Spazzer® 5400 Spacing & Bridging Bar - 16GA (SPZS-54) - Connection Strength and Stiffness

Product Code	Stud Depth (in)	Allowable Capacities	Stud Thickness, mils (ga.)			
			33 (20)	43 (18)	54 (16)	68 (14)
SPZS-54	3-5/8	Brace Stiffness (lbs/in)	1320	1984	2792	3120
		Brace Strength (lbs)	310	420	570	570
		Torsional Moment (in-lbs)	325	400	535	630
	6	Brace Stiffness (lbs/in)	920	1680	2240	2400
		Brace Strength (lbs)	300	400	555	555
		Torsional Moment (in-lbs)	265	365	610	705
	8	Brace Stiffness (lbs/in)	-	1080	1440	2176
		Brace Strength (lbs)	-	395	525	525
		Torsional Moment (in-lbs)	-	405	560	680

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 54-mil (16-ga) 5400 Spazzer Bar with a minimum yield strength, Fy=50 ksi and tensile strength, Fu=65 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.

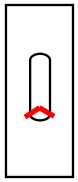

Figure-1

Spazzer® 5400 Spacing & Bridging Bar - 16GA (SPZS-54) - 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-54	0.0566	50	0.140	0.0032	0.0111	0.1511	0.0586	0.0518	0.6481	0.1491	4.70E-09	0.2616	-0.014	0.715	0.866

Spazzer® 5400 Spacing & Bridging Bar - 16GA (SPZS-54) - 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-54	0.0566	50	0.090	0.0009	0.0045	0.0981	0.0158	0.0215	0.4192	0.09621	2.88E-09	0.16889	0.093	0.462	0.867

Spazzer® 5400 (SPZS-54) - 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-54	334	334	334	334	1362	1244	785

- 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 - 16GA (SPZS-54) - 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	8	8	7	5	5	4	4	---
		43 (18)	8	8	8	8	8	7	6	5	5	4
		54 (16)	8	8	8	8	8	8	8	7	6	6
		68 (14)	8	8	8	8	8	8	8	8	7	7
	362S200	33 (20)	8	8	8	6	5	4	4	---	---	---
		43 (18)	8	8	8	8	6	5	4	4	---	---
		54 (16)	8	8	8	8	8	7	6	5	5	4
		68 (14)	8	8	8	8	8	8	7	6	6	5
	600S162	33 (20)	8	8	8	8	6	5	4	4	---	---
		43 (18)	8	8	8	8	8	7	6	5	5	4
		54 (16)	8	8	8	8	8	8	8	8	8	7
		68 (14)	8	8	8	8	8	8	8	8	8	8
	600S200	33 (20)	8	8	8	6	5	4	---	---	---	---
		43 (18)	8	8	8	8	7	5	5	4	4	---
		54 (16)	8	8	8	8	8	8	8	7	6	6
		68 (14)	8	8	8	8	8	8	8	8	7	6
	800S162	43 (18)	8	8	8	8	8	8	8	7	6	5
		54 (16)	8	8	8	8	8	8	8	8	8	8
		68 (14)	8	8	8	8	8	8	8	8	8	8
	800S200	43 (18)	8	8	8	8	8	7	6	5	4	4
		54 (16)	8	8	8	8	8	8	8	7	6	6
		68 (14)	8	8	8	8	8	8	8	8	8	7
16	362S162	33 (20)	8	8	8	6	5	4	4	---	---	---
		43 (18)	8	8	8	8	6	5	4	4	---	---
		54 (16)	8	8	8	8	8	7	6	5	5	4
		68 (14)	8	8	8	8	8	8	8	8	7	6
	362S200	33 (20)	8	8	6	5	4	---	---	---	---	---
		43 (18)	8	8	8	6	5	4	---	---	---	---
		54 (16)	8	8	8	8	6	5	5	4	4	---
		68 (14)	8	8	8	8	8	6	5	5	4	4
	600S162	33 (20)	8	8	8	6	5	4	---	---	---	---
		43 (18)	8	8	8	8	7	5	5	4	4	---
		54 (16)	8	8	8	8	8	8	8	7	6	6
		68 (14)	8	8	8	8	8	8	8	8	7	6
	600S200	33 (20)	8	8	6	4	4	---	---	---	---	---
		43 (18)	8	8	8	6	5	4	---	---	---	---
		54 (16)	8	8	8	8	8	7	6	5	5	4
		68 (14)	8	8	8	8	8	8	7	6	5	5
	800S162	43 (18)	8	8	8	8	8	7	6	5	4	4
		54 (16)	8	8	8	8	8	8	8	7	6	6
		68 (14)	8	8	8	8	8	8	8	8	8	7
	800S200	43 (18)	8	8	8	7	6	5	4	4	---	---
		54 (16)	8	8	8	8	8	7	6	5	5	4
		68 (14)	8	8	8	8	8	8	7	6	6	5
24	362S162	33 (20)	8	8	5	4	---	---	---	---	---	---
		43 (18)	8	8	7	5	4	---	---	---	---	---
		54 (16)	8	8	8	7	6	5	4	---	---	---
		68 (14)	8	8	8	8	7	5	5	4	4	---
	362S200	33 (20)	8	6	4	---	---	---	---	---	---	---
		43 (18)	8	8	5	4	---	---	---	---	---	---
		54 (16)	8	8	7	5	4	4	---	---	---	---
		68 (14)	8	8	8	6	5	4	4	---	---	---
	600S162	33 (20)	8	8	5	4	---	---	---	---	---	---
		43 (18)	8	8	7	5	4	4	---	---	---	---
		54 (16)	8	8	8	8	7	6	5	5	4	4
		68 (14)	8	8	8	8	8	7	6	5	5	4
	600S200	33 (20)	8	6	4	---	---	---	---	---	---	---
		43 (18)	8	8	5	4	---	---	---	---	---	---
		54 (16)	8	8	8	7	6	5	4	---	---	---
		68 (14)	8	8	8	8	6	5	4	4	---	---
	800S162	43 (18)	8	8	8	7	5	4	4	---	---	---
		54 (16)	8	8	8	8	8	6	5	5	4	4
		68 (14)	8	8	8	8	8	8	7	6	5	5
	800S200	43 (18)	8	8	7	5	4	---	---	---	---	---
		54 (16)	8	8	8	7	6	5	4	---	---	---
		68 (14)	8	8	8	8	7	6	5	4	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 - 16GA (SPZS-54) - 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 = 365 in-lbs > 60.3 in-lbs **OK**

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

Allowable moment = 334 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)

β = 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 = 400 lbs > 54 lbs. **OK**

Brace stiffness = 2100 lbs/in > 360 lbs/in. **OK**

Combined-Loading Checks

Connection

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

= 54/400 + 60.3/365 = 0.30 <1.0 **OK**

Bridging Member

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

1.8*54/1413 + 1.67*38.6/558 = 0.184 <1.0 **OK**