

**WALL BRACING**

**RULE TEXT**

## 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)(b)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 Tables for additional rectangles as needed):

Rectangle: \_\_\_\_\_ Wall Ht. = \_\_\_\_\_ Roof Pitch = \_\_\_\_\_ 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. = \_\_\_\_\_ Roof Pitch = \_\_\_\_\_ 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 1/2 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 321.15-A) in feet counts toward the required total length of bracing required. For intermittent or continuous, each PF panel meeting min. required width of Fig. 321.25-A counts spacing requirements as a braced wall panel when evaluating of Fig. 321.25-C.

Indicate location of required braced wall panels determined above on building plan in compliance with Figure 321.25-C.

TEXT OF RULE

SECTION 1. SPS 320.09 (5) (b) 2. d. is amended to read:

**SPS 320.09 (5) (b) 2. d.** The location and construction details of ~~the braced wall lines~~ wall bracing on each building side and floor level.

SECTION 2. SPS 321.02 (1) (c) is amended to read:

**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.

SECTION 3. SPS 321.02 (1) (c) (Note) is created to read:

**SPS 321.02 (1) (c) Note:** ASCE 7-05 allows for substantial reduction from 20 psf as applied to the surface area.

SECTION 4. SPS Table 321.25-A is amended to read:

**Table 321.25-A  
SIZE, HEIGHT AND SPACING OF WOOD STUDS<sup>a,c</sup>**  
(Partial Table)

Nominal Stud Size (inches)	Maximum Laterally Unsupported Stud Height <sup>a</sup> (feet)	Bearing and Exterior Nonbearing Walls				Interior Nonbearing Walls	
		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 <sup>a</sup> (feet)	Maximum Spacing (inches)
2x6	10 <sup>d</sup>	 24	 24	 16	 24	20	24

<sup>c</sup>All spacing dimensions are to the center of the studs.

<sup>a</sup>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<sub>f</sub> 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.

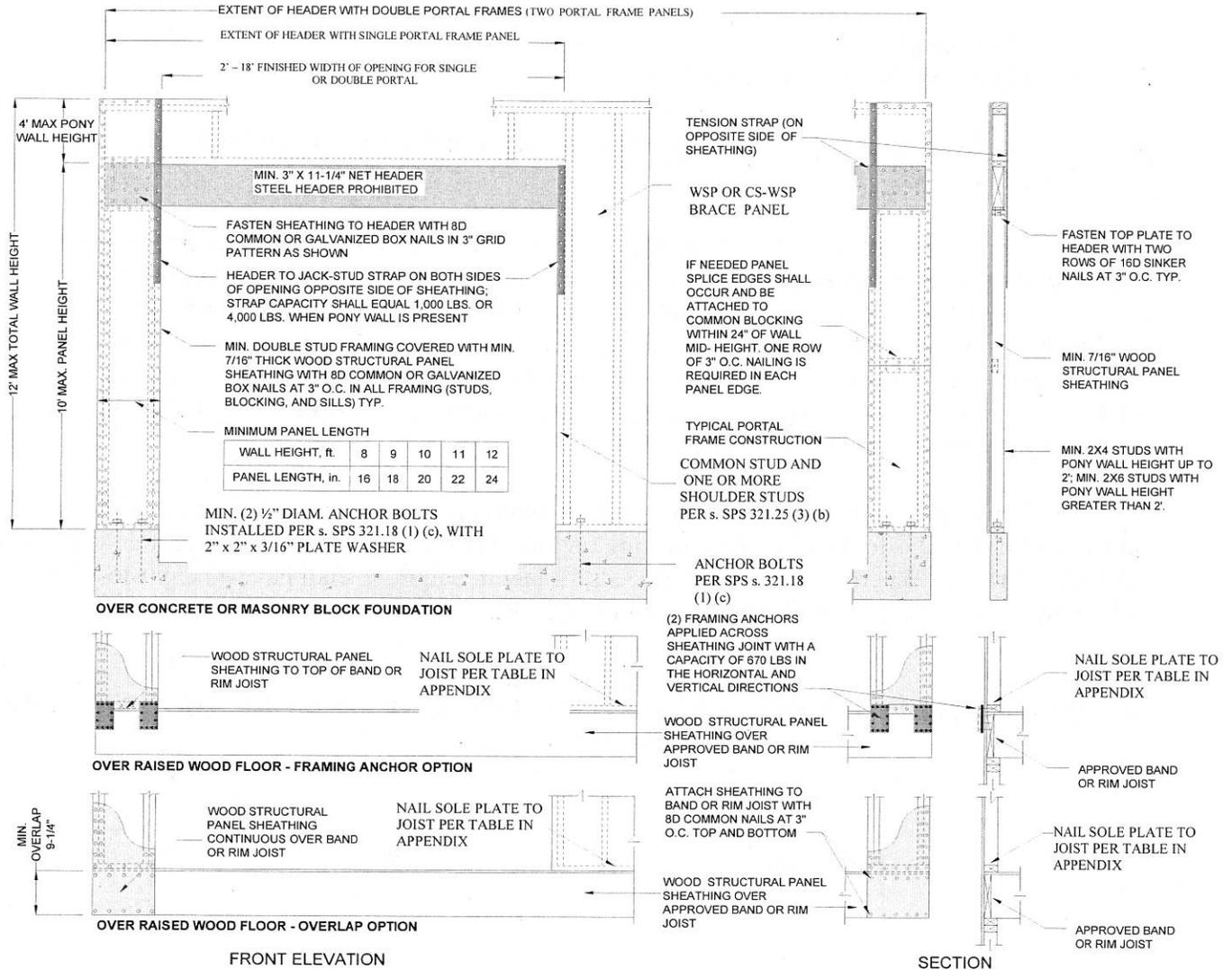
**Table 321.25-G  
BRACING METHODS<sup>a, f</sup>**

Material	Minimum Brace Material Thickness or Size	Maximum Nominal Wall Height <sup>b</sup>	Minimum Braced Wall Panel Width or Brace Angle	Connection Criteria	
				Minimum Fasteners	Maximum Spacing
<b>Intermittent Bracing Methods</b>					
LIB <sup>c</sup> Let-in bracing	1x4 wood brace (or approved metal brace installed per manufacturer instructions)	10'	45° angle and maximum 16" o.c. stud spacing <sup>b</sup>	2-8d common nails or 3-8d box nails (2 3/8" long x 0.113" diameter)	Per stud and top and bottom plates <sup>e</sup>
DWB Diagonal wood boards	3/4" (1" nominal) for maximum 24" o.c. stud spacing	10'	48"	2-8d box nails (2 3/8" long x 0.113" diameter) or 2 - 1 3/4" long 16-gage staples	Per stud and top and bottom plates <sup>e</sup>
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 3/8" long x 0.113" diameter); or 7/16"- or 1/2"-crown 16-gage staples, 1 1/4" long	6" edges, 12" field (nails) 3" edges, 6" field (staples)
SFB Structural fiberboard sheathing	1/2" 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)	1/2" for maximum 24" o.c. stud spacing	10'	96"	5d cooler nails, or #6 screws	7" edges, 7" field (including top and bottom plates)
<b>Continuous Sheathed Bracing Methods</b>					
CS-WSP <sup>d</sup> 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 <sup>d</sup> Continuous sheathed SFB	1/2" for maximum 16" o.c. stud spacing			Same as SFB	Same as SFB
<b>Narrow Panel Bracing</b>					
PF Portal frame	7/16"	12'	Refer to Figure 321.25-A	Refer to Figure 321.25-A	Refer to Figure 321.25-A

<sup>a</sup>The interior side of all exterior walls shall be sheathed with minimum 1/2-inch gypsum wallboard unless otherwise permitted to be excluded by this subsection. All edges of panel-type wall bracing, except horizontal joints in GB bracing, shall be attached to framing or blocking.

<sup>b</sup>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 1/2 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.

**Figure 321.25-A**  
**PF – PORTAL FRAME BRACE CONSTRUCTION**



**Note:** Steel headers are permitted if designed by structural analysis.

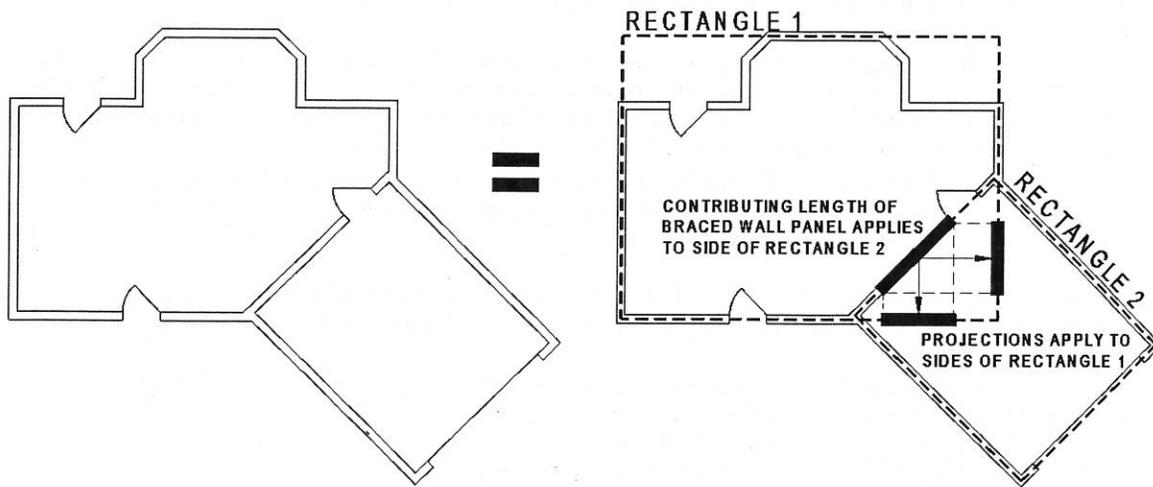
**Note:** As shown in the above cross-section, 1/2-inch gypsum wallboard is not required on the interior side of the wall.

(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.

**(2) Angled-building-side plan<sup>d</sup>**



**(3) Angled floor plan<sup>e</sup>**

<sup>a</sup>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.

<sup>b</sup>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.

<sup>c</sup>Each rectangle shall have a maximum rectangle length-to-width ratio of 3:1.

<sup>d</sup>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.

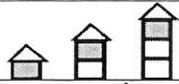
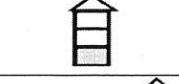
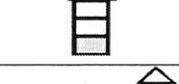
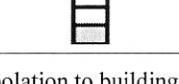
<sup>e</sup>Braced wall panels located on a common wall where angled rectangles intersect, as shown in Figure 321.25-B(3), shall have their contributing length applied towards the required length of bracing for the parallel rectangle side and its projected contributing lengths towards the adjacent angled 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).

**Table 321.25-I  
REQUIRED NUMBER OF INTERMITTENT BRACED WALL PANELS  
ON WALLS PARALLEL TO EACH RECTANGLE SIDE  
AT EACH FLOOR LEVEL<sup>a,b,c,d,e,f,h</sup>**

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

<sup>a</sup>Interpolation is permitted. Extrapolation to buildings larger than addressed in this table is prohibited.

**Table 321.25–J**  
**REQUIRED LENGTH OF CONTINUOUS BRACING ON WALLS PARALLEL TO EACH**  
**RECTANGLE SIDE AT EACH FLOOR LEVEL**<sup>a,b,c,d,e,g,h</sup>

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) <sup>f</sup>							
			10	20	30	40	50	60	70	80
10	Roof and ceiling only		2.0 <sup>i</sup>	3.5 <sup>i</sup>	5.0	6.0	7.5	9.0	10.5	12.0
	One floor, roof and ceiling		3.5 <sup>i</sup>	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 <sup>i</sup>	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 <sup>i</sup>	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

<sup>a</sup>Interpolation is permitted. Extrapolation to buildings larger than addressed in this table is prohibited.

<sup>b</sup>This table applies to wind exposure category B. For wind exposure category C or D, multiply the required length of wall bracing by 1.3 or 1.6, respectively. Wind exposure categories are as defined in Table 321.25–I footnote b.

<sup>c</sup>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.

<sup>d</sup>Where minimum ½-inch gypsum wallboard interior finish is not provided, the required bracing amount for the affected rectangle side shall be multiplied by 1.4, except this increase is not required for the portal frame method.

<sup>e</sup>Adjustments in footnotes b to d apply cumulatively.

<sup>f</sup>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.

<sup>g</sup>Continuous sheathing shall be applied to all surfaces of the wall, including areas between brace panels and above and below wall openings.

<sup>h</sup>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.

<sup>i</sup>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.

MINIMUM WIDTH OF BRACED WALL PANEL BETWEEN END OF WALL AND  
GARAGE DOOR

(Assuming garage end wall is the end of a rectangle side)

METHOD	WALL HEIGHT				
	8'	9'	10'	11'	12'
PORTAL FRAME <sup>1,2</sup>	16"	18"	20"	22"	24"
CONTINUOUS <sup>3</sup> SHEATHING (HEIGHT OF DOOR OPENING)					
6'8"	32"	30"	30"	33"	36"
8'	48"	41"	38"	37"	36"
9'		54"	46"	43.5"	41"
10'			60"	54"	48"
12'					72"
INTERMITTENT <sup>3</sup>	36" <sup>4</sup>	36" <sup>4</sup>	48"	48"	48"

<sup>1</sup> If using Intermittent Sheathing on the remainder of the rectangle side, a Portal Frame panel counts as ½ panel toward the total number of panels needed.

<sup>2</sup> A full-height braced wall panel must go immediately on the other side of the garage door opening.

<sup>3</sup> As long as the first panel starts within 12.5' of the end, there is no minimum width.

<sup>4</sup> Counts as ½ panel toward the total number of panels needed.