



# Steel Strong-Wall® Shearwall

## ◆ STRONGER WALL

The Simpson Strong-Tie® Steel Strong-Wall® shearwall features shear capacities between two to three times higher than the original Wood Strong-Wall

## ◆ LESS LABOUR = INCREASED PRODUCTION

Fewer anchor bolts and fasteners coupled with easy access to the top and bottom of the wall result in more efficient installation.

## ◆ EASIER FOR ALL TRADES

Strong-Wall shearwalls are designed for easy installation with features such as an easy-to-use anchor-bolt template for concrete contractors, pre-attached wood studs and predrilled holes for electricians who need them for wiring.

## ◆ NARROW GARAGE WALL SOLUTION

With walls as narrow as 12", Steel Strong-Wall shearwalls solve the problem of wider required walls at garage fronts.

## ◆ SUPPORT AND SERVICE

Simpson Strong-Tie provides the best engineering technical support and experienced field representation available.

### Models:

**SSW12** 7'-10'

**SSW15** 7'-12'

**SSW18** 7'-13'

**SSW21** 7'-13'

**SSW24** 7'-13'

Contact Simpson Strong-Tie for availability.



# SIMPSON STRONG-TIE® STEEL STRONG-WALL®

Working with specifiers, builders and contractors has given Simpson Strong-Tie insight into the needs of the various players in the design and construction process. This insight has enabled Simpson Strong-Tie to design a composite shearwall that features some of the highest shear capacities in the industry while offering the easiest and fastest installation: The Steel Strong-Wall® panel.

**MATERIAL:**

- Vertical panel – 10 gauge

**COATING:**

- Vertical panel – Galvanized
- Top and base plates – Simpson Strong-Tie gray paint

**WALL PROFILES**

Pre-attached wood studs are 2x4 for walls 7' to 10' tall, and 2x6 for walls 11' to 13' tall.



**SSW12**



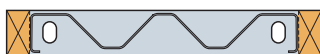
**SSW15**



**SSW18**



**SSW21**



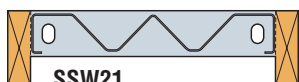
**SSW24**



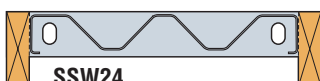
**SSW15**



**SSW18**



**SSW21**

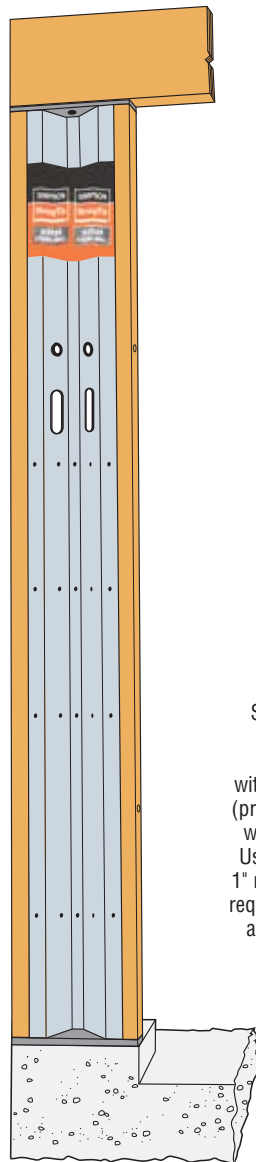


**SSW24**

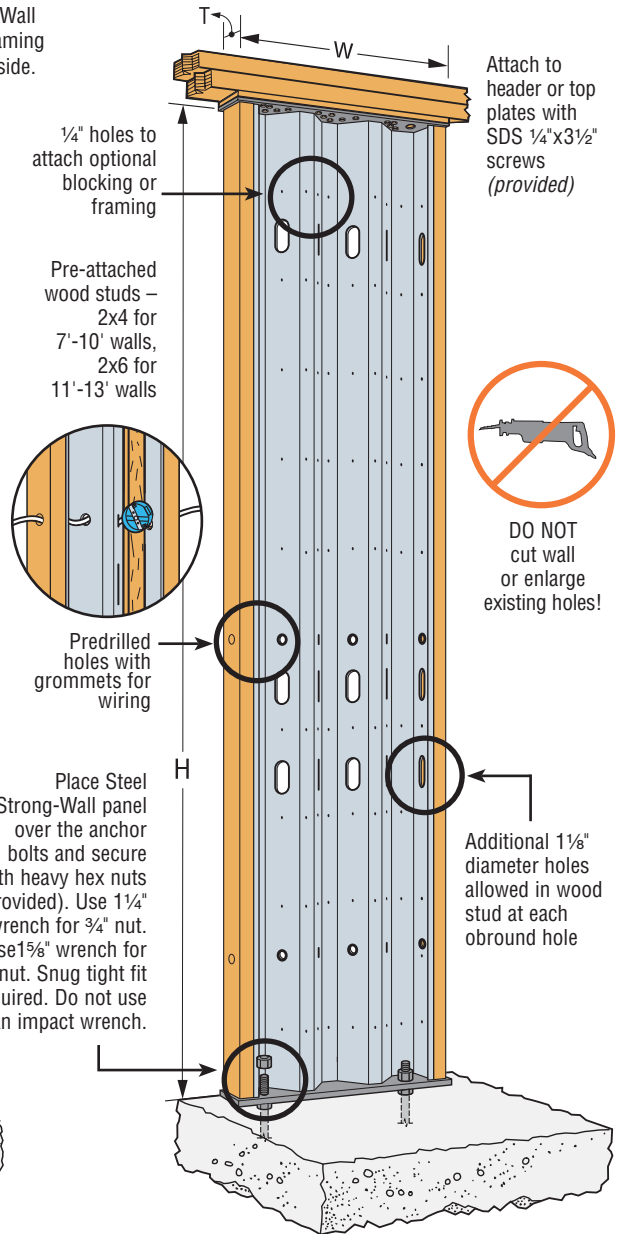
Maximum shim thickness between the Steel Strong-Wall panel and the top plates or header is 7/8" using Simpson Strong-Tie® Strong-Drive® SDS 1/4" x 3 1/2" screws. For additional shim thickness, contact Simpson Strong-Tie.

Check our website for structural details:  
[www.strongtie.com](http://www.strongtie.com)

**NOTE:**  
Walls with 2x4 pre-attached studs may also be used in 2x6 wall framing. Install Steel Strong-Wall panel flush to one face of framing and add furring to opposite side.



**SSW12x7**



**SSW24x10**  
Patent Pending

*NOTE: The Designer is responsible for concrete design.*

The Designer shall verify that these details are consistent with the complete load path requirements of the structure.

# SIMPSON STRONG-TIE® STEEL STRONG-WALL®

## FACTORED RESISTANCES FOR STEEL STRONG-WALL ON CONCRETE FOUNDATION

Model No.	Dimensions (in)			Qty of Top of Wall Screws	Anchor Bolt diam.	Factored Shear Resistance, $V_r$ (lbs)	Anchor Bolt <sup>6</sup> Tension $T_f$ (lbs)	Drift at $V_r$ (in)	Specified <sup>4</sup> Load at H/500 (lbs)	Total Wall Weight (lbs)
	W	H	T							
SSW12x7	12	80	3 ½	4	¾"	1095	10255	0.407	465	74
SSW15x7	15	80	3 ½	6	1"	2135	15880	0.407	920	86
SSW18x7	18	80	3 ½	9	1"	3370	20185	0.382	1565	99
SSW21x7	21	80	3 ½	12	1" HS	4895	24495	0.363	2415	117
SSW24x7	24	80	3 ½	14	1" HS	6405	27305	0.349	3230	127
SSW12x7.4	12	85 ½	3 ½	4	¾"	990	9870	0.431	420	78
SSW15x7.4	15	85 ½	3 ½	6	1"	1940	15355	0.431	830	91
SSW18x7.4	18	85 ½	3 ½	9	1"	3125	19980	0.413	1415	104
SSW21x7.4	21	85 ½	3 ½	12	1" HS	4525	24155	0.391	2185	122
SSW24x7.4	24	85 ½	3 ½	14	1" HS	6230	28545	0.376	3155	134
SSW12x8	12	93 ¼	3 ½	4	¾"	885	9595	0.471	370	85
SSW15x8	15	93 ¼	3 ½	6	1"	1730	14880	0.471	740	99
SSW18x8	18	93 ¼	3 ½	9	1"	2860	19935	0.463	1255	113
SSW21x8	21	93 ¼	3 ½	12	1" HS	4135	24060	0.438	1940	132
SSW24x8	24	93 ¼	3 ½	14	1" HS	5675	28330	0.419	2800	144
SSW12x9	12	105 ¼	3 ½	4	¾"	750	9135	0.529	315	94
SSW15x9	15	105 ¼	3 ½	6	1"	1525	14795	0.529	705	110
SSW18x9	18	105 ¼	3 ½	9	1"	2465	19320	0.529	1060	125
SSW21x9	21	105 ¼	3 ½	12	1" HS	3640	23885	0.511	1635	147
SSW24x9	24	105 ¼	3 ½	14	1" HS	4975	27990	0.488	2360	160
SSW12x10	12	117 ¼	3 ½	4	¾"	645	8720	0.588	265	104
SSW15x10	15	117 ¼	3 ½	6	1"	1265	13535	0.588	535	121
SSW18x10	18	117 ¼	3 ½	9	1"	2130	18500	0.588	910	138
SSW21x10	21	117 ¼	3 ½	12	1" HS	3520	26030	0.588	1535	162
SSW24x10	24	117 ¼	3 ½	14	1" HS	4440	27805	0.559	2030	177
SSW15x11	15	129 ¼	5 ½	6	1"	1110	13040	0.647	465	148
SSW18x11	18	129 ¼	5 ½	9	1"	1870	17830	0.647	795	167
SSW21x11	21	129 ¼	5 ½	12	1" HS	2860	22930	0.647	1225	193
SSW24x11	24	129 ¼	5 ½	14	1" HS	4015	27700	0.635	1770	209
SSW15x12	15	141 ¼	5 ½	6	1"	890	11270	0.684	375	160
SSW18x12	18	141 ¼	5 ½	9	1"	1660	17230	0.706	700	180
SSW21x12	21	141 ¼	5 ½	12	1" HS	2535	22115	0.706	1080	208
SSW24x12	24	141 ¼	5 ½	14	1" HS	3630	27325	0.706	1560	225
SSW18x13	18	153 ¼	5 ½	9	1"	1500	16855	0.765	605	194
SSW21x13	21	153 ¼	5 ½	12	1" HS	2270	21405	0.765	965	224
SSW24x13	24	153 ¼	5 ½	14	1" HS	3250	26435	0.765	1395	243

1. SDS¼"x3½" screws provided with wall panel.
2. Factored shear capacities and anchor bolt tension forces are applicable to installation on concrete with minimum 3000 psi (20.7 MPa) compressive strength.
3. For designs using  $R_d R_o = 5.1$  per NBCC 2005.
4. Specified Load at H/500 to be used for wind calculations as per 4.1.3.5.(3) NBCC 2005.
5. The maximum factored axial load acting on the entire panel, in combination with the shear load is 7500 lbs.
6. Tabulated anchor bolt tension forces assume no resisting axial load. For anchor bolt tension forces at design shear values and including the effect of axial load, use the equations on page 4.
7. Drift values may be linearly reduced for lesser shear loads.
8. Anchor bolts listed as "HS" shall be High Strength as per ASTM A449. Standard anchor bolts shall be ASTM F1554 Grade 36.

The Designer shall verify that these details are consistent with the complete load path requirements of the structure.

# SIMPSON STRONG-TIE® STEEL STRONG-WALL®

## EQUATIONS FOR CALCULATING ANCHOR BOLT TENSION FORCES

(Based on limiting concrete bearing on a 3/2" wide base plate at the edge of the concrete)

These equations may be used to calculate uplift forces at the base of the 1st-storey wall to aid Designers in developing anchorage solutions.

### ANCHOR BOLT TENSION EQUATIONS

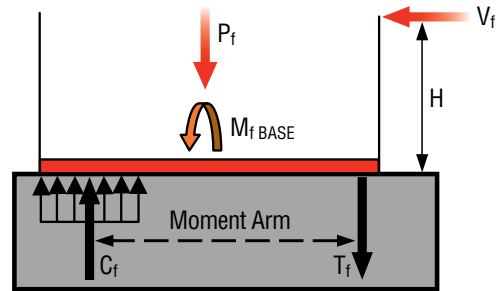
$$\text{SSW12 } T_f = [18.25 f'_c - \sqrt{333 (f'_c)^2 - 3.87 f'_c (3.44 P_f + V_f H)}] - P_f$$

$$\text{SSW15 } T_f = [23.45 f'_c - \sqrt{550 (f'_c)^2 - 3.87 f'_c (4.63 P_f + V_f H)}] - P_f$$

$$\text{SSW18 } T_f = [29.25 f'_c - \sqrt{855 (f'_c)^2 - 3.87 f'_c (6.13 P_f + V_f H)}] - P_f$$

$$\text{SSW21 } T_f = [35.05 f'_c - \sqrt{1228 (f'_c)^2 - 3.87 f'_c (7.63 P_f + V_f H)}] - P_f$$

$$\text{SSW24 } T_f = [40.85 f'_c - \sqrt{1669 (f'_c)^2 - 3.87 f'_c (9.13 P_f + V_f H)}] - P_f$$



Forces at Base of Wall

#### Notes:

- Equations may be used to calculate uplift forces at the base of one-storey wall on concrete foundations.
- Equations are based on the design methodology contained in AISC Steel Design Guide 1 – Base Plate and Anchor-Rod Design, second edition using a rectangular compression stress block.

#### EXAMPLE 1

##### Given:

- SSW18x9 wall on 3.0 ksi (20.7 Mpa) concrete
- $V_f$  (Factored shear force) = 2.0 kips (2000 lbs) <  $V_r = 2.465$  kips (2465 lbs)
- $P_f$  (Factored vertical load) = 1.0 kip (1000 lbs)
- H = Wall height = 105.25"
- $f'_c = 3.0$  ksi (3000 psi)

$$T_f = [29.25 f'_c - \sqrt{855 (f'_c)^2 - 3.87 f'_c (6.13 P_f + V_f H)}] - P_f$$

$$T_f = [29.25 (3.0) - \sqrt{855 (3.0)^2 - 3.87 (3.0) (6.13 \times 1 + 2.0 \times 105.25)}] - 1.0 = 14.78 \text{ kips (14780 lbs)}$$

$T_f$  = Resulting factored tension (uplift) force (kips)

$V_f$  = Factored shear force (kips)

$P_f$  = Factored vertical load (kips)

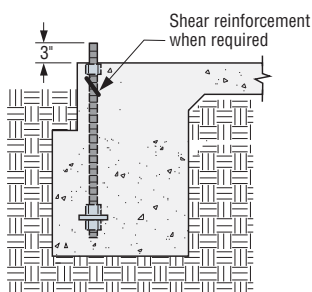
$f'_c$  = Concrete compressive strength (ksi)  
= 3.0 for 3000 psi concrete

1 kip = 1000 lbs

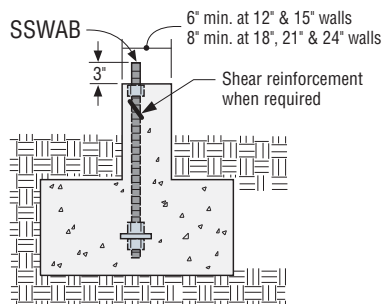
H = Wall height (inches)

## SLAB-ON-GRADE / STEMWALL INSTALLATIONS

Foundation design (size and reinforcement) by Designer.

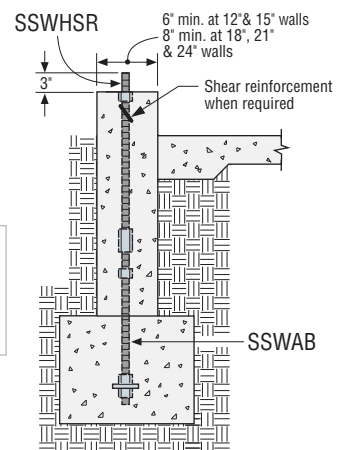


Section at Slab-on-Grade



Section at Stemwall

Foundation and stemwall design (size and reinforcement) by Designer.



Section at Stemwall – SSWAB and SSWHSR Extension Application

Simpson Strong-Tie recommends the use of a nut at the top of concrete for all SSW18, SSW21, and SSW24 wall models due to high compression loads. These wall models require 1" diameter anchor bolts; all SSWAB anchor bolts include this nut.

SSW12 and SSW15 models have lower loads and therefore the nut at the top of concrete is not necessary. However, all SSWAB anchor bolts will include this nut to simplify installation and set the height of the bolt correctly.

The Designer shall verify that these details are consistent with the complete load path requirements of the structure.

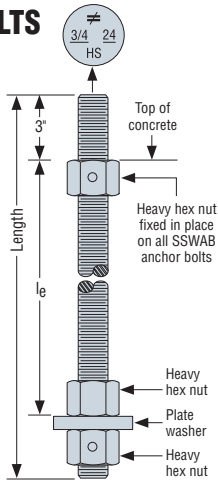
# SIMPSON STRONG-TIE® STEEL STRONG-WALL®

## SSWAB ANCHOR BOLTS

SSWAB anchor bolts in the 3/4" and 1" diameters offer flexibility to meet specific project demands. Inspection is easy; the head is stamped with a "No Equal" symbol for identification, bolt length, bolt diameter, and optional "HS" for high strength if specified.

**MATERIAL:** ASTM F1554 Grade 36; High Strength (HS) ASTM A449

An additional nut for template installation is provided with each SSWAB. May also be used for SSW installation.

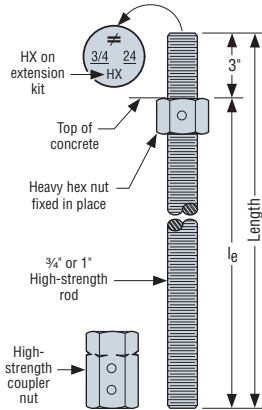


Patent Pending

Steel Strong-Wall Width (in)	Model No.	Dia. (in)	Total Length (in)	le (in)
12" Model	SSWAB3/4x24	3/4	24	19
	SSWAB3/4x24HS	3/4	24	19
	SSWAB3/4x30	3/4	30	25
	SSWAB3/4x30HS	3/4	30	25
	SSWAB3/4x36HS	3/4	36	31
15", 18", 21", 24" Models	SSWAB1x24	1	24	19
	SSWAB1x24HS	1	24	19
	SSWAB1x30	1	30	25
	SSWAB1x30HS	1	30	25
	SSWAB1x36HS	1	36	31

## SSWHR EXTENSION KIT

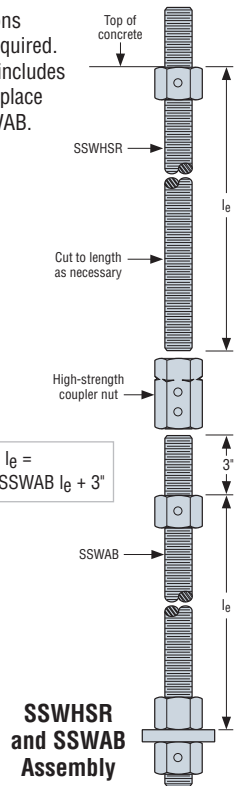
SSWHR allows for anchorage in tall stem wall applications where full embedment of an SSWAB into the footing is required. The head is stamped for identification like an SSWAB. Kit includes ASTM A449 high strength rod with heavy hex nut fixed in place and high strength coupler nut. Do not use in place of SSWAB.



SSWHR\_KT  
Patent Pending

$$\text{Total } l_e = \text{SSWHR } l_e + \text{SSWAB } l_e + 3"$$

Steel Strong-Wall Width (in)	Model No.	Dia. (in)	Total Length (in)	le (in)
12" Model	SSWHR3/4-2KT	3/4	24	21
	SSWHR3/4-3KT	3/4	36	33
15", 18", 21", 24" Models	SSWHR1-2KT	1	24	21
	SSWHR1-3KT	1	36	33



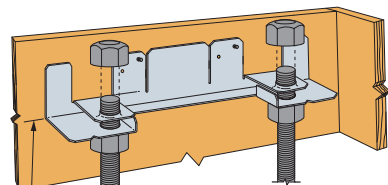
SSWHR and SSWAB Assembly

## STEEL STRONG-WALL ANCHOR BOLT TEMPLATES

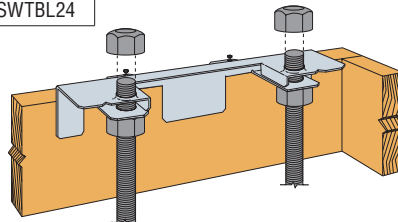
Steel Strong-Wall Model	Width (in)	Steel Strong-Wall Template Model		
		Reversible	Panel Form	Brick Ledge
SSW12	12	SSWT12	SSWTPF12	SSWTBL12
SSW15	15	SSWT15	SSWTPF15	SSWTBL15
SSW18	18	SSWT18	SSWTPF18	SSWTBL18
SSW21	21	SSWT21	SSWTPF21	SSWTBL21
SSW24	24	SSWT24	SSWTPF24	SSWTBL24

- The height of the garage curb above the garage slab is critical for rough header opening at garage return walls.
- Templates are recommended and are required in some jurisdictions.
- Foundation design by Designer.
- Templates are the same for 4" or 6" thick walls.

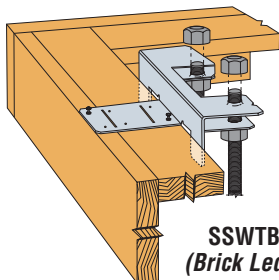
An additional nut for template installation is provided with each SSWAB. May also be used for SSW installation.



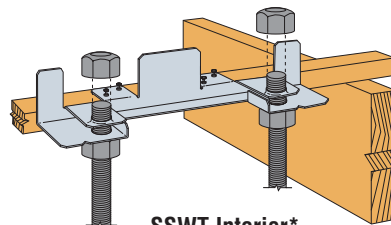
SSWTPF  
(Panel Form)



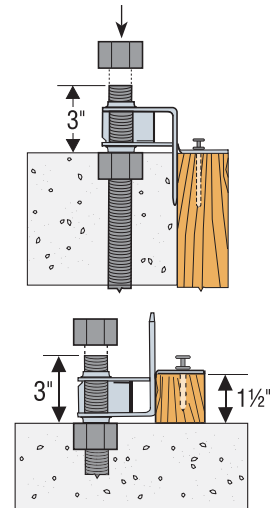
SSWT Exterior Installation\*  
(May be used for Steel Form Systems)



SSWTBL  
(Brick Ledge)



SSWT Interior\*  
Installation



Anchor Bolt Height

\*SSWT templates are reversible. Use the same template for interior or exterior applications. Template and nut configuration patent pending.

The Designer shall verify that these details are consistent with the complete load path requirements of the structure.

# SIMPSON STRONG-TIE® STEEL STRONG-WALL®

## FACTORED COMPRESSIVE RESISTANCES

Model	Factored Compressive Resistance (lbs)							
	Nominal Height of Wall Panel (ft)							
	7	7.4	8	9	10	11	12	13
12" Wide	29150	27300	24750	20850	17000	N/A	N/A	N/A
15" Wide	36500	34850	32500	28800	25100	21500	18100	N/A
18" Wide	61150	58150	53950	47300	40850	34710	29100	24700
21" Wide	63000	59300	54050	46050	38500	31700	26550	22550
24" Wide	74200	70150	64500	55750	47330	39400	33000	28000

1. Compression capacity is the lesser of the wall buckling capacity or concrete bearing with  $f_c = 3000$  psi.
2. Tabulated values assume no lateral loads present. See table on page 3 for combined loadings.

## FACTORED OUT-OF-PLANE RESISTANCES

Model	Factored Axial Load (lbs)	Maximum Factored Wind Pressure (psf)					
		Nominal Height of Wall Panel (ft)					
		7 to 8	9	10	11	12	13
12" Wide	1000	315	250	200	N/A	N/A	N/A
	7500	195	135	85	N/A	N/A	N/A
15" Wide	1000	250	195	155	130	110	N/A
	7500	175	130	95	70	50	N/A
18" Wide	7500	550	380	340	270	210	160
21" Wide	7500	460	345	260	190	155	120
24" Wide	7500	425	375	295	235	185	145

1. Values shown are the maximum factored wind pressures that can be applied over the entire panel.
2. Factored axial load denotes maximum gravity load permitted on the entire panel in combination with the factored out-of-plane wind pressures.
3. Factored out-of-plane load for the 12" and 15" walls may be linearly interpolated between the factored axial loads shown.

## SPECIFIED OUT-OF-PLANE RESISTANCES AT H/240

Model	Maximum Specified Wind Pressure at H/240 (psf)					
	Nominal Height of Wall Panel (ft)					
	7 to 8	9	10	11	12	13
12" Wide	200	140	105	N/A	N/A	N/A
15" Wide	240	170	120	95	70	N/A
18" Wide	305	215	155	115	90	75
21" Wide	260	180	135	100	75	60
24" Wide	275	190	135	105	80	65

1. Values shown are the maximum specified wind pressures that can be applied over the entire panel producing a deflection of H/240 at the mid height of the wall.

The Designer shall verify that these details are consistent with the complete load path requirements of the structure.

This flier is effective until June 30, 2012, and reflects information available as of April 1, 2010. This information is updated periodically and should not be relied upon after June 30, 2012; contact Simpson Strong-Tie for current information and limited warranty or see [www.strongtie.com](http://www.strongtie.com).

©2010 Simpson Strong-Tie Company Inc. • P.O. Box 10789, Pleasanton, CA 94588

F-CANSSW10 4/10 exp. 6/12

800-999-5099  
www.strongtie.com