind Exp. = ____

Walls Supporting:	Intermittent method (LIB, DWB, WSP, SFB, GB, PCP) and # of panels per Table 321.25-I Min. panel width (Table 321.25-G) = _____		Continuous method (CS-WSP, CS-SFB) and total length required per Table 321.25-H Min. panel width (Table 321.25-H) = _____		PF Method (see Figure 321.25-A). Indicate number of PF panels 16-24" wide provided. Min. PF width (Fig. 321.25-A) = _____	
	Long side	Short side	Long side	Short Side	Long side	Short side
Roof and ceiling only						
One floor, roof and ceiling						
Two floors, roof and ceiling						

PF Method: For Intermittent bracing, per Table 321.25-I footnote 'h', each PF panel (16-24" wide per Figure 321.25-A) counts as ½ of a braced wall panel when determining compliance with Table 321.25-I. For Continuously Sheathed bracing, the actual length of each PF panel (16-24" wide per Figure 321.25-A) in feet counts toward the required total length of bracing required. For intermittent or continuous methods, each PF panel meeting min. required width of Fig. 321.25-A counts as a braced wall panel when evaluating panel spacing per Fig. 321.25-C.

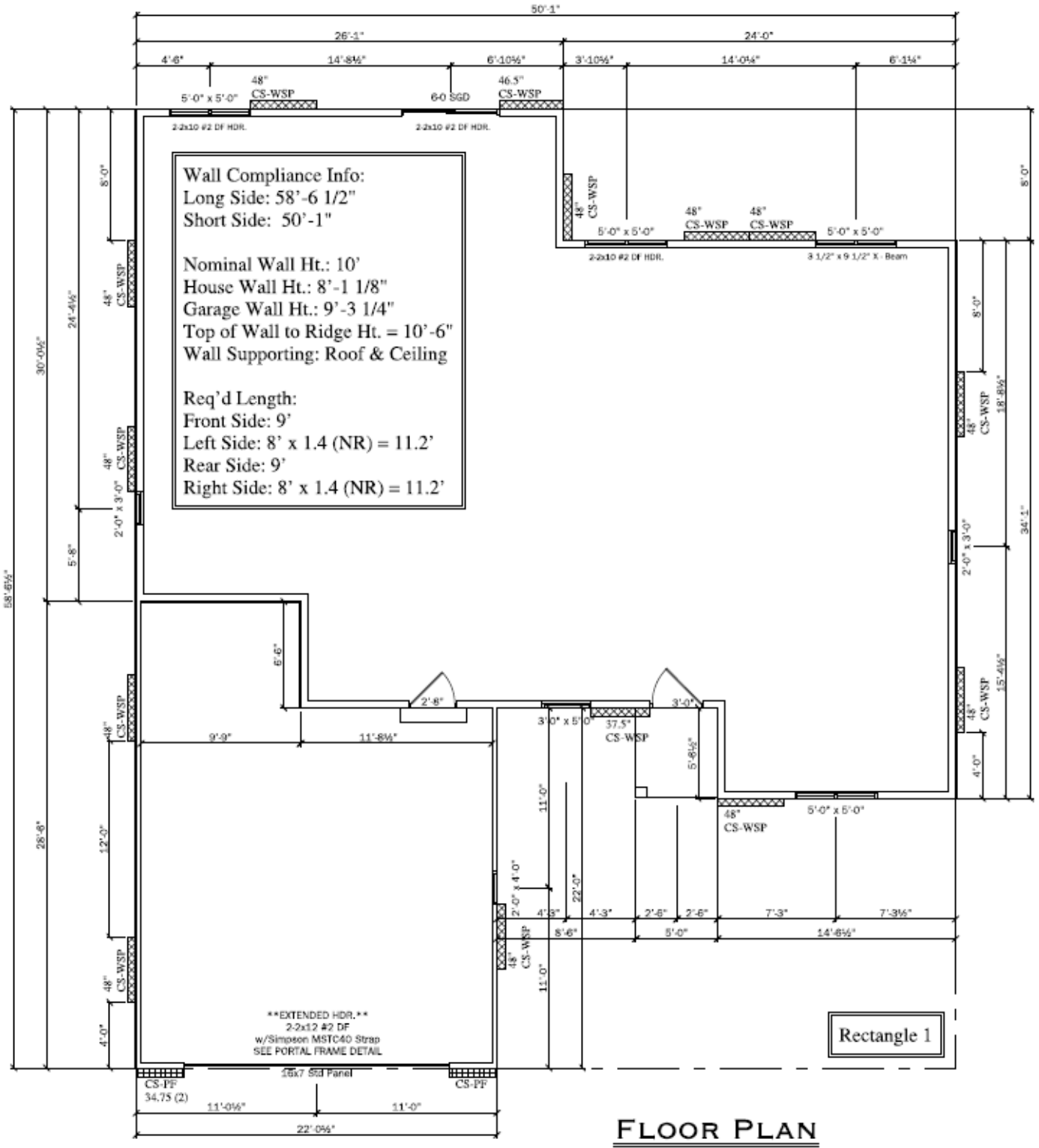
Indicate location of required braced wall panels determined above on each rectangle side as required by Figure 321.25-C.



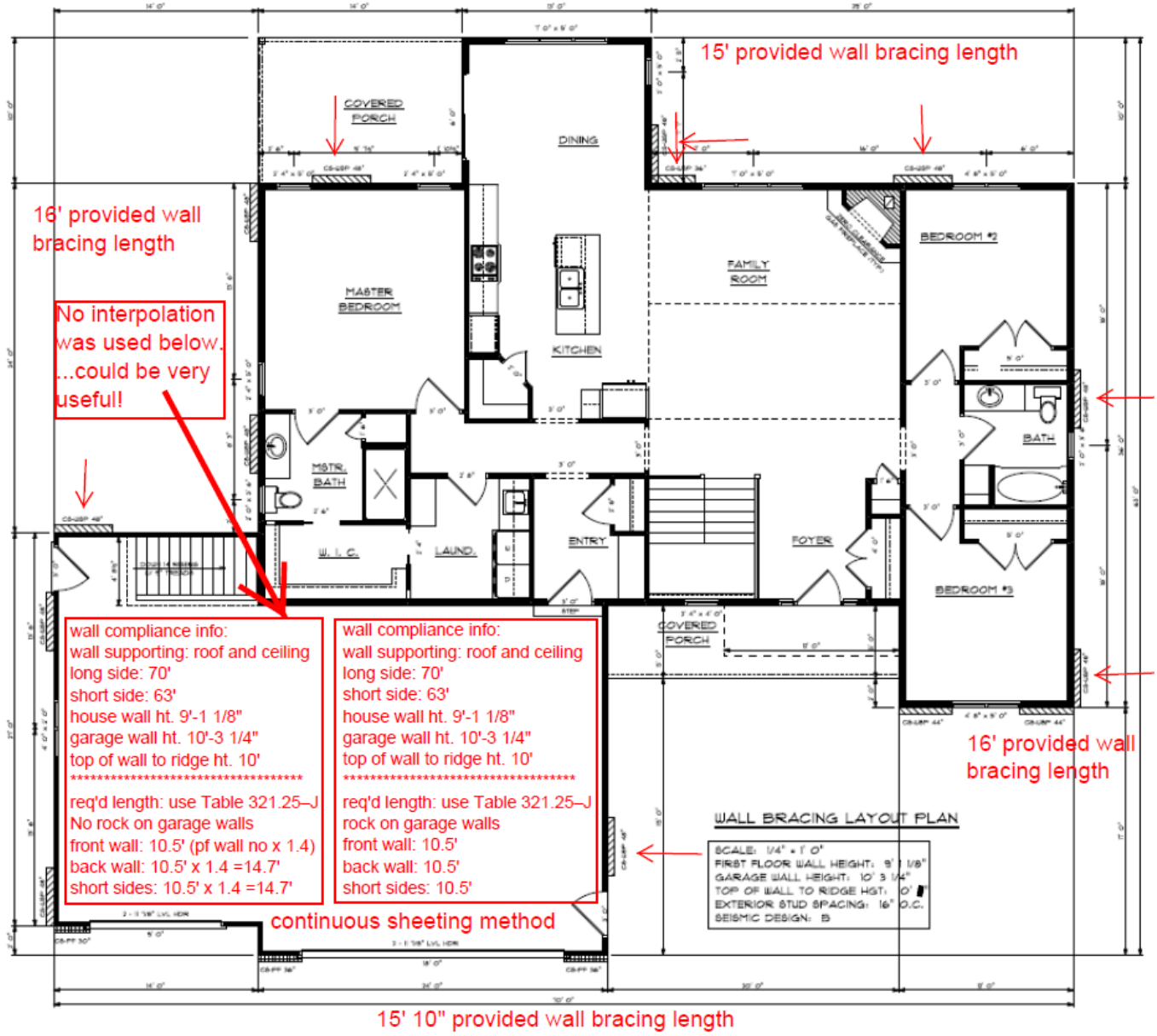
Continuous Sheeting with no gypsum wall board on garage walls above. This affects the entire rectangle.

Table 321.25-J footnote d: Where minimum ½" gypsum wall board interior finish is not provided, the required bracing amount for the **affected rectangle side shall be multiplied by 1.40**. **(The entire rectangle)**

SPS 321.02 (1) (c) *Wind loads.* Dwellings shall be designed and constructed to withstand either a horizontal and uplift pressure of 20 pounds per square foot acting over the surface area or the wind loads determined in accordance with ASCE 7–05, *Minimum Design Loads for Buildings and Other Structures*. **SPS 321.02 (1)** (c) **Note:** ASCE 7–05 allows for substantial reduction from 20 psf as applied to the surface area.


Wall Compliance Info:
Long Side: 58'-6 1/2"
Short Side: 50'-1"
Nominal Wall Ht.: 10'
House Wall Ht.: 8'-1 1/8"
Garage Wall Ht.: 9'-3 1/4"
Top of Wall to Ridge Ht. = 10'-6"
Wall Supporting: Roof & Ceiling
Req'd Length:
Front Side: 9'
Left Side: 8' x 1.4 (NR) = 11.2'
Rear Side: 9'
Right Side: 8' x 1.4 (NR) = 11.2'
50'-1"
26'-1"
24'-0"
EXTENDED HDR.
2-2x12 #2 DF
w/Simpson MSTC40 Strap
SEE PORTAL FRAME DETAIL
Rectangle 1

FLOOR PLAN


15' provided wall bracing length
COVERED PORCH
DINING
16' provided wall bracing length
No interpolation was used below. ...could be very useful!
MASTER BEDROOM
KITCHEN
FAMILY ROOM
BEDROOM #2
MSTR. BATH
BATH
W. I. C.
LAUND.
ENTRY
FOYER
BEDROOM #3
COVERED PORCH
16' provided wall bracing length
wall compliance info:
wall supporting: roof and ceiling
long side: 70'
short side: 63'
house wall ht. 9'-1 1/8"
garage wall ht. 10'-3 1/4"
top of wall to ridge ht. 10'
****
req'd length: use Table 321.25–J
No rock on garage walls
front wall: 10.5' (pf wall no x 1.4)
back wall: 10.5' x 1.4 =14.7'
short sides: 10.5' x 1.4 =14.7'
wall compliance info:
wall supporting: roof and ceiling
long side: 70'
short side: 63'
house wall ht. 9'-1 1/8"
garage wall ht. 10'-3 1/4"
top of wall to ridge ht. 10'
****
req'd length: use Table 321.25–J
rock on garage walls
front wall: 10.5'
back wall: 10.5'
short sides: 10.5'
continuous sheeting method
WALL BRACING LAYOUT PLAN
SCALE: 1/4" = 1' 0"
FIRST FLOOR WALL HEIGHT: 9' 1 1/8"
GARAGE WALL HEIGHT: 10' 3 1/4"
TOP OF WALL TO RIDGE HGT: 10'
EXTERIOR STUD SPACING: 16" O.C.
SEISMIC DESIGN: B
15' 10" provided wall bracing length

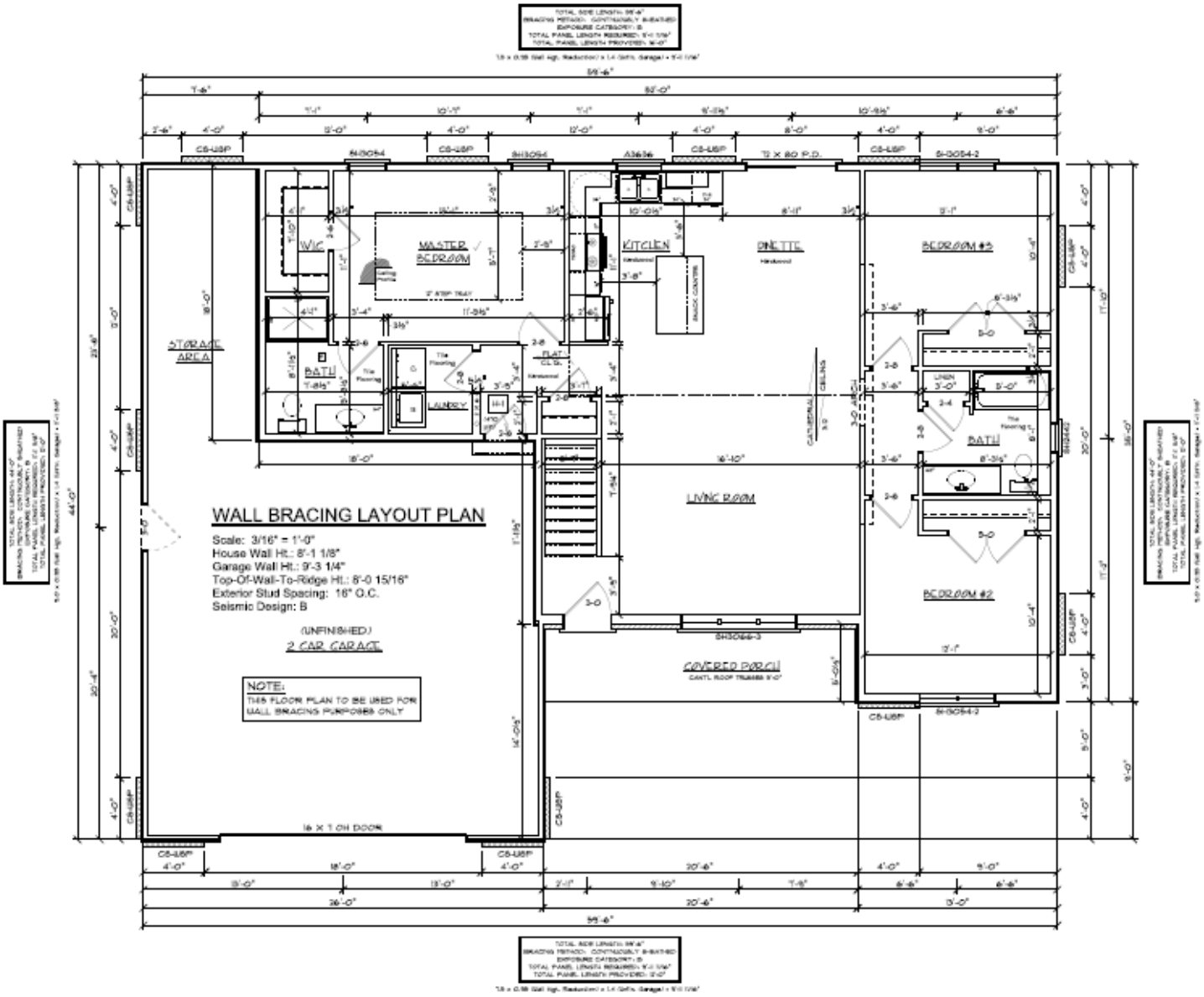


Table 321.25−A
SIZE, HEIGHT AND SPACING OF WOOD STUDS[a,c] (Partial Table)

	Bearing and Exterior Nonbearing Walls					Interior Nonbearing Walls	
Nominal Stud Size (inches)	Maximum Laterally Unsupported Stud Height[a] (feet)	Maximum Spacing When Supporting Roof and Ceiling Only (inches)	Maximum Spacing When Supporting One Floor, Roof and Ceiling (inches)	Maximum Spacing When Supporting Two Floors, Roof and Ceiling (inches)	Maximum Spacing When Supporting One Floor Only (inches)	Maximum Laterally Unsupported Stud Height[a] (feet)	Maximum Spacing (inches)
2x6	12[d]	24	24	16	24	20	24

[c]All spacing dimensions are to the center of the studs.

[d]Unless supported by structural analysis, use of stud heights that range from over 10 feet to 12 feet is limited to where all of the following conditions are met: snow loads do not exceed 25 psf; tributary dimensions for floors and roofs do not exceed 6 feet; spans for floors and roofs do not exceed 12 feet; eave projections do not exceed 2 feet; the bending modulus of elasticity is at least 1,600,000 lb_f per square inch; the allowable fiber stress in bending for the wood is not less than 1310 psi as determined by multiplying the AF&PA NDS tabular base design value by the repetitive use factor, and by the size factor for all species except southern pine; utility, standard, stud, and No. 3 grade lumber of any species is not used; and the allowable deflection does not exceed whichever of the following are applicable:

Interior walls and partitions – span height/180.
Exterior walls with plaster or stucco finish – span height/360.
Exterior walls with other brittle finishes – span height/240.
Exterior walls with flexible finishes – span height/120.
Exterior walls with interior gypsum wallboard finish – span height/180.
Any manufacturer-specified limits for any included windows or doors.

SECTION 1. SPS 321.25 (7) (d) and (8) (a) (Note) are amended to read:

SPS 321.25 (7) (d) Cripple walls with a stud height of 14 inches or greater shall be braced in accordance with sub. (8)

(8) (a) **Note:** Acceptable engineering wall bracing practices include any of the following:

1. The provisions under section R602.10 or R602.12 of the International Residential Code (IRC) – 2012.
2. Design in accordance with the engineering basis of the 2012 IRC bracing provisions, such as described in Crandell, J. and Martin, Z., "The Story Behind the *2009 IRC* Wall Bracing Provisions (Part 2: New Wind Bracing Requirements)," *Wood Design Focus*, Forest Products Society, Peachtree Corners, GA, Spring 2009.
3. Installation instructions from the manufacturer of the bracing product that are compliant with section SPS 321.02.

SECTION 2. SPS 321.25 (8) (b) and (c), Tables 321.25–G to 321.25–J, and Figures 321.25–A to 321.25–C are repealed and recreated to read: **SPS 321.25 (8)** (b) *Bracing materials and methods.* Wall bracing shall consist of the materials and methods listed in Table 321.25–G or approved alternatives capable of providing the required wind load resistance as determined in accordance with s. SPS 321.02 (1) (c). (c) *Bracing amount.* Bracing methods and materials complying with Table 321.25–G shall be applied to walls in accordance with all of the following requirements:

1. For the purpose of determining bracing amounts, the outermost extents of the building plan at each floor level shall be circumscribed with a rectangle to define the overall length of each building side as shown in Figure 321.25–B.
2. In no case may the amount of bracing be less than two braced wall panels on walls parallel to each rectangle side for each floor level of the building.
3. Where used, the number of intermittent brace panels applied to walls parallel to each rectangle side shall comply with Table 321.25–I.
4. Where used, the total length of continuous sheathed brace panels applied to walls parallel to each building side shall comply with Table 321.25–J.
5. The location of brace panels applied to walls parallel to each building side shall comply with Figure 321.25–C.
6. Balloon-frame walls may be no longer than 21 feet and shall have a maximum height of two floors unless constructed in accordance with an approved design. Wall framing shall be continuous from the lowest floor to the wall top plate at the roof. All edges of sheathing shall be supported on and fastened to blocking or framing. Braced wall panels may not be required on the balloon-frame wall portion provided the bracing amount and brace spacing requirement are satisfied for the building side. Where brace panels are located on the balloon-frame wall portion, they shall have a height-to-width ratio of not more than 2.5:1.

7. For a gable end wall, if the brace-panel height does not exceed 12 feet at the highest portion and if the 12 ½-foot and 21-foot spacing requirements in Figure 321.25–C are met, the wall is adequately braced. Where a brace panel exceeds 12 feet in height, it shall have a height-to-width ratio of not more than 2.5:1, and comply with Figure 21.25–C.

SECTION 4. SPS 321.25 (7) (d) and (8) (a) (Note) are amended to read:

SPS 321.25 (7) (d) Cripple walls with a stud height of 14 inches or greater shall be braced in accordance with sub. (8).
(8) (a) **Note:** Acceptable engineering wall bracing practices include any of the following:

1. The provisions under s. section R602.10 or R602.12 of the International Residential Code (IRC) – 2009 2012.
2. Design in accordance with the engineering basis of the 2012 IRC bracing provisions as described in Crandell, J. and Martin, Z., "The Story Behind the *2009 IRC* Wall Bracing Provisions (Part 2: New Wind Bracing Requirements)," *Wood Design Focus,* Forest Products Society, Peachtree Corners, GA, Spring 2009.
3. Bracing manufacturer installation instructions and code-compliance data.

SECTION 6. SPS 320 to 325 Appendix, Minimum Fastener Schedule Table is amended to read:

CHAPTERS SPS 320–325 Appendix
MINIMUM FASTENER SCHEDULE TABLE

Other interior and exterior panel products and finishes installed per manufacturer requirements.
For engineered connectors, use manufacturer's specified fasteners.

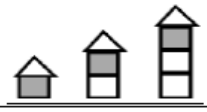
Description of Building Materials/Connection	**Number and Type of Fastener[1 2 3]**
Wall Framing	
Sole plate to joist or blocking, face nail	2-16d at 16"o.c.

Panel Sheathing

Material	**Fastener**	**Spacing of Fastener**	
		Edges	**Intermediate Supports**
Wood panel siding to framing			
5/8″ gypsum sheathing[5]	1¾″ galvanized roofing nail; 8d common nail; staple galvanized 1 5/8" long; 1 5/8" screws, Type W or S	7"	7"

97. Cripple walls with a stud height of ___ or greater shall be braced in accordance with sub. (8).
    a. 14'
    b. 12"
    c. 14"
    d. 16"
98. When fastening sole plate to joist or blocking, face nail the plate using _____.
    a. 1-16d at 16" o.c.
    b. 2-14d at 16" o.c.
    c. 2-10d at 16" o.c.
    d. 2-16d at 16" o.c.

Table 321.25–A
SIZE, HEIGHT AND SPACING OF WOOD STUDS[a]
(Partial Table)

	Bearing Walls					Nonbearing Walls	
Stud Size (inches)	Laterally Unsupported Stud Height[a] (feet)	Maximum Spacing When Supporting Roof and Ceiling Only (inches) 	Maximum Spacing When Supporting One Floor, Roof and Ceiling (inches)	Maximum Spacing When Supporting Two Floors, Roof and Ceiling (inches)	Maximum Spacing When Supporting One Floor Only (inches)	Laterally Unsupported Stud Height[a] (feet)	Maximum Spacing (inches)
2x4	10	24	16	-	24	14	24
	12	16	12	-	16		
2x6	~~10~~12	24	24	16	24	20	24

99. Using a 12’ 2x4 stud supporting a roof and ceiling, what is the maximum stud spacing for this load bearing wall?
a. 12”
b. 16”
c. 24”
d. 30”

100. Using a 14’ 2x4 stud supporting nothing, what is the maximum stud spacing for this non-load bearing wall?
a. 12”
b. 16”
c. 24”
d. 30”

101. Using a 12’ 2x6 stud supporting a 2 floors, roof and ceiling, what is the maximum stud spacing for this load bearing wall?
a. 12”
b. 16”
c. 24”
d. 30”

SECTION 116. Comm 21.26 (1) is repealed and recreated to read: **Comm 21.26 (1)** COLD WEATHER WORK. When ambient air temperature is below 40ₒF, the cold weather construction procedures under ACI 530.1 shall be followed. **Note:** The requirements for cold weather work are in sections 1.8 and 1.8C of the 2005 edition of the ACI standard. SECTION 117. Comm 21.26 (3) (a) is renumbered Comm 21.26 (3) (b) and Comm 21.26 (3) (intro.) is renumbered Comm 21.26 (3) (a).

SECTION 118. Comm 21.26 (3) (a), as renumbered, is amended to read: **Comm 21.26 (3)** TYPES OF MORTAR. (a) *Mortar specifications*. The type of **Comm 21.26 (3)** TYPES OF MORTAR. (a) *Mortar specifications*. The type of to the requirements of ASTM C-270 SECTION 119.
Comm 21.26 (4) (b) is amended to read: **Comm 21.26 (4)** (b) *Admixtures or mortar colors*. Admixtures or mortar colors shall notbe added to the mortar unless the resulting mortar conforms to the mortar specifications. Only mineral oxide may be used as mortar color and shall not exceed 10% by weight of the cement. **Comm 21.26 (7)** (a) 2. A minimum one-inch air space shall be provided between the veneer and the sheathing unless a manufactured offset material is used.

SECTION 124. Comm 21.26 (7) (a) 5. to 7. are created to read: **Comm 21.26 (7)** (a) 5. Ventilation openings shall be provided at the top of the wall. **Note:** The ventilation opening could be other than a weep hole. **Comm 21.26 (7)** (a) 6. Studs and sheathing behind masonry veneer shall be covered with material used to construct the water-resistive barrier as required under s. Comm 21.24 (4). **Note:** Acceptable water-resistive barrier materials include polymeric-based house wraps and # 15 or greater asphalt-saturated felts that comply with ASTM D 226 for type I felt. **Comm 21.26 (7)** (a) 7. Masonry or brick veneer shall be above final exterior grade unless there is through-wall flashing at grade or within two courses above grade. SECTION 125. Comm 21.26 (7) (c) is created to read: **Comm 21.26 (7)** (c) *Veneer attachment*. Veneers shall be anchored or adhered in accordance with ACI 530 and ACI 530.1.
SECTION 126. Comm 21.26 (8) and Comm 21.26 (12) are repealed and recreated to read: **Comm 21.26 (8)** FLASHING. (a) *General*. 1. Flashing shall be installed in accordance with this section to drain any water outward away from structural members, sheathing and insulation.
2. Open joints or weep holes shall be provided in the facing immediately above the flashing at a horizontal spacing not exceeding 2 feet.
3. Flashing shall consist of materials that are durable and permanently UV-resistant such as sheet metal or heavy gauge PVC. **Note:** Materials including house wrap, asphalt-impregnated building paper, plastic sheeting, peel-and-stick rubberized sheet material, and light gauge PVC are not acceptable as meeting this requirement.
(b) *Location*. 1. 'Lintels and chimneys.' In exterior hollow masonry walls, flashing shall be installed at the backsides of chimneys and at the bottom of the cavity formed by openings such as lintels over doors and windows.
2. 'Veneer.' Flashing shall be installed at the bottom of veneer and shall extend over the top of the foundation and up at least 8 inches and be embedded in the backing course. (c) *Weep holes*. 1. Weep holes may not be placed below final grade.
2. Rope or similar material used to form a weep hole shall be removed as soon as the mortar sets.
3. Weep holes shall be 3/8-inch minimum diameter. **Comm 21.26 (12)** JOINTS. Joints in masonry construction shall be constructed in accordance with ACI 530.1.

102. Only mineral oxide may be used as mortar color and shall not exceed 30% by weight of the cement.
a. true
b. false
103. When ambient air temperature is below 40^{o}F, the cold weather construction procedures under ACI 530.1 shall be followed.
a. true
b. false
104. Studs and sheathing behind masonry veneer shall be covered with material used to construct the water-resistive barrier as required under s. Comm 21.24 (4).
a. true
b. false
105. Acceptable water-resistive barrier materials include polymeric-based house wraps and # 15 or greater asphalt-saturated felts that comply with ASTM D 226 for type I felt.
a. true
b. false
106. Open joints or weep holes shall be provided in the facing immediately above the flashing at a horizontal spacing not exceeding 4 feet.
a. true
b. false
107. Flashing shall consist of materials that are durable and permanently UV-resistant such as sheet metal or heavy gauge PVC.
a. true
b. false
108. Materials including house wrap, asphalt-impregnated building paper, plastic sheeting, peel-and-stick

rubberized sheet material, and light gauge PVC are acceptable as meeting the flashing requirement.

a. true
b. false

109. In exterior hollow masonry walls, flashing shall be installed at the backsides of chimneys and at the bottom of the cavity formed by openings such as lintels over doors and windows.

a. true
b. false

110. Weep holes may be placed below final grade.

a. true
b. false

111. Rope or similar material used to form a weep hole shall can remain permanently.

a. true
b. false

112. Weep holes shall be the minimum diameter of the best drill bit on site.

a. true
b. false

113. Joints in masonry construction shall be constructed in accordance with the spacing necessary to complete the job.

a. true
b. false

Comm 21.27 Roof design and framing. (1) STRUCTURAL DESIGN. (a) *General.* Roof and roof-ceiling assemblies shall support all dead loads plus the minimum live loads under par. (c) and s. Comm 21.02. 61 (b) *Applicability of tables*. The joist and rafter tables in the appendix are valid for roofs with a minimum slope of 3 in 12. Lesser slopes require engineering analysis or shall be provided with a ridge beam.

(c) *Sloped roof snow loads.* Snow loads specified in s. Comm 21.02 (1) (b) 2. may be reduced for roof slopes greater than 30° by multiplying the snow load by Cs. The value of Cs shall be determined by the following: $Cs = 1 - \frac{(a-30)}{40}$ where a is the slope of the roof expressed in degrees.

Note: A roof pitch of 7 in 12 is equal to 30°.

(2) LATERAL RESTRAINT OF WALLS. Provisions shall be taken to absorb the horizontal thrust produced by a sloping roof through the use of wall ties, ceiling joists, beams at the ridge or at the wall or a system designed through structural analysis.

(3) UPLIFT AND SUCTION FORCES. (a) *General*. 1. Roofs shall withstand a pressure of at least 20 pounds per square foot acting upward normal to the roof surface. 2. Roof overhangs, eaves, canopies and cornices shall withstand an upward wind pressure of at least 20 pounds per square foot applied to the entire exposed area.

(b) *Anchorage.* 1. Roof framing members spanning more than 6 feet measured from the outermost edge of the roof shall be permanently fastened to the top plate of load bearing walls using engineered clips, straps or hangers.

2. Roof framing members spanning 6 feet or less measured from the outermost edge of the roof shall be permanently fastened to the top plate of load bearing walls using toe-nailing or engineered clips, straps or hangers. **Note:** For information on toe nailing, see the fastener schedule table in the appendix.

114. Provisions shall be taken to absorb the horizontal thrust produced by a sloping roof through the use of _____.

a. wall ties
b. ceiling joists
c. neither a or b
d. both a & b

115. Provisions shall be taken to absorb the horizontal thrust produced by a sloping roof through the use of _____.

a. beams at the ridge
b. a system designed through structural analysis.
c. neither a or b
d. both a & b

116. The joist and rafter tables in the appendix are valid for roofs with a minimum slope of 3 in 12. Lesser slopes require:

a. engineering analysis
b. shall be provided with a ridge beam.
c. neither a or b
d. either a or b

117. Roof framing members spanning 6 feet or less measured from the outermost edge of the roof shall be permanently fastened to the top plate of load bearing walls using:

a. toe-nailing
b. engineered clips
c. neither a or b
d. either a or b

118. Roof framing members spanning 6 feet or less measured from the outermost edge of the roof shall be permanently fastened to the top plate of load bearing walls using:

a., straps
b. hangers
c. neither a or b
d. either a or b

119. Roof framing members spanning more than 6 feet measured from the outermost edge of the roof shall be permanently fastened to the top plate of load bearing walls using:

a. engineered clips
b. straps
c. hangers.
d. all of the above

120. _____ shall withstand a pressure of at least 20 pounds per square foot acting upward normal to the roof surface.

a. roofs
b. walls
c. garage doors
d. all of the above

121. _____ and cornices shall withstand an upward wind pressure of at least 20 pounds per square foot applied to the entire exposed area.

a. Roof overhangs
b. eaves
c. canopies
d. all of the above

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(4) ROOF RAFTERS. (a) *General.* 1. Rafters shall be notched to fit the exterior wall plate and fastened to the wall. 2. Collar ties shall be installed on the upper third of every third pair of abutting roof

rafters or every 48 inches, whichever is less. **Note:** Collar ties are intended to provide stability to the roof at the ridge. Lateral restraint for the walls must be provided in accordance with sub. (2).
(b) *Ridge boards.* 1. Where rafters meet to form a ridge, the rafters shall be attached to a ridge board. 2. The ridge board shall have a depth at least equal to the length of the cut end of the rafter abutting it. 3. Where all rafters are placed directly opposite each other or are offset at the ridge board by less than the thickness of the rafter, the ridge board shall have a nominal thickness of at least 1 inch. 4. Where one or more rafters are offset at the ridge board by more than the thickness of the rafter, the ridge board shall have a nominal thickness of at least 2 inches.
(c) *Ridge beams.* Rafters shall be attached to ridge beams using engineered clips, straps or hangers or the connection shall be designed through structural analysis.
(d) *Bearing.* The required bearing for wood rafters shall be in accordance with the NDS adopted in Table 20.24-2, except in no case shall the bearing be less than 1½ inches on wood or metal or less than 3 inches on masonry or concrete.
(e) *Ladders.* 1. Overhangs at gable end walls of more than 12 inches shall be provided with ladders which extend into the structure a distance no less than the length of the overhang. 2. The ladders shall be fastened at the wall. 3. The interior end of each ladder shall be attached to a rafter or truss with a hanger. **Note:** For the purposes of this section, a ladder is defined as a perpendicular projection extending beyond the face of the wall below.
(5) CEILING JOISTS. (a) Ceiling joists shall be nailed to exterior walls and to the ends of rafters.
(b) Ends of ceiling joists shall be lapped at least 3 inches and be fastened either with 3-16d nails or in accordance with the floor joist requirements under s. Comm 21.22 (4) (a) 1. d. **Note:** See the fastener table in appendix for a nailing schedule for ceiling joists.
(c) Where ceiling joists are placed at right angles to the rafters, the lookout joist or ties shall be fastened to the parallel ceiling joists or rafters using engineered clips, straps or hangers or the connection shall be designed through structural analysis.

122. Ends of ceiling joists shall be lapped at least 3 inches and be fastened either with 3- 16d nails or in accordance with the floor joist requirements under s. Comm 21.22 (4) (a) 1. d.
a. true
b. false
123. Where ceiling joists are placed at right angles to the rafters, the lookout joist or ties shall be fastened to the parallel ceiling joists or rafters using:
a. engineered clips
b. straps
c. neither a or b
d. both a & b
124. Where ceiling joists are placed at right angles to the rafters, the lookout joist or ties shall be fastened to the parallel ceiling joists or rafters using:
a. the connection shall be designed through structural analysis.
b. hangers
c. neither a or b
d. both a or b
125. The interior end of each ladder >12” shall be attached to a rafter or truss with a hanger.
a. true
b. false
126. Overhangs at gable end walls of more than 12 inches shall be provided with ladders which extend into the structure a distance no less than the length of the overhang.
a. true
b. false

127. The required bearing for wood rafters shall be in accordance with the NDS adopted in Table 20.24-2, except in no case shall the bearing be less than 1½ inches on wood or metal or less than 3 inches on masonry or concrete.
a. true
b. false
128. Rafters shall be attached to ridge beams using engineered:
a. clips
b. straps or hangers
c. the connection shall be designed through structural analysis
d. all of the above
129. Where one or more rafters are offset at the ridge board by more than the thickness of the rafter, the ridge board shall have a nominal thickness of at least 1 inches.
a. true
b. false
130. Where rafters meet to form a ridge, the rafters shall be attached to a ridge board.
a. true
b. false
131. Collar ties shall be installed on the upper forth of every third pair of abutting roof rafters or every 64 inches, whichever is less.
a. true
b. false
132. Rafters shall be notched to fit the exterior wall plate and fastened to the wall.
a. true
b. false

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(6) VALLEY AND HIP RAFTERS. (a) *Valley rafters.* 1. Where no bearing is provided under valley rafters at the intersection of 2 roof areas, the valley rafters shall be doubled in thickness and shall be at least 2 inches deeper than the required common rafter to permit full bearing at the beveled end.
2. Where ridges are provided at different elevations, vertical support shall be provided for the interior end of the lower ridge board or ridge beam. (b) *Hip rafters.* Where no bearing is provided under hip rafters, the hip rafters shall be of the same thickness as common rafters and shall be at least 2 inches deeper than required to permit full contact with the jack rafter.
(7) ROOF TRUSSES. (a) Metal plate connected wood roof trusses shall be designed in accordance with TPI 1 and the NDS adopted under s. Comm 20.24. (b) Truss members shall not be cut, bored or notched, except as allowed under sub. (8)(d). (c) If connection is provided to stabilize a non-load bearing wall, a slotted expansion joint or clip shall be used.

133. Where no bearing is provided under valley rafters at the intersection of 2 roof areas, the valley rafters shall be doubled in thickness.
a. true
b. false
134. Where no bearing is provided under valley rafters the valley rafters shall be doubled in thickness and shall be at least 3 inches deeper than the required common rafter to permit full bearing at the beveled end.
a. true
b. false
135. Where ridges are provided at different elevations, horizontal support shall be provided for the exterior end of the lower ridge board or ridge beam.
a. true
b. false

136. Where no bearing is provided under hip rafters, the hip rafters shall be double in thickness as common rafters.

a. true
b. false

137. Where no bearing is provided under hip rafters, the hip rafters shall be shall be at least 2 inches deeper than required to permit full contact with the jack rafter.

a. true
b. false

138. Truss members shall not be cut, bored or notched, except as allowed under sub. (8)(d).

a. true
b. false

139. If connection is provided to stabilize a non-load bearing wall, a slotted expansion joint or clip shall be used.

a. true
b. false

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(8) NOTCHING AND BORING. (a) *General.* 1. Notching and boring of beams or girders is prohibited unless determined through structural analysis. 2. Notching and boring of ceiling joists and rafters shall comply with pars. (b) and (c). (b) *Notching.* 1. Notches located in the top or bottom of ceiling joists and rafters are prohibited from all of the following:

a. Having a depth exceeding 1/6 the depth of the member.
b. Having a length exceeding 1/3 the depth of the member.
c. Being located in the middle 1/3 of the span of the member.

2. Where ceiling joists or rafters are notched at the ends, the notch may not exceed ¼ the depth of the member. 3. Bird mouth cuts may not exceed 1/3 the depth of the rafter unless the seat cut bears fully on the wall plate. (c) *Boring.* 1. Holes bored within 2 inches of the top or bottom of ceiling joists or rafters may not be located in the middle 1/3 of the span of the member. 2. The diameter of a hole may not exceed 1/3 the depth of the member. 3. A hole may not be bored within 2 inches of a notch or another hole. 4. The distance between adjacent holes may not be less than the diameter of the larger hole.
(d) *Engineered wood products.* Notching or boring of engineered wood products shall be done in accordance with the manufacturer's instructions provided those instructions were developed through structural analysis or product testing.

140. Where ceiling joists or rafters are notched at the ends, the notch may not exceed 1/2 the depth of the member.

a. true
b. false

141. Bird mouth cuts may not exceed 1/3 the depth of the rafter unless the seat cut bears fully on the wall plate.

a. true
b. false

142. Holes bored within 2 inches of the top or bottom of ceiling joists or rafters may not be located in the middle 1/3 of the span of the member.

a. true
b. false

143. The diameter of a hole may not exceed 1/2 the depth of the member.

a. true
b. false

144. A hole may be bored within 2 inches of a notch or another hole.

a. true
b. false

145. The distance between adjacent holes may be less than the diameter of the larger hole.
a. true
b. false
146. Notching or boring of engineered wood products shall be done in accordance with the manufacturer's instructions provided those instructions were developed through structural analysis or product testing.
a. true
b. false
147. Notches located in the top or bottom of ceiling joists and rafters are prohibited from which of the following:
a. Having a depth exceeding 1/6 the depth of the member.
b. Having a length exceeding 1/3 the depth of the member.
c. Being located in the middle 1/3 of the span of the member.
d. all of the above
148. Notching and boring of beams or girders is prohibited unless determined through structural analysis.
a. true
b. false
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(9) ROOF SHEATHING, BOARDS AND PLANKING. (a) *Structural sheathing.* The allowable loads and spans for structural sheathing shall be in accordance with the grade stamp on the panel.
(b) *Roof boards.* 1. Where the rafter spacing is 24 inches on center or less, roof boards may be used that have a minimum thickness of 5/8-inch for solid sheathing and ¾-inch for spaced sheathing. 2. Where the rafter spacing is greater than 24 inches on center, roof boards shall be tongue and groove, at least 1.5 inches thick. (c) *Roof planks.* 1. Roof planks shall be tongue and groove or splined and at least 2 inches, nominal, in thickness. 2. Planks shall terminate over beams unless the joints are end matched.
3. The planks shall be laid so that no continuous line of joints will occur except at points of support.
4. Planks shall be nailed or fastened to each beam.

149. Where the rafter spacing is greater than 24 inches on center, roof boards shall be tongue and groove
a. true
b. false
150. Where the rafter spacing is greater than 24 inches on center, roof boards shall be at least 1.5 inches thick.
a. true
b. false
151. Roof planks shall be tongue and groove or splined and at least 1 1/2 inches, nominal, in thickness
a. true
b. false
152. Planks shall terminate over beams unless the joints are end matched.
a. true
b. false
153. The planks shall be laid so that a continuous line of joints will occur..
a. true
b. false
154. Planks shall be nailed or fastened to each beam.
a. true
b. false
155. Where the rafter spacing is 24 inches on center or less, roof boards may be used that have a minimum thickness of 5/8-inch for solid sheathing
a. true
b. false

156. Where the rafter spacing is 24 inches on center or less, roof boards may be used that have a minimum thickness of ¾-inch for spaced sheathing.

a. true
b. false

157. The allowable loads and spans for structural sheathing shall be in accordance with the grade stamp on the panel.

a. true
b. false

Comm 21.28 Weather protection for roofs. (1) GENERAL. (a) All roofs shall be designed and constructed to assure drainage of water. (b) All fasteners shall be corrosion resistant. **(2)** UNDERLAYMENT FOR SHINGLES. Underlayment consisting of number 15 asphalt-impregnated felt paper or equivalent or other type I material that shows no water transmission when tested in accordance with ASTM D 226 or ASTM D 4869 shall be provided under shingles. **Note:** Underlayment materials meeting the requirements of ASTM D 1970 meet the performance requirements of this section.

(3) ASPHALT SHINGLES. (a) *General*. 1. Shingles that have a self-sealing adhesive strip shall include a sealant which has an average bond strength of at least 1.5 pounds per 3.75 inches of shingle width, at 32º F. **Note:** The department will accept results of testing conducted in accordance with an approved test method for verifying compliance with the sealant uplift resistance required in this paragraph. Information on the applicable test method may be obtained from the department.

2. Each shingle package shall be labeled by the manufacturer to indicate conformance to the applicable ASTM standard for each type of shingle or the exception in par (c).

3. Shingles shall be installed in accordance with the manufacturer's recommendations.

4. Shingles shall have at least 4 fasteners per strip shingle or 2 fasteners per interlocking shingle, unless the manufacturer has other specifications.

5. Shingle head lap shall be at least 2 inches, unless the manufacturer has other specifications.

Note 1: See s. Comm 20.07 (62) for definitions of shingle terms.

Note 2: The Residential Asphalt Roofing Manual can be purchased from the Asphalt Roofing Manufacturers Association at 6000 Executive Boulevard, Suite 201, Rockville, Maryland 20852-3803. This manual contains extensive information on shingles from manufacture through installation, inspection and maintenance. It includes a recommendation that properly driven and applied nails are the preferred fastening system for asphalt shingles. **Note 3:** Section Comm 20.04 (2) requires compliance with all parts of this code, including these roofing provisions, for an alteration to any dwelling that is regulated under this code.

(b) *Organic shingles*. Organic asphalt shingles shall conform to ASTM D 225 and the Class C requirements of ASTM E 108, and shall pass the wind resistance test of ASTM D 3161.

(c) *Fiberglass shingles*. Fiberglass asphalt shingles shall conform to ASTM D 3462 except that laminated shingles shall have a tear strength of at least 1450 grams in each ply.

158. Underlayment consisting of number 25 asphalt-impregnated felt paper or equivalent or other type I material that shows no water transmission when tested in accordance with ASTM D 226 or ASTM D 4869 shall be provided under shingles.

a. true
b. false

159. Underlayment materials meeting the requirements of ASTM D 1970 meet the performance requirements of this section.

a. true
b. false

160. Shingles that have a self-sealing adhesive strip shall include a sealant which has an average bond strength of at least 7.5 pounds per 3.75 inches of shingle width, at 90º F.

a. true
b. false

161. The department will accept results of testing conducted in accordance with an approved test method for verifying compliance with the sealant uplift resistance required in this paragraph. Information on the applicable test method may be obtained from the department.

a. true
b. false

162. Each shingle package shall be labeled by the manufacturer to indicate conformance to the applicable Fly-Away standard for each type of shingle or the exception in par (c).

a. true
b. false

163. Section Comm 20.04 (2) requires compliance with all parts of this code, including these roofing provisions, for an alteration to any dwelling that is regulated under this code.

a. true
b. false

164. Organic asphalt shingles shall conform to ASTM Z 225 and the Class Z requirements of ASTM Z 108, and shall pass the wind resistance test of ASTM D 3161.

a. true
b. false

165. Fiberglass asphalt shingles shall conform to ASTM D 3462 except that laminated shingles shall have a tear strength of at least 1450 grams in each ply.

a. true
b. false

166. All roofs shall be designed and constructed to assure drainage of water.

a. true
b. false

167. All fasteners shall be corrosion resistant.

a. true
b. false

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(4) ICE DAM PROTECTION. (a) Shingled or shake roofs that extend over a heated area of a dwelling or attached garage and that have a slope of 4:12 or less shall be provided with ice dam protection in the form of sheet metal or a product labeled as meeting the requirements of ASTM D 1970. (b) The ice dam protection shall extend at least 30 inches up the roof slope from the roof edge and at least 12 inches up the roof slope beyond the inner face of the exterior wall.

(5) OTHER ROOF COVERINGS. All roof coverings not otherwise addressed in this section shall be installed in accordance with the manufacturer's instructions or a national standard recognized by the department.

(6) REROOFING. New roof coverings may not be installed over existing roof coverings where any of the following conditions exist: (a) The existing roof or roof covering is water-soaked or has deteriorated such that it is inadequate as a base for additional roofing. (b) The existing roof is wood shake, slate, clay, cement or asbestos-cement tile. (c) The existing roof has 2 or more applications of any type of permanent roof covering.

168. New roof coverings may not be installed over existing roof coverings where any of the following conditions exist: The existing roof has 1 or more applications of any type of permanent roof covering.

a. true
b. false

169. New roof coverings may not be installed over existing roof coverings where any of the following conditions exist: The existing roof is wood shake, slate, clay, cement or asbestos-cement tile.

a. true
b. false

170. New roof coverings may be installed over existing roof coverings where any of the following conditions exist: The existing roof or roof covering is water-soaked.

a. true
b. false

171. New roof coverings may be installed over existing roof coverings where any of the following conditions exist: has deteriorated such that it is inadequate as a base for additional roofing.

a. true
b. false

172. All roof coverings not otherwise addressed in this section shall be installed in accordance with the manufacturer's instructions or a national standard recognized by the department.

a. true
b. false

173. Shingled or shake roofs that extend over a heated area of a dwelling or attached garage and that have a slope of 2:12 or less shall be provided with ice dam protection in the form of sheet metal or a product labeled as meeting the requirements of ASTM D 1970.

a. true
b. false

174. The ice dam protection shall extend at least 60 inches up the roof slope from the roof edge and at least 24 inches up the roof slope beyond the inner face of the exterior wall.

a. true
b. false

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(7) FLASHING. (a) *General*. Flashing shall be installed at the junction of chimneys and roofs, in all valleys, and around all roof openings. (b) *Flashing of open valleys.* 1. Open valleys shall be flashed with at least No. 28 gauge corrosion-resistant sheet metal, 16 inches wide, or a layer of at least 50-pound roll roofing, 16 inches wide, placed over a layer of number 15 roofing underlayment. 2. Flashing sections shall be overlapped by at least 4 inches. (c) *Flashing of closed valleys*. Where shingles are laced or woven over the valley, the valley shall be flashed with at least one layer of 50-pound roofing, at least 20 inches wide, over a layer of number 15 roofing underlayment. (d) *Chimney flashing.* 1. Chimneys shall be flashed and counter-flashed to a height of at least 6 inches. 2. Chimney crickets or saddles shall be installed where the upper side of a chimney is more than 30 inches wide on a sloping roof. 3. The intersection of the cricket and the chimney shall be flashed and counter-flashed to a height of at least 6".

175. Flashing shall be installed at the junction of chimneys.

a. true
b. false

176. Flashing shall be installed at the junction of roofs.

a. true
b. false

177. Flashing shall be installed in all valleys.

a. true
b. false

178. Flashing shall be installed around all roof openings.

a. true
b. false

179. Where shingles are laced or woven over the valley, the valley shall be flashed with at least one layer of 50-pound roofing.

a. true
b. false

180. Where shingles are laced or woven over the valley, the valley shall be flashed with at least 24 inches wide, over a layer of number 25 roofing underlayment.

a. true
b. false

181. Open valleys shall be flashed with at least No. 28 gauge corrosion-resistant sheet metal, 16 inches wide, or a layer of at least 50-pound roll roofing, 16 inches wide, placed over a layer of number 15 roofing underlayment.

a. true
b. false

182. Chimney crickets or saddles shall be installed where the upper side of a chimney is more than 20 inches wide on a sloping roof.

a. true
b. false

183. The intersection of the cricket and the chimney shall be flashed and counter-flashed to a height of at least 16 inches.

a. true
b. false

Comm 21.40 (2) (b) 13. a. Each pier shall be capped with a solid concrete block at least 4 inches thick or a solid wood block having a nominal thickness of at least 2 inches. b. The cap shall be the same width and length as the top of the pier. c. The cap shall consist of no more than 2 pieces. d. Two-piece caps shall be positioned with the joint perpendicular to the main frame.

184. Each pier shall be capped with a solid concrete block at least 6 inches thick or a solid wood block having a nominal thickness of at least 4 inches.

a. true
b. false

185. The cap shall consist of no more than 3 pieces.

a. true
b. false

186. Two-piece caps shall be positioned with the joint perpendicular to the main frame.

a. true
b. false

UDC NEW Wall Bracing Provisions quiz and updates part 2-Quiz Answer Sheet

1	a b c d	41	a b c d	81	a b c d
2	a b c d	42	a b c d	82	a b c d
3	a b c d	43	a b c d	83	a b c d
4	a b c d	44	a b c d	84	a b c d
5	a b c d	45	a b c d	85	a b c d
6	a b c d	46	a b c d	86	a b c d
7	a b c d	47	a b c d	87	a b c d
8	a b c d	48	a b c d	88	a b c d
9	a b c d	49	a b c d	89	a b c d
10	a b c d	50	a b c d	90	a b c d
11	a b c d	51	a b c d	91	a b c d
12	a b c d	52	a b c d	92	a b c d
13	a b c d	53	a b c d	93	a b c d
14	a b c d	54	a b c d	94	a b c d
15	a b c d	55	a b c d	95	a b c d
16	a b c d	56	a b c d	96	a b c d
17	a b c d	57	a b c d	97	a b c d
18	a b c d	58	a b c d	98	a b c d
19	a b c d	59	a b c d	99	a b c d
20	a b c d	60	a b c d	100	a b c d
21	a b c d	61	a b c d	101	a b c d
22	a b c d	62	a b c d	102	a b c d
23	a b c d	63	a b c d	103	a b c d
24	a b c d	64	a b c d	104	a b c d
25	a b c d	65	a b c d	105	a b c d
26	a b c d	66	a b c d	106	a b c d
27	a b c d	67	a b c d	107	a b c d
28	a b c d	68	a b c d	108	a b c d
29	a b c d	69	a b c d	109	a b c d
30	a b c d	70	a b c d	110	a b c d
31	a b c d	71	a b c d	111	a b c d
32	a b c d	72	a b c d	112	a b c d
33	a b c d	73	a b c d	113	a b c d
34	a b c d	74	a b c d	114	a b c d
35	a b c d	75	a b c d	115	a b c d
36	a b c d	76	a b c d	116	a b c d
37	a b c d	77	a b c d	117	a b c d
38	a b c d	78	a b c d	118	a b c d
39	a b c d	79	a b c d	119	a b c d
40	a b c d	80	a b c d	120	a b c d

UDC NEW Wall Bracing Provisions quiz and updates part 2-Quiz Answer Sheet

121	a b c d	143	a b c d	165	a b c d
122	a b c d	144	a b c d	166	a b c d
123	a b c d	145	a b c d	167	a b c d
124	a b c d	146	a b c d	168	a b c d
125	a b c d	147	a b c d	169	a b c d
126	a b c d	148	a b c d	170	a b c d
127	a b c d	149	a b c d	171	a b c d
128	a b c d	150	a b c d	172	a b c d
129	a b c d	151	a b c d	173	a b c d
130	a b c d	152	a b c d	174	a b c d
131	a b c d	153	a b c d	175	a b c d
132	a b c d	154	a b c d	176	a b c d
133	a b c d	155	a b c d	177	a b c d
134	a b c d	156	a b c d	178	a b c d
135	a b c d	157	a b c d	179	a b c d
136	a b c d	158	a b c d	180	a b c d
137	a b c d	159	a b c d	181	a b c d
138	a b c d	160	a b c d	182	a b c d
139	a b c d	161	a b c d	183	a b c d
140	a b c d	162	a b c d	184	a b c d
141	a b c d	163	a b c d	185	a b c d
142	a b c d	164	a b c d	186	a b c d

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