

Wall Bridging

Background

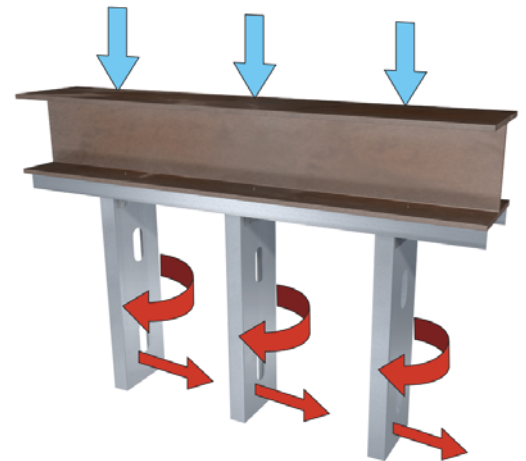
Bridging Background

Bridging for load bearing and curtain wall 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 (S211) and AISI Specification (S100) provide 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.

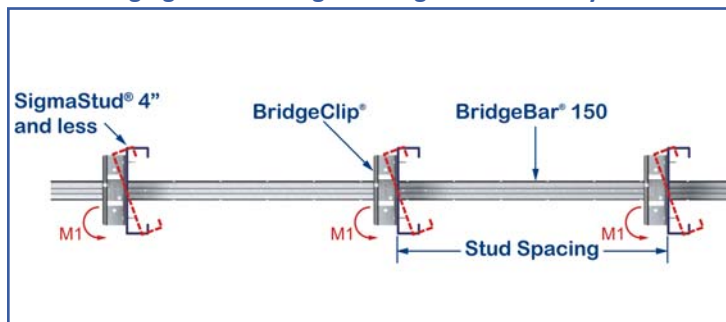


Bridging Requirements

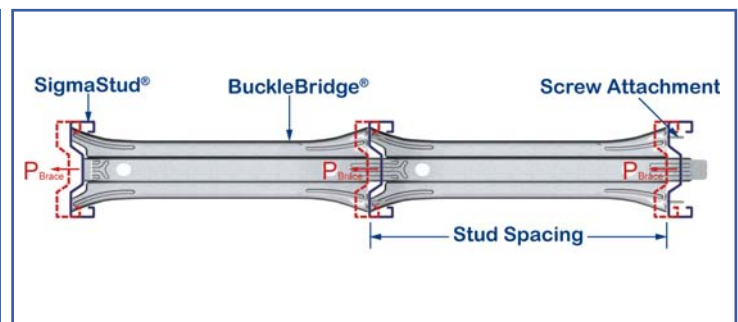
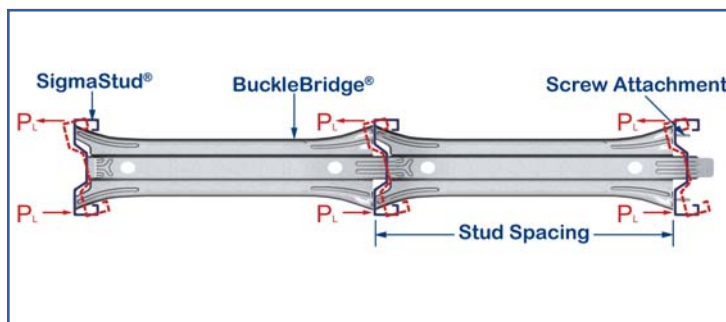
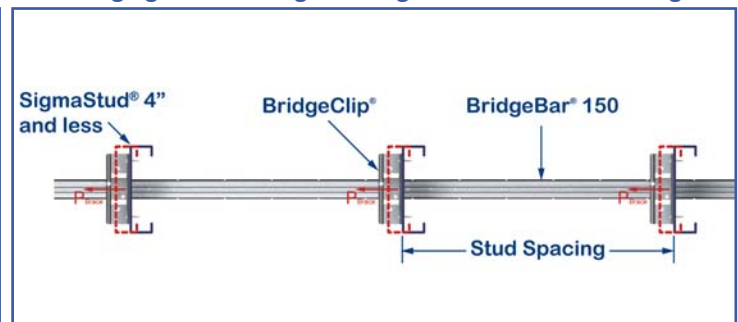
| | AISI Wall Stud Design Standard (S211) | AISI Specification (S100) |
|------------------------|---|---|
| Stud Axial Compression | Load Capacity: Bracing Load $P_{\text{Brace}}^* = 0.02 \times \text{Stud Compression Load } (P_{\text{Stud}}) \times \# \text{ of studs braced.}$ | Load Capacity: Bracing Load $P_{\text{Brace}}^* = 0.01 \times \text{Stud Compression Load } (P_{\text{Stud}}) \times \# \text{ of studs braced.}$ |
| | | Stiffness Capacity: 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). |
| Wind | Load Capacity: 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

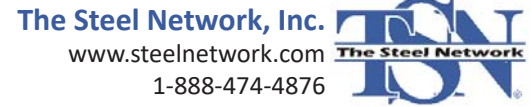


Bridging Load Bearing Studs Against Weak Axis Buckling



Curtain Wall Bridging Chart

Quick Reference



| Bridging Clip Chart: Design Wind Pressure, Stud Spacing and Maximum Bridging Spacing | | | | | | | | | | | | | | | |
|--|----------|-----|-----|----------|-----|-------|----------|-------|-------|----------|-------|-------|----------|-------|-------|
| Section | 10 psf | | | 20 psf | | | | | | 25 psf | | | | | |
| | 24" o.c. | | | 16" o.c. | | | 24" o.c. | | | 16" o.c. | | | 24" o.c. | | |
| | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' |
| 600S162-33, 33 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | N/A | BC3 | BC600 | N/A | BC1 | BC3 | N/A | BC600 | N/A | N/A |
| 600S162-43, 33 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | N/A | BC1 | BC1 | BC1 | BC1 | BC600 | N/A |
| 600S162-54, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC3 | BC1 | BC1 | BC1 | BC1 | BC600 | N/A |
| 600S162-68, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC600 | BC600 | BC600 |
| 600S162-97, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC600 | BC600 | BC600 |
| 600S200-33, 33 ksi | BC1 | BC1 | BC1 | BC1 | BC3 | BC600 | BC600 | BC600 | N/A | BC3 | BC600 | BC600 | BC600 | N/A | N/A |
| 600S200-43, 33 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC600 | BC600 | BC600 | BC1 | BC600 | BC600 | BC600 | BC600 | N/A |
| 600S200-54, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC3 | BC600 | BC600 | BC1 | BC3 | BC600 | BC600 | BC600 | BC600 |
| 600S200-68, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC3 | BC600 | BC1 | BC1 | BC3 | BC600 | BC600 | BC600 |
| 600S200-97, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC600 | BC600 | BC600 |
| 800S162-33, 33 ksi | BC1 | BC1 | BC1 | BC1 | BC3 | BC3 | BC3 | BC3 | N/A | BC3 | BC3 | N/A | BC3 | BC800 | N/A |
| 800S162-43, 33 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC3 | BC3 | BC1 | BC1 | BC1 | BC3 | BC3 | N/A |
| 800S162-54, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 |
| 800S162-68, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 |
| 800S162-97, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 |
| 800S200-33, 33 ksi | BC1 | BC3 | BC3 | BC3 | BC3 | BC3 | BC800 | BC800 | BC800 | BC3 | BC800 | BC800 | BC800 | BC800 | N/A |
| 800S200-43, 33 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC3 | BC3 | BC800 | BC800 | BC1 | BC3 | BC800 | BC800 | BC800 | BC800 |
| 800S200-54, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC3 | BC800 | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 |
| 800S200-68, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC800 | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 |
| 800S200-97, 50 ksi | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC1 | BC800 | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 |

| Bridging Clip Chart: Design Wind Pressure, Stud Spacing and Maximum Bridging Spacing | | | | | | | | | | | | | | | | |
|--|----------|-------|-------|----------|-------|-------|----------|-------|-------|----------|-------|-------|----------|-------|-------|--|
| Section | 30 psf | | | | | | 40 psf | | | | | | 50 psf | | | |
| | 16" o.c. | | | 24" o.c. | | | 16" o.c. | | | 24" o.c. | | | 16" o.c. | | | |
| | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' | |
| 600S162-33, 33 ksi | BC3 | BC600 | N/A | BC600 | N/A | N/A | BC600 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | |
| 600S162-43, 33 ksi | BC1 | BC1 | N/A | BC600 | N/A | N/A | BC600 | BC600 | N/A | BC600 | N/A | N/A | BC600 | N/A | N/A | |
| 600S162-54, 50 ksi | BC1 | BC1 | BC3 | BC600 | BC600 | N/A | BC3 | BC600 | N/A | BC600 | N/A | N/A | BC600 | BC600 | N/A | |
| 600S162-68, 50 ksi | BC1 | BC1 | BC1 | BC600 | BC600 | N/A | BC600 | BC600 | BC600 | BC600 | BC600 | N/A | BC600 | BC600 | N/A | |
| 600S162-97, 50 ksi | BC1 | BC1 | BC1 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | N/A | BC600 | BC600 | BC600 | |
| 600S200-33, 33 ksi | BC600 | BC600 | N/A | BC600 | N/A | N/A | BC600 | N/A | N/A | N/A | N/A | N/A | BC600 | N/A | N/A | |
| 600S200-43, 33 ksi | BC600 | BC600 | BC600 | BC600 | BC600 | N/A | BC600 | BC600 | N/A | BC600 | N/A | N/A | BC600 | BC600 | N/A | |
| 600S200-54, 50 ksi | BC3 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | N/A | BC600 | BC600 | BC600 | |
| 600S200-68, 50 ksi | BC1 | BC3 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | |
| 600S200-97, 50 ksi | BC1 | BC1 | BC1 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | BC600 | |
| 800S162-33, 33 ksi | BC3 | BC3 | N/A | BC800 | N/A | N/A | BC800 | N/A | N/A | BC800 | N/A | N/A | BC800 | N/A | N/A | |
| 800S162-43, 33 ksi | BC1 | BC3 | BC3 | BC3 | BC800 | N/A | BC3 | BC800 | N/A | BC800 | N/A | N/A | BC800 | BC800 | N/A | |
| 800S162-54, 50 ksi | BC1 | BC1 | BC1 | BC800 | BC800 | N/A | BC800 | BC800 | BC800 | BC800 | BC800 | N/A | BC800 | BC800 | N/A | |
| 800S162-68, 50 ksi | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | N/A | BC800 | BC800 | BC800 | |
| 800S162-97, 50 ksi | BC1 | BC1 | BC1 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | |
| 800S200-33, 33 ksi | BC800 | BC800 | BC800 | BC800 | BC800 | N/A | BC800 | BC800 | N/A | BC800 | N/A | N/A | BC800 | BC800 | N/A | |
| 800S200-43, 33 ksi | BC3 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | N/A | BC800 | BC800 | BC800 | |
| 800S200-54, 50 ksi | BC1 | BC3 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | |
| 800S200-68, 50 ksi | BC1 | BC1 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | |
| 800S200-97, 50 ksi | BC1 | BC1 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | BC800 | |

****Important table notes on next page.**

| BuckleBridge® Bridging Chart: Design Wind Pressure and Maximum Bridging Spacing | | | | | | | | | | | | | | | |
|---|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|
| Section | 20 psf | | | 25 psf | | | 30 psf | | | 40 psf | | | 50 psf | | |
| | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' | 5' | 6' | 7' |
| 600S162-33, 33 ksi | BKB | BKB | N/A | BKB | BKB | N/A | BKB | N/A | N/A | BKB | N/A | N/A | BKB | N/A | N/A |
| 600S162-43, 33 ksi | BKB | BKB | BKB | BKB | BKB | N/A | BKB | BKB | N/A | BKB | N/A | N/A | BKB | N/A | N/A |
| 600S162-54, 50 ksi | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | N/A | BKB | BKB | N/A | BKB | N/A | N/A |
| 600S162-68, 50 ksi | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | 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 |
| 600S200-33, 33 ksi | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | N/A | BKB | N/A | N/A | BKB | N/A | N/A |
| 600S200-43, 33 ksi | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | N/A | 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 |
| 800S162-33, 33 ksi | BKB | BKB | BKB | BKB | BKB | N/A | BKB | BKB | N/A | BKB | N/A | N/A | BKB | N/A | N/A |
| 800S162-43, 33 ksi | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | N/A | BKB | N/A | N/A |
| 800S162-54, 50 ksi | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | 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 |
| 800S200-33, 33 ksi | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | BKB | N/A | BKB | N/A | 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 |

Notes:

- Listed wind pressures represent calculated design wind pressure (1.0W based on 2009 IBC or 0.6W based on 2012 IBC).
- Allowable pressures are limited by published test data allowable torsional moments for bridging elements.
- Torsional moment acting on bridging elements is calculated as:

$$M = 1.5 \times \text{Wind Pressure} \times \text{Bridging Spacing} \times \text{Stud Spacing} \times m \text{ (distance from stud web to shear center).}$$

- Wall height is assumed twice the bridging spacing.
- BuckleBridge® stud spacing is fixed at 16".
- Stud design is limited by its flexural strength calculated with torsional bracing assumed at the bridging spacing and $k_{\phi} = 0$ and deflection limit of $L/360$.
- 20 psf and higher wind pressures have been multiplied by 0.7 for deflection determination, in accordance with footnote "f" of IBC table 1604.3. The 10 psf pressure has not been reduced for deflection checks.

Nomenclature:

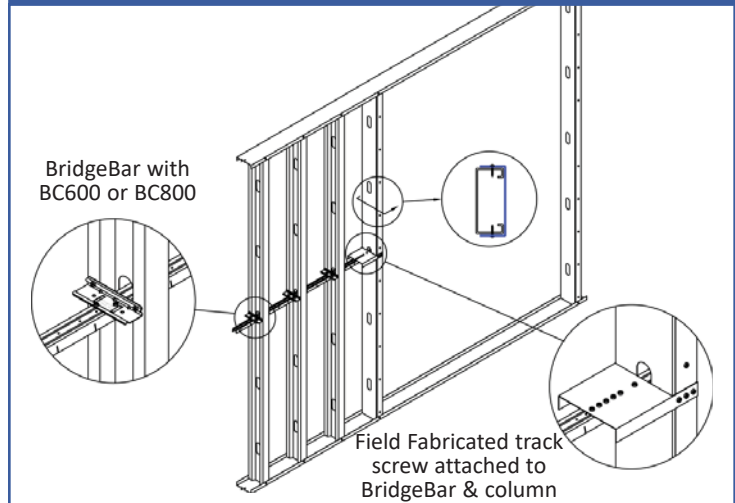
- **BC1** - BridgeClip with (1) #10 screw fastener into bridging member.
- **BC3** - BridgeClip with (1) #10 screw fastener into bridging member and (2) #10 screw fasteners into the web of the stud.
- **BC600** - BridgeClip BC600 with (2) #10 screw fasteners into bridging member and (2) #10 screw fasteners into the web of the stud.
- **BC800** - BridgeClip BC800 with (2) #10 screw fasteners into bridging member and (2) #10 screw fasteners into the web of the stud.
- **BKB** - BuckleBridge with (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

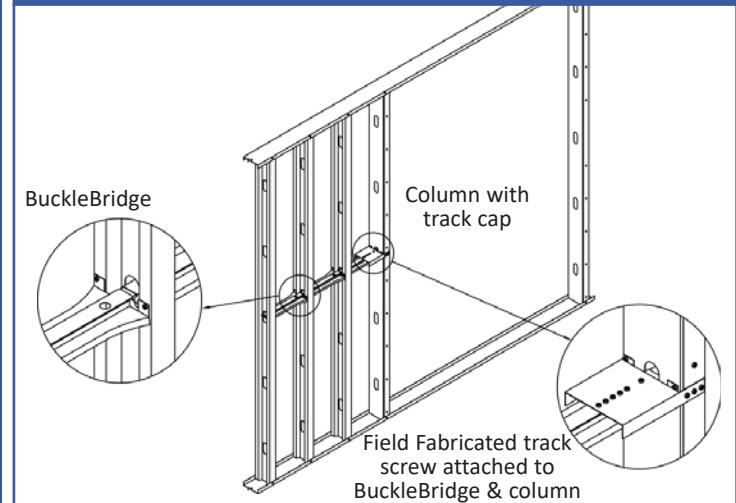
Quick Reference

Anchorage of Lateral Bracing (Bridging) Forces

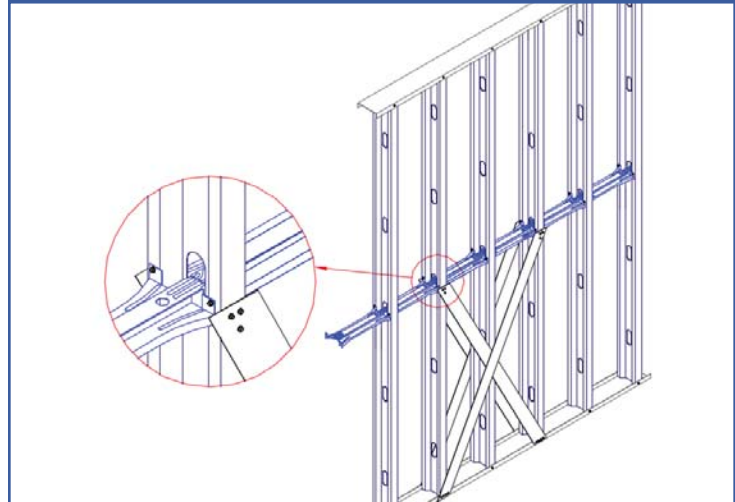
Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Track Bracing Utilizing BridgeBar® 150 with BC600/BC800



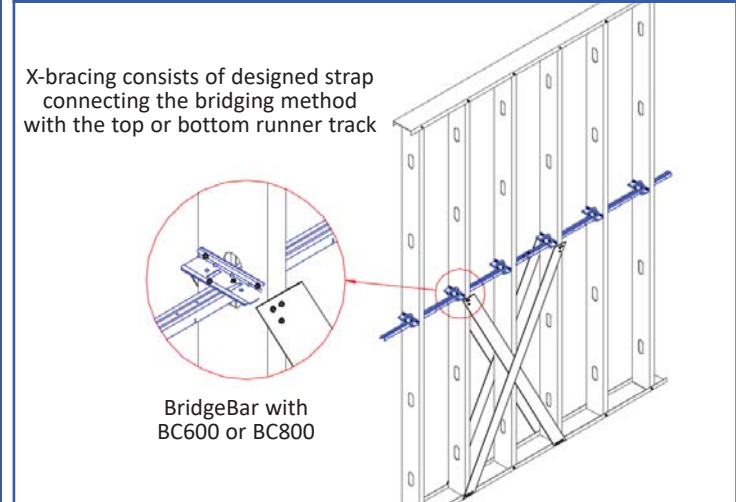
Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Track Bracing Utilizing BuckleBridge®



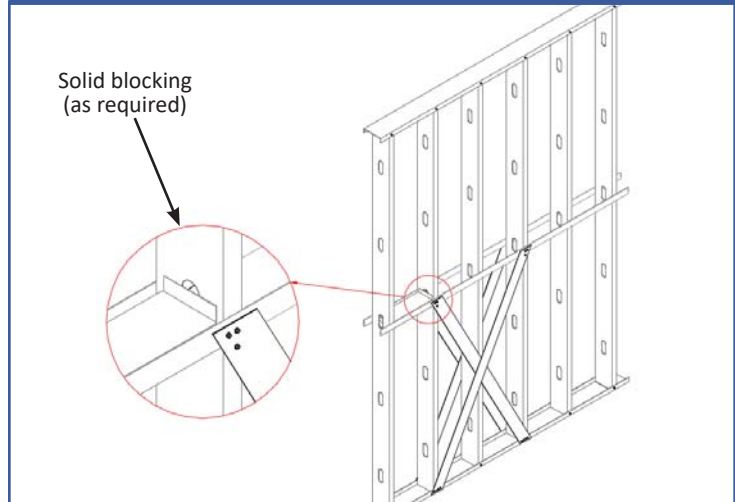
Load Bearing Wall Bridging Row Anchored to Floor System Through Cross Bracing - Utilizing BuckleBridge



Load Bearing Wall Bridging Row Anchored to Floor System Through Cross Bracing - Utilizing BridgeBar 150 with BC600/BC800



Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Flat Strap Bracing w/ Blocking



Load Bearing Wall Bridging Row Anchored to Jamb Stud or End Column - Flat Strap Bracing w/ Blocking

