

# Wall Bridging

## Background

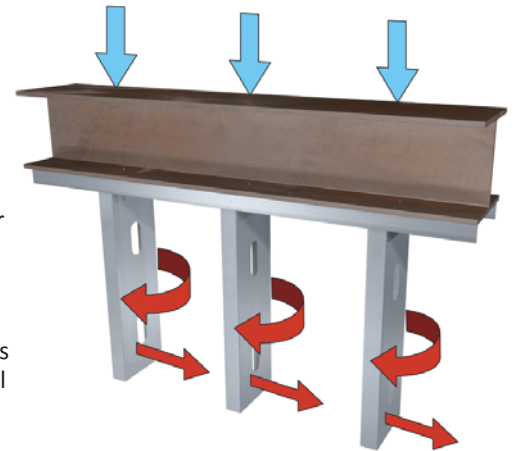
### Bridging Background

Bridging for load bearing studs is needed to resist the following forces:

- 1 - Weak axis buckling induced by axial compression load.
- 2 - Torsion induced by wind load.

As axial compression and lateral wind loads are applied, wall studs react with weak axis buckling and torsional rotation. To offset these forces, a form of bridging is incorporated into the wall system. Bridging loads accumulate over the run of the wall, requiring transfer of lateral forces in bridging at columns or to the floor slab into the structural load path to the foundation.

AISI Wall Stud Design Standard (2007), referenced by 2009 IBC; or AISI-NAS Specification (2007) provides the load and stiffness requirements for bracing members due to the effects of axial compression load and wind load as given in the table below. Contact TSN Technical Support (888) 474-4876 if further information is needed regarding wall bridging design.

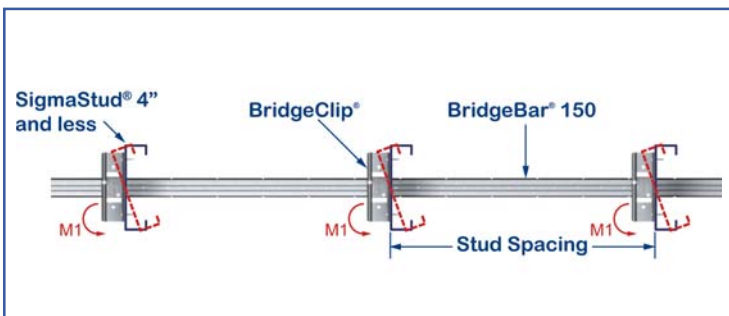


### Bridging Requirements

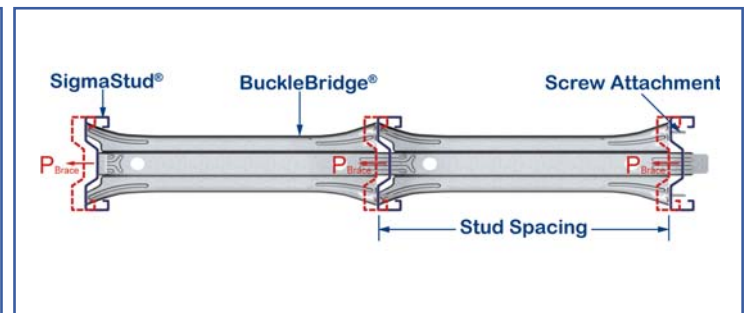
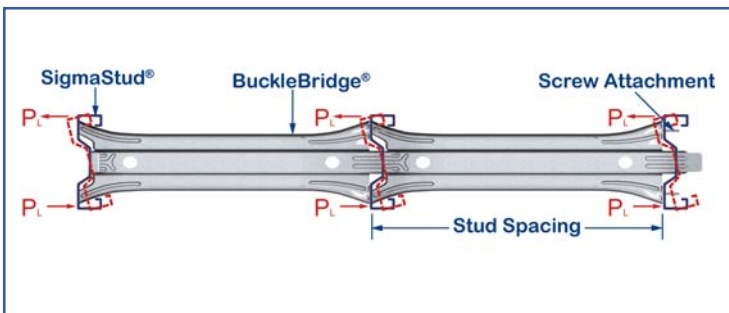
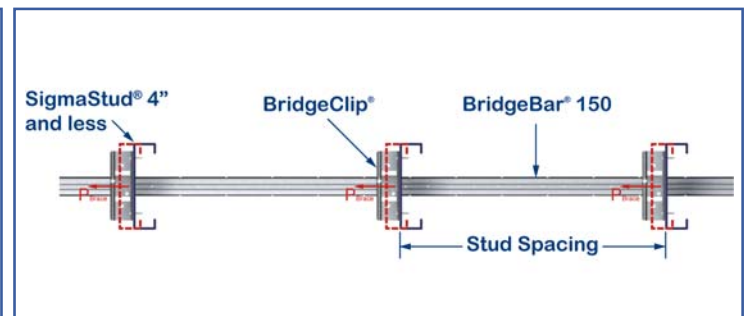
	AISI Wall Stud Design Standard 2007	AISI-NAS Specification 2007
<b>Stud Axial Compression</b>	<b>Load Capacity:</b> Bracing Load $P_{\text{Brace}}^* = 0.02 \times \text{Stud Design Compression Force } (P_{\text{Stud}}) \times \text{\# of studs braced.}$	<b>Load Capacity:</b> Bracing Load $P_{\text{Brace}}^* = 0.01 \times \text{Stud Axial Strength } (P_{\text{Stud}}) \times \text{\# of studs braced.}$  <b>Stiffness Capacity:</b> Lateral Stiffness $\beta_{\text{Brace}} = 4 \times \text{Stud Nominal Axial Strength} / \text{Unbraced Length}$ (for one row of bridging).  Lateral Stiffness $\beta_{\text{Brace}} = 6 \times \text{Stud Nominal Axial Strength} / \text{Unbraced Length}$ (for two rows of bridging).
<b>Wind</b>	<b>Load Capacity:</b> Twist Load $P_L = 1.5 \times \text{Wind Load} \times \text{Bridging Spacing} \times \text{Stud Spacing} \times m(\text{Shear Center Distance}) / \text{Stud Depth.}$  Twist Moment $M_1 = P_L \times \text{Stud Depth.}$	

\* Bracing forces accumulate over the run of the wall until anchored.

Bridging Load Bearing Studs Against Torsion by Wind



Bridging Load Bearing Studs Against Weak Axis Buckling



# Curtain Wall Bridging Chart

Quick Reference

Channel/Clip Bridging Chart: Design Wind Pressure and Stud Spacing										
Stud Designation	10psf*	20psf		25psf		30psf		40psf		50psf
	24" o.c.	16" o.c.	24" o.c.	16" o.c.	24" o.c.	16" o.c.	24" o.c.	16" o.c.	24" o.c.	16" o.c.
362S162-33, 33ksi	BB	BB / BC1	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A
362S162-43, 33ksi	BB	BB / BC1	BB / BC3	BB / BC3	N / A	BB / BC3	N / A	N / A	N / A	N / A
362S162-54, 50ksi	BB	BB / BC1	BB / BC3	BB / BC3	BB / BC3	BB / BC3	N / A	BB / BC3	N / A	N / A
362S162-68, 50ksi	BB	CRC / BC1	CRC / BC3	CRC / BC3	CRC / BC3	CRC / BC3	N / A	CRC / BC3	N / A	N / A
600S162-33, 33ksi	BB	BB / BC1	BB / BC3 or BC600	BB / BC1	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	N / A	N / A
600S162-43, 33ksi	BB	BB / BC1	BB / BC3 or BC600	BB / BC1	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC600	BB / BC3 or BC600
600S162-54, 50ksi	BB	BB / BC1	BB / BC3 or BC600	BB / BC1	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC600	BB / BC3 or BC600
600S162-68, 50ksi	BB	CRC / BC1	CRC / BC3 or BC600	CRC / BC1	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC600	CRC / BC3 or BC600
600S162-97, 50ksi	BB	CRC / BC1	CRC / BC3 or BC600	CRC / BC1	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC600	CRC / BC3 or BC600
800S162-33, 33ksi	BB	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800
800S162-43, 33ksi	BB	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800
800S162-54, 50ksi	BB	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800
800S162-68, 50ksi	BB	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800
800S162-97, 50ksi	BB	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800
362S200-33, 33ksi	BB	BB / BC3	N / A	BB / BC3	N / A	N / A	N / A	N / A	N / A	N / A
362S200-43, 33ksi	BB	BB / BC3	BB / BC3	BB / BC3	N / A	BB / BC3	N / A	N / A	N / A	N / A
362S200-54, 50ksi	BB	BB / BC3	BB / BC3	BB / BC3	N / A	BB / BC3	N / A	N / A	N / A	N / A
362S200-68, 50ksi	BB	CRC / BC3	CRC / BC3	CRC / BC3	N / A	CRC / BC3	N / A	N / A	N / A	N / A
600S200-33, 33ksi	BB	BB / BC1	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC600	BB / BC600	N / A	BB / BC600
600S200-43, 33ksi	BB	BB / BC1	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC600	BB / BC600	N / A	BB / BC600
600S200-54, 50ksi	BB	BB / BC1	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC3 or BC600	BB / BC600	BB / BC600	BB / BC600	BB / BC600
600S200-68, 50ksi	BB	CRC / BC1	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC600	CRC / BC600	CRC / BC600	CRC / BC600
600S200-97, 50ksi	BB	CRC / BC1	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC3 or BC600	CRC / BC600	CRC / BC600	CRC / BC600	CRC / BC600
800S200-33, 33ksi	BB	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800
800S200-43, 33ksi	BB	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800
800S200-54, 50ksi	BB	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800	BB / BC800
800S200-68, 50ksi	BB	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800
800S200-97, 50ksi	BB	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800	CRC / BC800

- Notes:**
- See also Curtain Wall BuckleBridge chart.
  - Stud height assumed 10' and bridging spacing assumed 60 o.c. max.
  - Allowable pressure limited by flexural strength of stud calculated with torsional bracing assumed at the bridging spacing and  $k_{\phi} = 0$ .
  - Allowable pressure limited by stud deflection calculated with deflection limit equal to  $l/360$ . Listed wind pressures except 10 psf have been reduced by 0.70 as allowed by the IBC code.
  - BB and CRC allowable pressure limited by flexural strength of bridging member calculated as:

$$M_{all} / (1.5 \times \text{Bridging Spacing} \times \text{Stud Spacing} \times m \text{ (distance from stud web to shear center)})$$

- Listed wind pressures represent calculated design wind pressures (1.0W based on IBC 2009 or 0.6W based on IBC 2012).
- \* For 10 psf wind pressure, it is assumed that gypsum board is installed on both sides of wall.

**Nomenclature:**

- **BB** - BridgeBar 150 without clip to stud
- **CRC** - Cold Rolled Channel
- **BB / BC1** - BridgeBar 150 and BridgeClip with (1) #10 screw fastener into BridgeBar 150 only
- **BB / BC3** - BridgeBar 150 & BridgeClip with (1) #10 screw fastener into BridgeBar 150 & (2) #10 screw fasteners into the web of the stud
- **BB / BC600** - BridgeBar 150 & BC600 with (2) #10 screw fasteners into BridgeBar 150 & (2) #10 screw fasteners into the web of the stud
- **BB / BC800** - BridgeBar 150 & BC800 with (2) #10 screw fasteners into BridgeBar 150 & (2) #10 screw fasteners into the web of the stud
- **BB** (BridgeBar 150) is an alternative for Cold-Rolled Channel (CRC), which may also be used with TSN's bridging clips.

BuckleBridge Bridging Chart: Design Wind Pressure and Bridging Spacing															
Stud Designation	20 psf					25 psf					30 psf				
	4' o.c.	5' o.c.	6' o.c.	7' o.c.	8' o.c.	4' o.c.	5' o.c.	6' o.c.	7' o.c.	8' o.c.	4' o.c.	5' o.c.	6' o.c.	7' o.c.	8' o.c.
600S162-33, 33 ksi	BKB	BKB	BKB	N/A	N/A	BKB	BKB	BKB	N/A	N/A	BKB	BKB	N/A	N/A	N/A
600S162-43, 33 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	N/A	N/A	BKB	BKB	BKB	N/A	N/A
600S162-54, 50 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	N/A	N/A
600S162-68, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A
600S162-97, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S162-33, 33 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	N/A	N/A	BKB	BKB	BKB	N/A	N/A
800S162-43, 33 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	N/A	N/A
800S162-54, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A
800S162-68, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S162-97, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
600S200-33, 33 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	N/A	N/A	BKB	BKB	BKB	N/A	N/A
600S200-43, 33 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A
600S200-54, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
600S200-68, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
600S200-97, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S200-33, 33 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	N/A
800S200-43, 33 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S200-54, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S200-68, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S200-97, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB

BuckleBridge Bridging Chart: Design Wind Pressure and Bridging Spacing											
Stud Designation	40 psf					50 psf					
	4' o.c.	5' o.c.	6' o.c.	7' o.c.	8' o.c.	4' o.c.	5' o.c.	6' o.c.	7' o.c.	8' o.c.	
600S162-33, 33 ksi	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
600S162-43, 33 ksi	BKB	BKB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
600S162-54, 50 ksi	BKB	BKB	N/A	N/A	N/A	BKB	BKB	N/A	N/A	N/A	N/A
600S162-68, 50 ksi	BKB	BKB	BKB	N/A	N/A	BKB	BKB	BKB	N/A	N/A	N/A
600S162-97, 50 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A	N/A
800S162-33, 33 ksi	BKB	BKB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
800S162-43, 33 ksi	BKB	BKB	BKB	N/A	N/A	BKB	BKB	N/A	N/A	N/A	N/A
800S162-54, 50 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	N/A	N/A	N/A
800S162-68, 50 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A	N/A
800S162-97, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	N/A	N/A
600S200-33, 33 ksi	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
600S200-43, 33 ksi	BKB	BKB	BKB	N/A	N/A	BKB	BKB	BKB	N/A	N/A	N/A
600S200-54, 50 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	BKB	N/A	N/A
600S200-68, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	N/A	N/A
600S200-97, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S200-33, 33 ksi	BKB	BKB	BKB	N/A	N/A	BKB	BKB	N/A	N/A	N/A	N/A
800S200-43, 33 ksi	BKB	BKB	BKB	BKB	N/A	BKB	BKB	BKB	N/A	N/A	N/A
800S200-54, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	N/A	N/A
800S200-68, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB
800S200-97, 50 ksi	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB	BKB

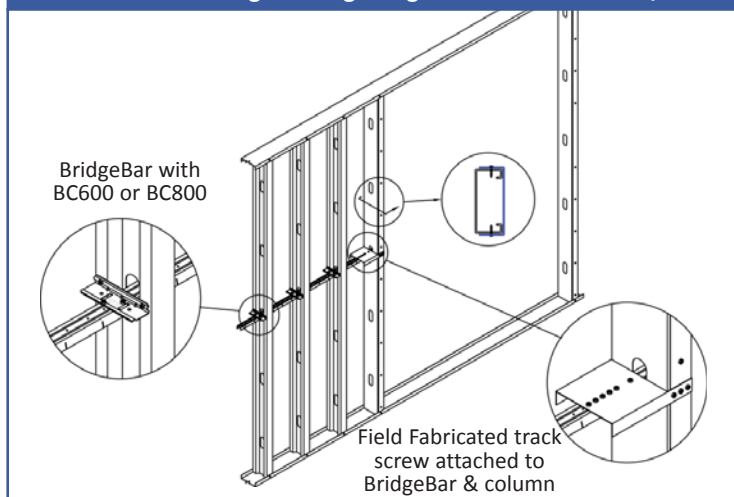
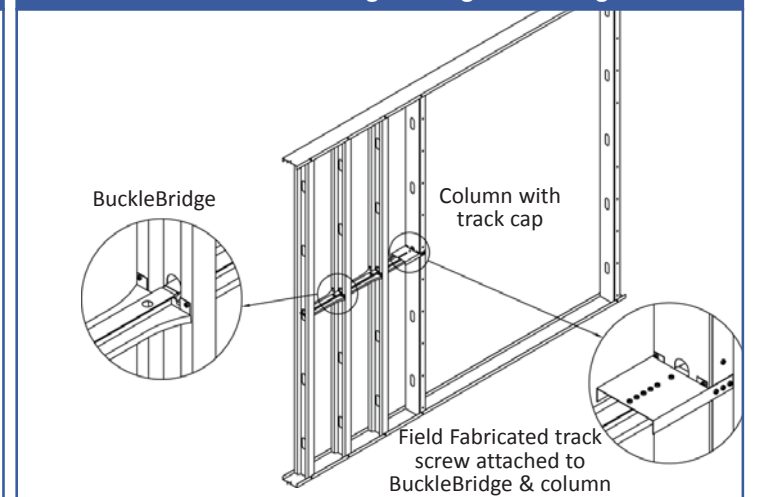
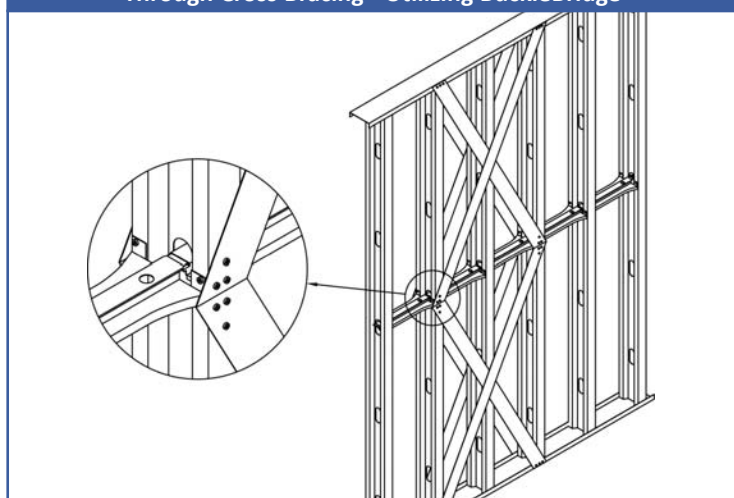
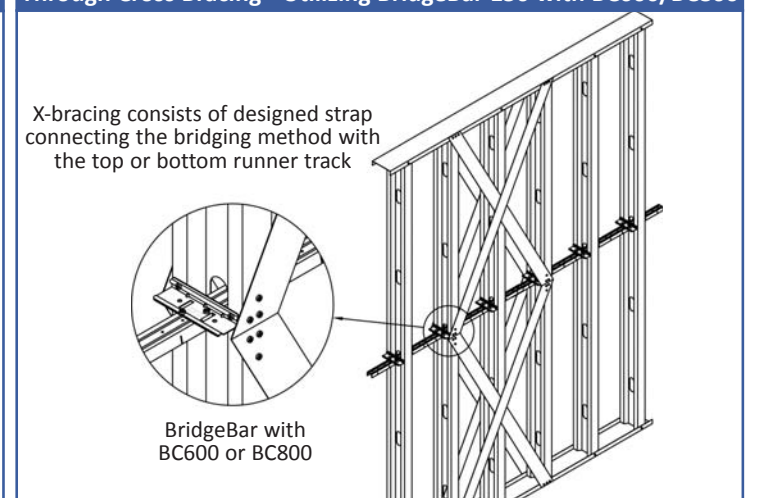
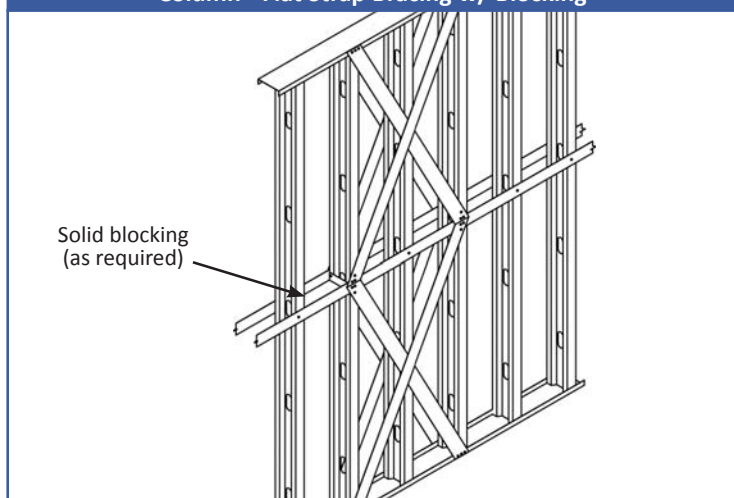
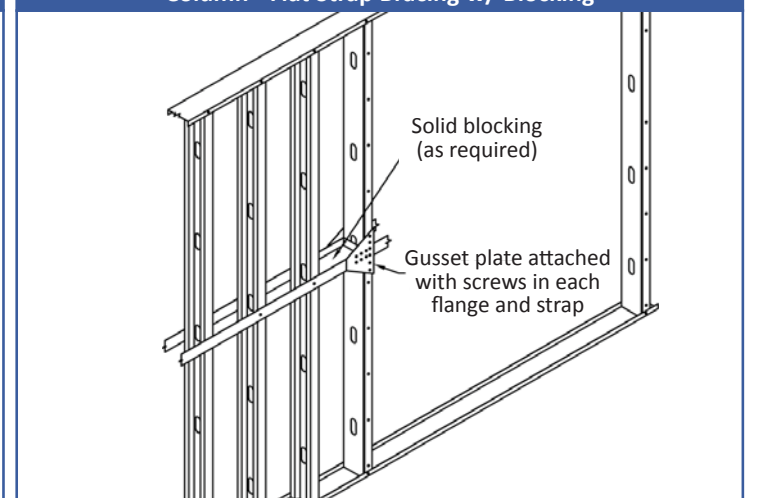
- Notes**
- 4' o.c. condition assumes 12' stud height with two rows of BuckleBridge bracing.
  - 5' o.c. condition assumes 10' stud height with a single row of BuckleBridge bracing.
  - 6' o.c. condition assumes 12' stud height with a single row of BuckleBridge bracing.
  - 7' o.c. condition assumes 14' stud height with a single row of BuckleBridge bracing.
  - 8' o.c. condition assumes 16' stud height with a single row of BuckleBridge bracing.
  - BuckleBridge design chart calculations are based on studs spaced at 16" o.c.
  - Stud flexural strength limited pressure calculated with torsional bracing assumed at the bridging spacing and  $k_{\phi} = 0$ .
  - Stud deflection limited pressure calculated with deflection limit equal to  $l/360$ . Listed wind pressures have been reduced by 0.70 as allowed by the IBC code.
  - BuckleBridge calculated twist moment (Reference AISI S100-07) is equal to:  

$$(1.5 \times \text{Wind Load} \times \text{Bridging Spacing} \times \text{Stud Spacing} \times m \text{ (distance from stud web to shear center)})$$
  - Listed wind pressures represent calculated design wind pressures (1.0W based on IBC 2009 or 0.6W based on IBC 2012).
  - Self weight of wall span assumed as 12 psf.
  - N/A indicates stud section is insufficient.
  - Use (1) #10 screw on alternate sides of the BuckleBridge at 3rd stud (48" o.c.) Use (2) #10 screws at end of wall run.

# Wall Bridging Anchorage

Quick Reference

## Anchorage of Lateral Bracing (Bridging) Forces

<p><b>Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Track Bracing Utilizing BridgeBar® 150 with BC600/BC800</b></p>  <p>BridgeBar with BC600 or BC800</p> <p>Field Fabricated track screw attached to BridgeBar &amp; column</p>	<p><b>Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Track Bracing Utilizing BuckleBridge®</b></p>  <p>BuckleBridge</p> <p>Column with track cap</p> <p>Field Fabricated track screw attached to BuckleBridge &amp; column</p>
<p><b>Load Bearing Wall Bridging Row Anchored to Floor System Through Cross Bracing - Utilizing BuckleBridge</b></p> 	<p><b>Load Bearing Wall Bridging Row Anchored to Floor System Through Cross Bracing - Utilizing BridgeBar 150 with BC600/BC800</b></p> <p>X-bracing consists of designed strap connecting the bridging method with the top or bottom runner track</p>  <p>BridgeBar with BC600 or BC800</p>
<p><b>Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Flat Strap Bracing w/ Blocking</b></p>  <p>Solid blocking (as required)</p>	<p><b>Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Flat Strap Bracing w/ Blocking</b></p>  <p>Solid blocking (as required)</p> <p>Gusset plate attached with screws in each flange and strap</p>