



**TECHNICAL BULLETIN**  
**Community Development & Planning, Building Inspections**  
**TOPIC:**  
**2009 IRC Wind Bracing Requirements**  
**May 24, 2012**

Effective May 24, 2012, wind bracing plans are required to be submitted with permit applications. This Technical Bulletin describes the minimal information necessary when applying for a permit and provides general inspection information. For a complete and thorough explanation of all the wind bracing requirements please refer to “A Guide to the 2009 IRC Wood Wall Bracing Provisions” published by the International Code Council and the APA-the Engineered Wood Association; and, the “2009 Edition of the International Residential Code” published by the International Code Council. These may be purchased from the web site [WWW.ICCSAFE.ORG](http://WWW.ICCSAFE.ORG).

Wind bracing must:

1. comply with the prescriptive requirements of the Section R602.10 of the 2009 Edition of the International Residential Code; or,
2. be designed by an engineer licensed to practice in the State of Texas. When designed, the sealed plans must include reference to the design wind speeds of 90 mph (3 second gust) and 76 mph fastest sustained speed.

The plans must detail the location and extent of the *braced wall lines* (exterior and interior) and the method(s) utilized for the *braced wall panel(s)*. If the *braced wall panel(s)* include hold downs or tie downs that must be placed in the foundation, the details of those items must be included.

### **PLAN REVIEW**

The following information that must be included with the permit application package:

1. Two sets of scaled and dimensioned wind bracing plans.
2. Identify the location of the *braced wall line(s)* on the plans. An effective (imaginary) *braced wall line* can be used when the physical wall has offset(s) of 4 feet or less from the effective *braced wall line*. Dimension any offset wall section from the effective *braced wall line*. *Braced wall line* L spacing cannot exceed 60 feet with the spacing between *braced wall line* dimensioned. Each story will need to be identified separately.
3. Each *braced wall line* is constructed using either the “continuously sheathed method” or the “intermittent bracing method.” The “continuously sheathed method” must be used for the entire story. The “intermittent bracing method” may be mixed on each story and along the same *braced wall line*. Refer to Table R602.10.2 (page 4) detailing each of the “intermittent bracing methods.” Each bracing method used must be indicated on the plans with sufficient detail and dimensioning to determine compliance. The commonly used *braced wall panel* (example OSB, structural fiberboard sheathing) are 4’ wide are must be located at each corner and every 25 feet.
4. Minimum total length of the *braced wall panels* for *each braced wall line* is determined by using Table R602.10.1.2(1) (see page 5). Several factors such as basic wind speed ( $\leq 90$ mph), number of *braced wall line*, story location, etc. determine this length. A partial list of other items that effect this length are listed below.

- a. Note the wind *exposure category* is listed as “B” (Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger).
  - b. Open terrain with scattered obstructions having heights generally less than 30 feet extending more than 1,500 feet from the building site in any direction is deemed wind *exposure category* “C.” For example, adjacent to Lake Arlington is deemed *exposure category* “C.” For *exposure category* “C” the length of the *braced wall panel* must be corrected by a factor indicated in Table R602.10.2(1) (see page 5).
  - c. For roof eave to ridge heights greater than 10’ above the supporting plate, the length of the *braced wall panel* must be corrected by a factor indicated in Table R602.10.1.2(1) (see page 5) using the appropriate correction factor.
5. If either *braced wall panel* method *ABW* or *PFH* is utilized, the foundation plan must include type/location of any hold down devices, reinforcing steel and/or foundation beam footing as required.
  6. An engineered approach to wind bracing will be acceptable with reference to the 2009 IRC and all details for methods used to comply. For multi-story buildings, each floor will show the location and type(s) of bracing used to comply.

## **FIELD INSPECTIONS**

At “Pre-pour foundation” inspection, the foundation anchor bolts and any other wind bracing hold downs must be on-site. If the hold down device is the type that is attached to the forms, they must be installed.

The standard anchor bolts must be on site. Bolts shall be at least 1/2 inch in diameter and shall extend a minimum of 7 inches into concrete.

## **WIND BRACING INSPECTION**

The wind bracing must be inspected prior to placing any house wrap

1. Verify the installation matches the approved plans.
2. Edge and field nailing patterns for the *braced wall panel* will be inspected. All joints of the *braced wall panel* must fall on a framing member (horizontally and vertically).
3. Sole plate attachment by 1/2 L-bolts must be properly spaced a maximum of 6 feet on center. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches or less than seven bolt diameters from each end of the plate section. A nut and washer shall be tightened on each anchor bolt. Any additional hold down devices will be checked for proper attachment to framing members.
4. Attachment of the rafter or truss and the top plate to the second floor at the band joist and any interior braced wall line to the floor joists.

Simpson Strong-Tie offers a **Wall-Bracing Length Calculator**, an online tool that helps calculate the required length of wall bracing in accordance with the 2009 IRC. The tool provides printed output of the bracing requirements along with a summary of input information and factors used in the calculations.

The tool is located at <http://strongtie.com/products/strongwall/wallbracing/intro.asp>

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Input selections for the location “City of Arlington” on the tool are as follows:

Seismic Design Category = A

Basic Wind Speed = 90 mph

Wind Exposure Category = B or C (see paragraph 4-b under the Plan Review heading above)

The City of Arlington does not endorse or require the use of the tool.

**TABLE R602.10.2  
INTERMITTENT BRACING METHODS**

METHOD	MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA
LIB	Let-in-bracing	1 × 4 wood or approved metal straps at 45° to 60° angles for maximum 16" stud spacing		Wood: 2-8d nails per stud including top and bottom plate metal: per manufacturer
DWB	Diagonal wood boards	$\frac{3}{4}$ " (1" nominal) for maximum 24" stud spacing		2-8d ( $2\frac{1}{2}$ " × 0.113") nails or 2 staples, $1\frac{3}{4}$ " per stud
WSP	Wood structural panel (see Section R604)	$\frac{3}{8}$ "		For exterior sheathing see Table R602.3(3) For interior sheathing see Table R602.3(1)
SFB	Structural fiberboard sheathing	$\frac{1}{2}$ " or $\frac{25}{32}$ " for maximum 16" stud spacing		$1\frac{1}{2}$ " galvanized roofing nails or 8d common ( $2\frac{1}{2}$ " × 0.131) nails at 3" spacing (panel edges) at 6" spacing (intermediate supports)
GB	Gypsum board	$\frac{1}{2}$ "		Nails or screws at 7" spacing at panel edges including top and bottom plates; for all braced wall panel locations for exterior sheathing nail or screw size, see Table R602.3(1); for interior gypsum board nail or screw size, see Table R702.3.5
PBS	Particleboard sheathing (see Section R605)	$\frac{3}{8}$ " or $\frac{1}{2}$ " for maximum 16" stud spacing		$1\frac{1}{2}$ " galvanized roofing nails or 8d common ( $2\frac{1}{2}$ " × 0.131) nails at 3" spacing (panel edges) at 6" spacing (intermediate supports)
PCP	Portland cement plaster	See Section R703.6 For maximum 16" stud spacing		$1\frac{1}{2}$ ", 11 gage, $\frac{7}{16}$ " head nails at 6" spacing or $\frac{7}{8}$ ", 16 gage staples at 6" spacing
HPS	Hardboard panel siding	$\frac{7}{16}$ " For maximum 16" stud spacing		0.092" dia., 0.225" head nails with length to accommodate $1\frac{1}{2}$ " penetration into studs at 4" spacing (panel edges), at 8" spacing (intermediate supports)
ABW	Alternate braced wall	See Section R602.10.3.2		See Section R602.10.3.2
PFH	Intermittent portal frame	See Section R602.10.3.3		See Section R602.10.3.3
PFG	Intermittent portal frame at garage	See Section R602.10.3.4		See Section R602.10.3.4

**TABLE R602.10.1.2(1)<sup>a,b,c,d,e</sup>**  
**BRACING REQUIREMENTS BASED ON WIND SPEED**  
**(as a function of braced wall line spacing)**

EXPOSURE CATEGORY B, 30 FT MEAN ROOF HEIGHT, 10 FT EAVE TO RIDGE HEIGHT, 10 FT WALL HEIGHT, 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (feet) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE			
Basic Wind Speed (mph)	Story Location	Braced Wall Line Spacing (feet)	Method LIB <sup>f,h</sup>	Method GB (double sided) <sup>g</sup>	Methods DWB, WSP, SFB, PCP, HPS <sup>i,1</sup>	Continuous Sheathing
≤ 90 (mph)		10	3.5	3.5	2.0	2.0
		20	7.0	7.0	4.0	3.5
		30	9.5	9.5	5.5	5.0
		40	12.5	12.5	7.5	6.0
		50	15.5	15.5	9.0	7.5
		60	18.5	18.5	10.5	9.0
		10	7.0	7.0	4.0	3.5
		20	13.0	13.0	7.5	6.5
		30	18.5	18.5	10.5	9.0
		40	24.0	24.0	14.0	12.0
		50	29.5	29.5	17.0	14.5
		60	35.0	35.0	20.0	17.0
		10	NP	10.5	6.0	5.0
		20	NP	19.0	11.0	9.5
		30	NP	27.5	15.5	13.5
		40	NP	35.5	20.5	17.5
		50	NP	44.0	25.0	21.5
		60	NP	52.0	30.0	25.5

**TABLE R602.10.1.2(1)<sup>a, b, c, d, e</sup>—continued**  
**BRACING REQUIREMENTS BASED ON WIND SPEED**  
**(as a function of braced wall line spacing)**

For SI: 1 foot = 304.8 mm, 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s, 1 pound force = 4.448 N.

a. Tabulated bracing lengths are based on Wind Exposure Category B, a 30-ft mean roof height, a 10-ft eave to ridge height, a 10-ft wall height, and two braced wall lines sharing load in a given plan direction on a given story level. Methods of bracing shall be as described in Sections R602.10.2, R602.10.4 and R602.10.5. Interpolation shall be permitted.

NUMBER OF STORIES	EXPOSURE/HEIGHT FACTORS		
	Exposure B	Exposure C	Exposure D
1	1.0	1.2	1.5
2	1.0	1.3	1.6
3	1.0	1.4	1.7

b. For other mean roof heights and exposure categories, the required bracing length shall be multiplied by the appropriate factor from the following table:

c. For other roof-to-eave ridge heights, the required bracing length shall be multiplied by the appropriate factor from the following table: interpolation shall be permitted.

SUPPORT CONDITION	ROOF EAVE-TO-RIDGE HEIGHT			
	5 ft or less	10 ft	15 ft	20 ft
Roof only	0.7	1.0	1.3	1.6
Roof + floor	0.85	1.0	1.15	1.3
Roof + 2 floors	0.9	1.0	1.1	NP

d. For a maximum 9-foot wall height, multiplying the table values by 0.95 shall be permitted. For a maximum 8-foot wall height, multiplying the table values by 0.90 shall be permitted. For a maximum 12-foot wall height, the table values shall be multiplied by 1.1.

e. For three or more braced wall lines in a given plan direction, the required bracing length on each braced wall line shall be multiplied by the appropriate factor from the following table:

NUMBER OF BRACED WALL LINES	ADJUSTMENT FACTOR
3	1.30
4	1.45
≥ 5	1.60

f. Bracing lengths are based on the application of gypsum board finish (or equivalent) applied to the inside face of a braced wall panel. When gypsum board finish (or equivalent) is not applied to the inside face of braced wall panels, the tabulated lengths shall be multiplied by the appropriate factor from the following table:

BRACING METHOD	ADJUSTMENT FACTOR
Method LIB	1.8
Methods DWB, WSP, SFB, PBS, PCP, HPS	1.4

g. Bracing lengths for Method GB are based on the application of gypsum board on both faces of a braced wall panel. When Method GB is provided on only one side of the wall, the required bracing amounts shall be doubled. When Method GB braced wall panels installed in accordance with Section R602.10.2 are fastened at 4 inches on center at panel edges, including top and bottom plates, and are blocked at all horizontal joints, multiplying the required bracing percentage for wind loading by 0.7 shall be permitted.

h. Method LIB bracing shall have gypsum board attached to at least one side according to the Section R602.10.2 Method GB requirements.

i. Required bracing length for Methods DWB, WSP, SFB, PBS, PCP and HPS in braced wall lines located in one-story buildings and in the top story of two or three story buildings shall be permitted to be multiplied by 0.80 when an approved hold-down device with a minimum uplift design value of 800 pounds is fastened to the end studs of each braced wall panel in the braced wall line and to the foundation or framing below.