Spazzer® 5400 Spacing & Bridging Bar - 18GA (SPZS-43) - Connection Strength and Stiffness

Product Code	Stud Depth (in)	Allowable Capacities	Stud Thickness, mils (ga.)			
			33 (20)	43 (18)	54 (16)	68 (14)
SPZS-43	3-5/8	Brace Stiffness (lbs/in)	525	735	1160	1380
		Brace Strength (lbs)	310	360	360	360
		Torsional Moment (in-lbs)	150	240	300	300
	6	Brace Stiffness (lbs/in)	290	420	520	890
		Brace Strength (lbs)	300	340	340	340
		Torsional Moment (in-lbs)	210	250	290	290
	8	Brace Stiffness (lbs/in)	-	240	430	650
		Brace Strength (lbs)	-	290	320	320
		Torsional Moment (in-lbs)	-	230	250	280

Spazzer Bar Allowable Table Notes:

- Allowable loads are based on the use of cold-formed steel studs with a minimum yield strength, Fy=33 ksi and tensile strength, Fu=45 ksi for 43-mil (18-ga) or thinner and a minimum yield strength, Fy=50 ksi and tensile strength, Fu=65 ksi for 54 mil (16-ga) or thicker.
- Allowable loads are based on 43-mil (18-ga) 4300 Spazzer Bar with a minimum yield strength, Fy=33 ksi and tensile strength, Fu=45 ksi.
- Allowable loads are for the bridging connection only. The strength and serviceability of the framing members is the responsibility of the designer.
- Allowable loads may not be increased for wind or seismic load.
- Allowable loads are for use when using ASD design methodology. For LRFD loads, multiply ASD allowable loads by 1.6.
- Allowable brace loads are based on ultimate test loads divided by a safety factor. Serviceability limits are not considered. Brace stiffness requirements are detailed in AISI S100 Section D3.3.
- Axial brace stiffness values apply to both ASD and LRFD designs.
- Listed Spazzer Bar capacities are based on Spazzer Bar fully seated in the bottom of the stud knockout as shown in Figure-1.

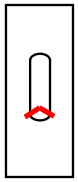

Figure-1

Spazzer® 5400 Spacing & Bridging Bar - 18GA (SPZS-43) - Gross Properties

Product Code	Design Thickness (in)	F_y (ksi)	Area (in^2)	I_x (in^4)	S_x (in^3)	R_x (in)	I_y (in^4)	S_y (in^3)	R_y (in)	Torsional Properties					
										Jx1000 (in^4)	C_w (in^6)	Y_o (in)	m (in)	R_o (in)	β
SPZS-43	0.0451	33	0.112	0.0026	0.0093	0.1513	0.0470	0.0415	0.6493	0.07563	1.79E-09	0.2622	-0.014	0.716	0.866

Spazzer® 5400 Spacing & Bridging Bar - 18GA (SPZS-43) - Net Properties

Product Code	Design Thickness (in)	F_y (ksi)	Area (in^2)	I_x (in^4)	S_x (in^3)	R_x (in)	I_y (in^4)	S_y (in^3)	R_y (in)	Torsional Properties					
										Jx1000 (in^4)	C_w (in^6)	Y_o (in)	m (in)	R_o (in)	β
SPZS-43	0.0451	33	0.066	0.0005	0.0032	0.0906	0.0100	0.0147	0.3877	0.045052	1.01E-09	0.15632	0.093	0.428	0.867

Spazzer® 5400 (SPZS-43) - Allowable Member Strengths

Product Code	M_a (F_y) (in-lbs)	M_a (12"o.c.) (in-lbs)	M_a (16"o.c.) (in-lbs)	M_a (24"o.c.) (in-lbs)	P_a (12"o.c.) (lbs)	P_a (16"o.c.) (lbs)	P_a (24"o.c.) (lbs)
SPZS-43	179	179	179	161	525	485	375

- Net section properties are based on section that excludes material from slot/notch.
- Member strengths analysis are based on AISI S100-12.

Spazzer® 5400 Spacing & Bridging Bar - 18GA (SPZS-43) - Maximum Bridging Distance (ft.)

Stud Spacing, in	Stud Section	Stud thickness, mils (ga.)	Lateral Stud Pressure (psf)									
			5	10	15	20	25	30	35	40	45	50
12	362S162	33 (20)	8	8	5	4	---	---	---	---	---	---
		43 (18)	8	8	8	6	5	4	4	---	---	---
		54 (16)	8	8	8	8	6	5	4	4	---	---
		68 (14)	8	8	8	8	6	5	4	4	---	---
	362S200	33 (20)	8	6	4	---	---	---	---	---	---	---
		43 (18)	8	8	6	5	4	---	---	---	---	---
		54 (16)	8	8	8	6	5	4	---	---	---	---
		68 (14)	8	8	8	6	5	4	---	---	---	---
	600S162	33 (20)	8	8	8	6	5	4	4	---	---	---
		43 (18)	8	8	8	7	6	5	4	4	---	---
		54 (16)	8	8	8	8	7	6	5	4	4	---
		68 (14)	8	8	8	8	7	6	5	4	4	4
	600S200	33 (20)	8	8	6	5	4	---	---	---	---	---
		43 (18)	8	8	7	6	4	4	---	---	---	---
		54 (16)	8	8	8	7	5	4	4	---	---	---
		68 (14)	8	8	8	7	5	4	4	---	---	---
	800S162	43 (18)	8	8	8	8	6	5	4	4	---	---
		54 (16)	8	8	8	8	7	6	5	4	4	---
		68 (14)	8	8	8	8	8	6	5	5	4	4
	800S200	43 (18)	8	8	8	6	5	4	---	---	---	---
		54 (16)	8	8	8	6	5	4	4	---	---	---
		68 (14)	8	8	8	7	6	5	4	4	---	---
16	362S162	33 (20)	8	6	4	---	---	---	---	---	---	---
		43 (18)	8	8	6	5	4	---	---	---	---	---
		54 (16)	8	8	8	6	5	4	---	---	---	---
		68 (14)	8	8	8	6	5	4	---	---	---	---
	362S200	33 (20)	8	4	---	---	---	---	---	---	---	---
		43 (18)	8	7	5	4	---	---	---	---	---	---
		54 (16)	8	8	6	4	4	---	---	---	---	---
		68 (14)	8	8	6	4	4	---	---	---	---	---
	600S162	33 (20)	8	8	6	5	4	---	---	---	---	---
		43 (18)	8	8	7	6	4	4	---	---	---	---
		54 (16)	8	8	8	7	5	4	4	---	---	---
		68 (14)	8	8	8	7	5	4	4	---	---	---
	600S200	33 (20)	8	7	5	---	---	---	---	---	---	---
		43 (18)	8	8	6	4	---	---	---	---	---	---
		54 (16)	8	8	7	5	4	---	---	---	---	---
		68 (14)	8	8	7	5	4	---	---	---	---	---
	800S162	43 (18)	8	8	8	6	5	4	---	---	---	---
		54 (16)	8	8	8	6	5	4	4	---	---	---
		68 (14)	8	8	8	7	6	5	4	4	---	---
	800S200	43 (18)	8	8	6	4	---	---	---	---	---	---
		54 (16)	8	8	6	5	4	---	---	---	---	---
		68 (14)	8	8	7	5	4	4	---	---	---	---
24	362S162	33 (20)	8	4	---	---	---	---	---	---	---	---
		43 (18)	8	6	4	---	---	---	---	---	---	---
		54 (16)	8	8	5	4	---	---	---	---	---	---
		68 (14)	8	8	5	4	---	---	---	---	---	---
	362S200	33 (20)	6	---	---	---	---	---	---	---	---	---
		43 (18)	8	5	---	---	---	---	---	---	---	---
		54 (16)	8	6	4	---	---	---	---	---	---	---
		68 (14)	8	6	4	---	---	---	---	---	---	---
	600S162	33 (20)	8	6	4	---	---	---	---	---	---	---
		43 (18)	8	7	5	4	---	---	---	---	---	---
		54 (16)	8	8	6	4	---	---	---	---	---	---
		68 (14)	8	8	6	4	4	---	---	---	---	---
	600S200	33 (20)	8	5	---	---	---	---	---	---	---	---
		43 (18)	8	6	4	---	---	---	---	---	---	---
		54 (16)	8	7	4	---	---	---	---	---	---	---
		68 (14)	8	7	4	---	---	---	---	---	---	---
	800S162	43 (18)	8	8	5	4	---	---	---	---	---	---
		54 (16)	8	8	6	4	---	---	---	---	---	---
		68 (14)	8	8	6	5	4	---	---	---	---	---
	800S200	43 (18)	8	6	4	---	---	---	---	---	---	---
		54 (16)	8	6	4	---	---	---	---	---	---	---
		68 (14)	8	7	5	4	---	---	---	---	---	---

Notes:
- Tabulated maximum bridging distances are for ASD lateral pressures.
- Tabulated maximum bridging distances are based on the tested connection strength.
- Studs must be checked for unbraced length seperately.
- Lateral pressures shall be determined based on the load combinations of the applicable building code.
- For designs using 2009 IBC and earlier, wind pressures are at the working stress level and may be used directly.
- For designs using 2012 IBC and 2015 IBC, wind pressures are at the strength level and must be multiplies by 0.6 for ASD load combinations.

Spazzer® 5400 Spacing & Bridging Bar - 18GA (SPZS-43) - Design Example

Example-1: Exterior Bearing-Wall Stud

Input

- 2012 IBC (ASCE 7-10 & AISI S100-2012)
- 600S162-43 (33-ksi) studs at 16" o.c., 10 ft. tall
- Bracing at 5-ft o.c. (Mid-point bracing)
- Nominal axial stud strength, Pn=5400 lbs (2013 AISI Manual, Table III-8)
- Distance from shear center to mid-plane of web, m=0.670-in (2013 AISI Manual, Table I-2)
- Wind Design Pressure = 20psf

Laterally-Loaded Stud Design

Design Load tributary to brace:

W=(0.6)(20psf)(16"/12")(5ft) = 80 lbs

Note - IBC 2015 load combinations for ASD include a factor of 0.6 for wind loads.

Required flange force (AISI S100 Eq. D3.2.1-3)

$P = 1.5(m/d)W = 1.5(0.67/6)80 = 10.05$ lbs

Torsional Moment

$M_z = P(d) = 10.05(6) = 60.3$ in-lbs

Moment applied to bridging member

$M_m = 0.64(M_z) = 0.64*60.3 = 38.6$ in-lbs

(Note: For 0.64 factor, refer AISI Design Guide D110-07 for analysis of a five-span continuous beam that is loaded with equal support moments)

From Allowable Loads Table for 6-in deep 43-mil stud,

Allowable Torsional Moment = 250 in-lbs > 60.3 in-lbs **OK**

Check member strength from allowable strengths table for 16" o.c.

Allowable moment = 179 in-lbs > 38.6 in-lbs **OK**

Axially-Loaded Stud Design

Required brace strength (AISI S100 Eq. D3.3-1)

$P = 0.01(Pn) = 0.01(5400) = 54$ lbs.

For ASD, divide by 1.5 (2012 AISI Cold-Formed Steel Design Manual, Pg. III-54)

(54)/(1.5) = 36.0 lbs.

Required brace stiffness (AISI S100 Eq. D3.3-2)

$\beta = 2[4-(2/n)](Pn)/(L) = 2[4-(2/1)](5400)/(60) = 360$ lbs/in

From Allowable Loads Table for 6-in deep 43-mil stud,

Allowable brace strength = 340 lbs > 54 lbs. **OK**

Brace stiffness = 420 lbs/in > 360 lbs/in. **OK**

Combined-Loading Checks

Connection

$P_{br}/P_n + M_z/M_a \leq 1.0$

$= 54/340 + 60.3/250 = 0.40 < 1.0$ **OK**

Bridging Member

$\Omega_c P/P_n + \Omega_b M/M_n \leq 1.0$

$1.8*54/675 + 1.67*38.6/299 = 0.360 < 1.0$ **OK**