



BADGER INDUSTRIES - CITY OF LOS ANGELES COLA REPORT

— LARR 26090 —

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San Diego, CA 92120

RESEARCH REPORT: RR 26090  
(CSI # 13080)

Attn: Brad Lawhorn  
(714) 929-8668

REEVALUATION DUE  
DATE: May 1, 2018  
Issued Date: December 1, 2017  
Code: 2017 LABC

**GENERAL APPROVAL** – Technical Modification – Badger Industries Seismic and Vertical Components

## DETAILS

The Badger Industries seismic SSC, SSC-HD and SSC-RF components are composed of ASTM A1011 CS, Grade 33 or equivalent minimum 33,000 psi yield strength carbon steel. Pivot pin is composed of (1/2") diameter ASTM A307 or equivalent carbon steel. A slotted tabbed washer sized to fit connection is provided with, and is required to be installed with each Badger Industries SSC-RF seismic bracket. Seismic brackets can be used for upper or lower brace end connections. Badger SBEMT pivot arm shall be removed when connecting cable brace member to pivot pin. The Allowable and (LRFD) capacities are listed in Attachments 1, 2 and 3.

The Badger Industries seismic SB1258 and SBRF components are composed of ASTM A1011 CS, Grade 33 or equivalent minimum 33,000 psi yield strength carbon steel. Pivot pin is composed of (3/8") diameter ASTM A307 or equivalent carbon steel. Two slotted washers sized to fit connection is provided with, and is required to be installed with each SBRF seismic bracket. Seismic brackets can be used for upper or lower brace end connections. Badger SBEMT pivot arm shall be removed when connecting cable brace member to pivot pin. The Allowable and (LRFD) capacities are listed in Attachments 4 and 5.

The Badger Industries seismic SBEMT rigid bracing component using (2)-(1/4"x1") hex washer head screws. SBEMT component is composed of minimum 33,000 psi yield strength carbon steel. The Allowable and (LRFD) capacities are listed in Attachment 6.

RR 26090  
Page 1 of 4

Badger Industries

RE: Badger Seismic Bracing And Vertical Components

The Badger Industries seismic SWB component is composed of 0.30-inch diameter, minimum 33,000 psi yield strength carbon steel rod. The Allowable and (LRFD) capacities are listed in Attachment 7.

The Badger Industries seismic SCC-1 cable braces are composed of (1/16") diameter 7x7 galvanized steel aircraft cable with a stake-eye fitting at one end and a Badger Industries SCC-1 cable clamp bolt turn back connection at the other end. Badger Industries seismic SCC-2 cable braces are composed of (1/8") diameter 7x7 galvanized steel aircraft cable, or (3/16") diameter 7x19 galvanized steel aircraft cable with a stake-eye fitting at one end and a Badger Industries SCC-2 cable clamp bolt turn back connection at the other end. The Allowable and (LRFD) capacities are listed in Attachment 8.

The Badger Industries seismic MDH3812, MDH1258 and MDH5834 components are composed of a minimum 33,000 psi yield strength carbon steel body. MDH3812 is composed of (1/2") diameter ASTM A307 or equivalent carbon steel shaft, and the MDH1258, and the MDH5834 is composed of (3/4") diameter ASTM A307 or equivalent carbon steel shaft. The Allowable and (LRFD) capacities are listed in Attachment 9.

The Badger Industries MDH3812 with 12 gauge ASTM A641 wire tied through the 3/8-16 hole in the body of the MDH3812. The Allowable and (LRFD) capacities are listed in Attachment 10.

The Badger Industries beam clamp SBC158 and SBC158L components are composed of ASTM A1011 CS, Grade 33 or equivalent minimum 33,000 psi yield strength carbon steel and a 1/2-13 ASTM A307 or equivalent carbon steel clamp bolt. The SBC158 and SBC158L beam clamps can be used as individual beam clamps or in pairs as double beam clamps. The Allowable and (LRFD) capacities are listed in Attachments 11, 12, 13, 14, 15 and 16.

Note, attachments 12 and 15 reference detail (CMN) Cantilevered Member Notice, see Attachment 17.

The Badger Industries seismic SHCA components are composed of ASTM A1011 CS, Grade 33 or equivalent minimum 33,000 psi yield strength carbon steel. V-Bolt is composed of (1/4") diameter ASTM A307 or equivalent carbon steel. The Allowable and (LRFD) capacities are listed in Attachment 18.

The Badger Industries with Anvil International LLC seismic FIG: 212 component sizes (1-1/2" and smaller) are composed of ASTM A1011 carbon steel. FIG: 212 component sizes (2" thru 4") and FIG: 212FP component sizes (5" thru 12") are composed of ASTM A36 carbon steel. Clamp Bolts are composed of (1/2") diameter ASTM A307 or equivalent carbon steel. Badger SBEMT pivot arm shall be removed when connecting cable brace member to clamp bolt. The Allowable and (LRFD) capacities are listed in Attachments 19, 20, 21 and 22.

**The approval is subject to the following conditions:**

1. This approval is limited to mechanical, electrical, ductwork, equipment, plumbing components, and fire protection components
2. Fire protection vertical hangers shall be per 2016 NFPA-13, 9.1.1.2.
3. Fire protection seismic bracing shall be per ASCE 7, Seismic Design Requirements for Non-Structural Components.
4. The use of Badger Industries components is for interior use only.
5. The tabulated allowable and/or (LRFD) loads shall not be increased for duration of loading.
6. The values listed in attachments 1-22 are for the Badger Industries components only. Calculations demonstrating the applied loads are less than the loads for each individual component within the assembly shall be submitted for plan check at the time of permit application.
7. The Badger Industries seismic components and assembly installations shall be in accordance with the manufacturer's most current instructions and the requirements herein. A copy of this report and the installation instruction shall be provided at each job site by the installing contractor.
8. Periodic Special Inspection required during installation and anchorage of piping and ductwork designed to carry hazardous material in structures in accordance with LABC 1705.11.6

**DISCUSSION**

The technical modification is to add the SSC-HD, SB1258, SBRF, Rigid Brace Member, SWB, Cable Brace Member, MDH3812, SBC158, SBC158L, CMN, SHCA, Anvil 212, and Anvil 212FP components to the approval.

This report is in compliance with the 2017 City of Los Angeles Building Code.

This approval is based on load tests provided by CEL Consulting and FM Approvals.

Badger Industries  
RE: Badger Seismic Bracing And Vertical Components

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

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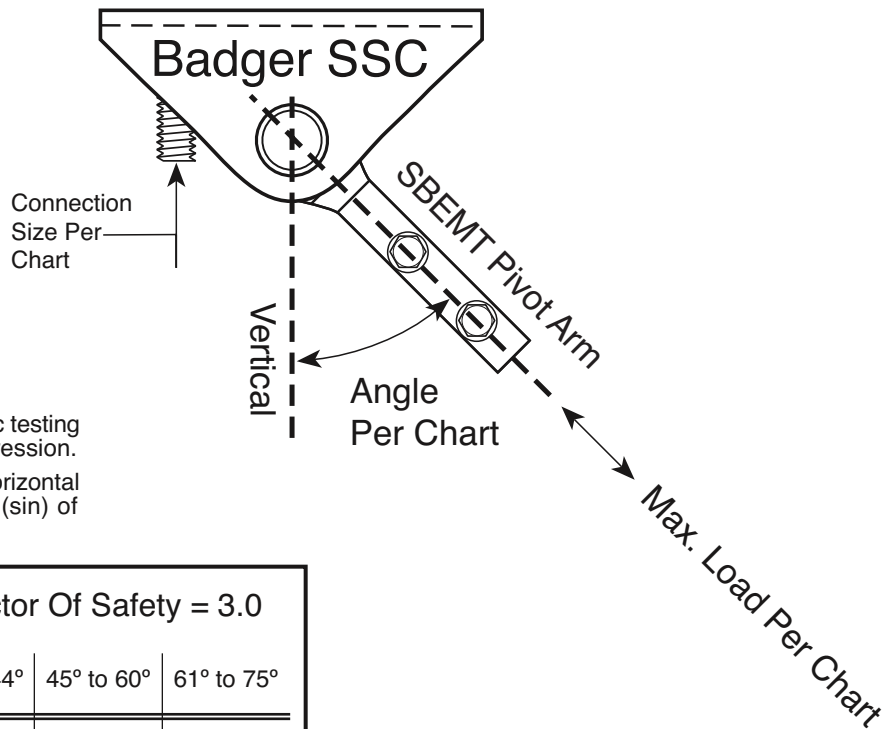
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201 N. Figueroa St., Room 880  
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Attachments: Badger Industries Details (22 Pages)

DE  
RR26090  
R11/20/17  
TLB1700395  
1705.11.6, 2210, 2210A

RR 26090  
Page 4 of 4

# BADGER INDUSTRIES - Part SSC



NOTES:  
Capacity of bracket based on seismic testing considering both tension and compression.  
To convert listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

Allowable Load with Factor Of Safety = 3.0

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°
1/2 In.	Rigid	1,602 lbs.	1,602 lbs.	1,195 lbs.
5/8 In.	Rigid	1,602 lbs.	1,602 lbs.	1,195 lbs.

(LRFD) Load with Factor Of Safety = 2.0

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°
1/2 In.	Rigid	2,403 lbs.	2,403 lbs.	1,793 lbs.
5/8 In.	Rigid	2,403 lbs.	2,403 lbs.	1,793 lbs.



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# BADGER INDUSTRIES - Part SSC-RF

Max. Load Per Chart

Angle Per Chart

Vertical

SBEMT Pivot Arm

Badger SSC-RF



Connection Size Per Chart

STW Washer Sized To Fit Conn.

**NOTES:**

Capacity of bracket based on seismic testing considering both tension and compression.

To convert listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

**Allowable Load with Factor Of Safety = 3.0**

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°	76° to 90°
3/8 In.	Rigid	1,451 lbs.	1,142 lbs.	889 lbs.	821 lbs.
1/2 In.	Rigid	1,451 lbs.	1,142 lbs.	889 lbs.	821 lbs.
5/8 In.	Rigid	1,451 lbs.	1,142 lbs.	889 lbs.	821 lbs.
3/4 In.	Rigid	1,451 lbs.	1,142 lbs.	889 lbs.	821 lbs.

**(LRFD) Load with Factor Of Safety = 2.0**

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°	76° to 90°
3/8 In.	Rigid	2,176 lbs.	1,714 lbs.	1,333 lbs.	1,232 lbs.
1/2 In.	Rigid	2,176 lbs.	1,714 lbs.	1,333 lbs.	1,232 lbs.
5/8 In.	Rigid	2,176 lbs.	1,714 lbs.	1,333 lbs.	1,232 lbs.
3/4 In.	Rigid	2,176 lbs.	1,714 lbs.	1,333 lbs.	1,232 lbs.

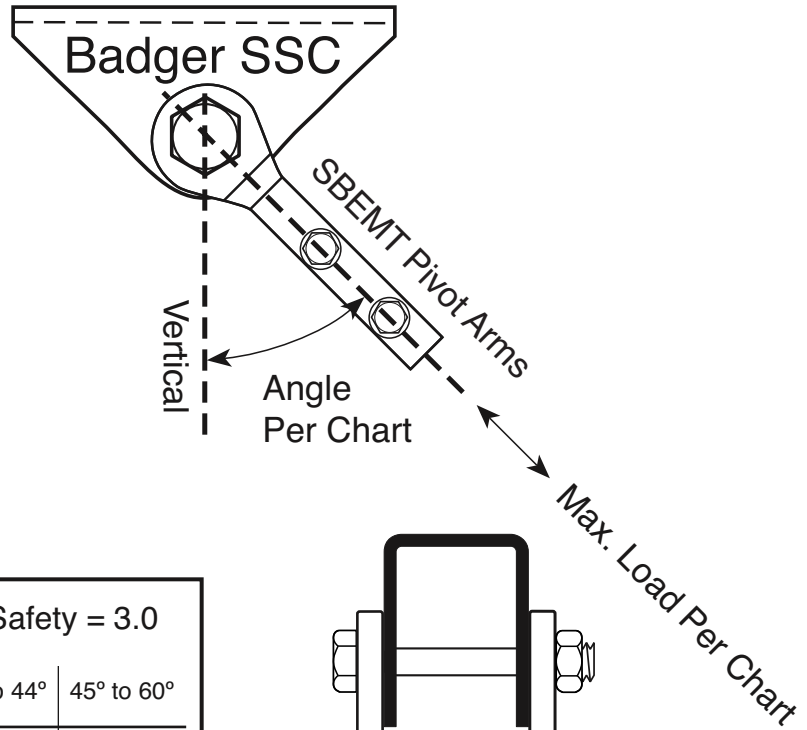


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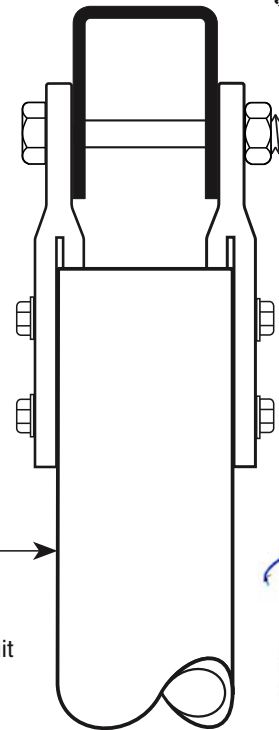
# BADGER INDUSTRIES - Part SSC-HD



NOTES:  
Capacity of bracket based on seismic testing considering both tension and compression.  
To convert listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

Allowable Load with Factor Of Safety = 3.0				
Connection Size	Bracing Type	0°	30° to 44°	45° to 60°
(2) - 1/2 In.	Rigid	2,501 lbs.	2,501 lbs.	2,501 lbs.

(LRFD) Load with Factor Of Safety = 2.0				
Connection Size	Bracing Type	0°	30° to 44°	45° to 60°
(2) - 1/2 In.	Rigid	3,752 lbs.	3,752 lbs.	3,752 lbs.



(TYP.) (2")  
EMT Conduit  
Rigid Brace  
Member



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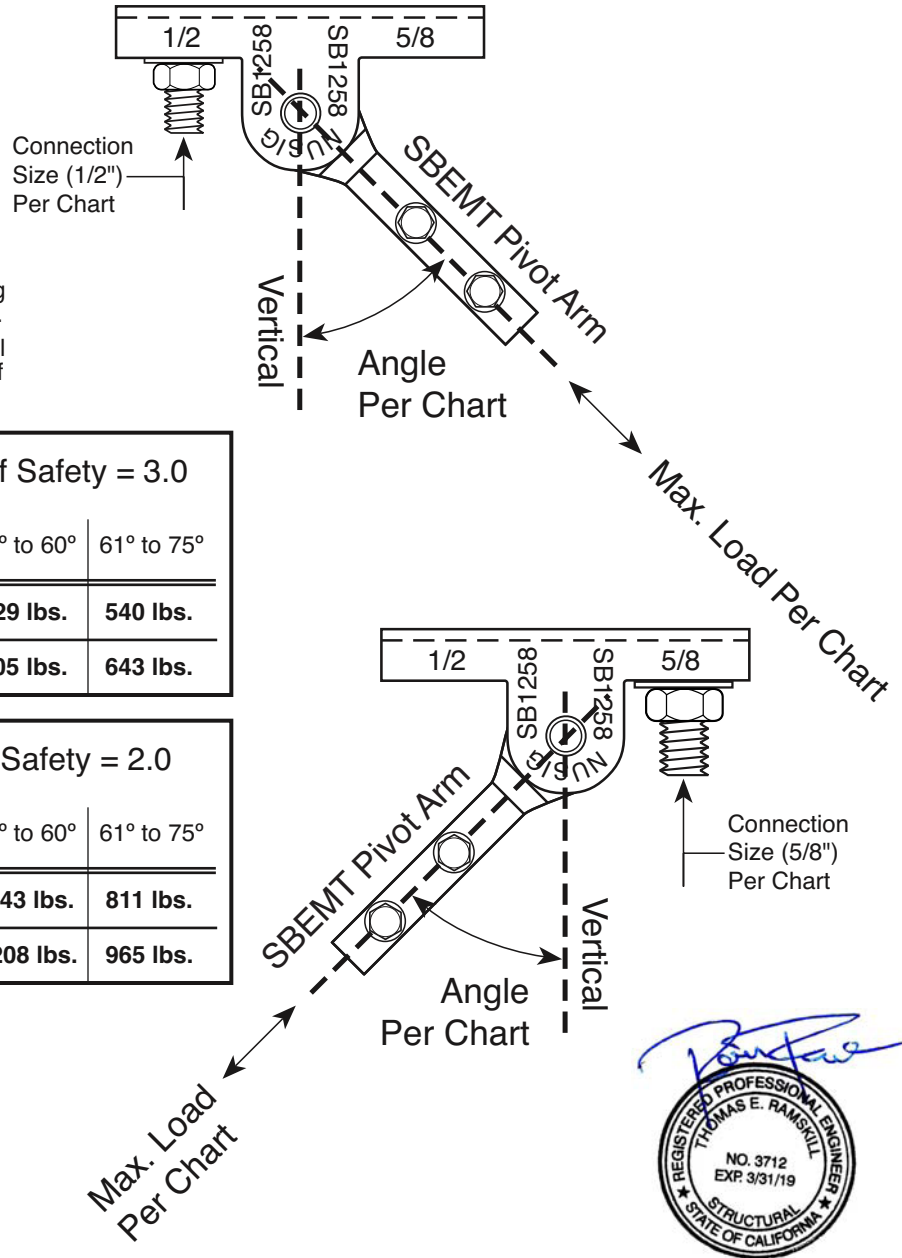


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# BADGER INDUSTRIES - Part NUSIG SB1258

Patent #9,777,870



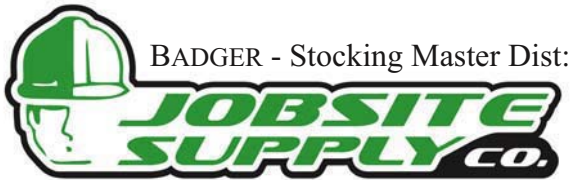
NOTES:  
 Capacity of bracket based on seismic testing considering both tension and compression.  
 To convert listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

Allowable Load with Factor Of Safety = 3.0

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°
1/2 In.	Rigid	962 lbs.	629 lbs.	540 lbs.
5/8 In.	Rigid	972 lbs.	805 lbs.	643 lbs.

(LRFD) Load with Factor Of Safety = 2.0

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°
1/2 In.	Rigid	1,443 lbs.	943 lbs.	811 lbs.
5/8 In.	Rigid	1,458 lbs.	1,208 lbs.	965 lbs.



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# BADGER INDUSTRIES - Part NUSIG SBRF

Patent #9,777,870

Max. Load Per Chart

Angle Per Chart

SBEMT Pivot Arm



Connection Size Per Chart

Upper SRW Washers And Lower SRW Washers Sized To Fit Conn.

NOTES:  
Capacity of bracket based on seismic testing considering both tension and compression.  
To convert listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

### Allowable Load with Factor Of Safety = 3.0

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°	76° to 90°
3/8 In.	Rigid	688 lbs.	695 lbs.	455 lbs.	375 lbs.
1/2 In.	Rigid	688 lbs.	695 lbs.	455 lbs.	375 lbs.
5/8 In.	Rigid	688 lbs.	695 lbs.	455 lbs.	375 lbs.

### (LRFD) Load with Factor Of Safety = 2.0

Connection Size	Bracing Type	30° to 44°	45° to 60°	61° to 75°	76° to 90°
3/8 In.	Rigid	1,033 lbs.	1,043 lbs.	682 lbs.	535 lbs.
1/2 In.	Rigid	1,033 lbs.	1,043 lbs.	682 lbs.	535 lbs.
5/8 In.	Rigid	1,033 lbs.	1,043 lbs.	682 lbs.	535 lbs.

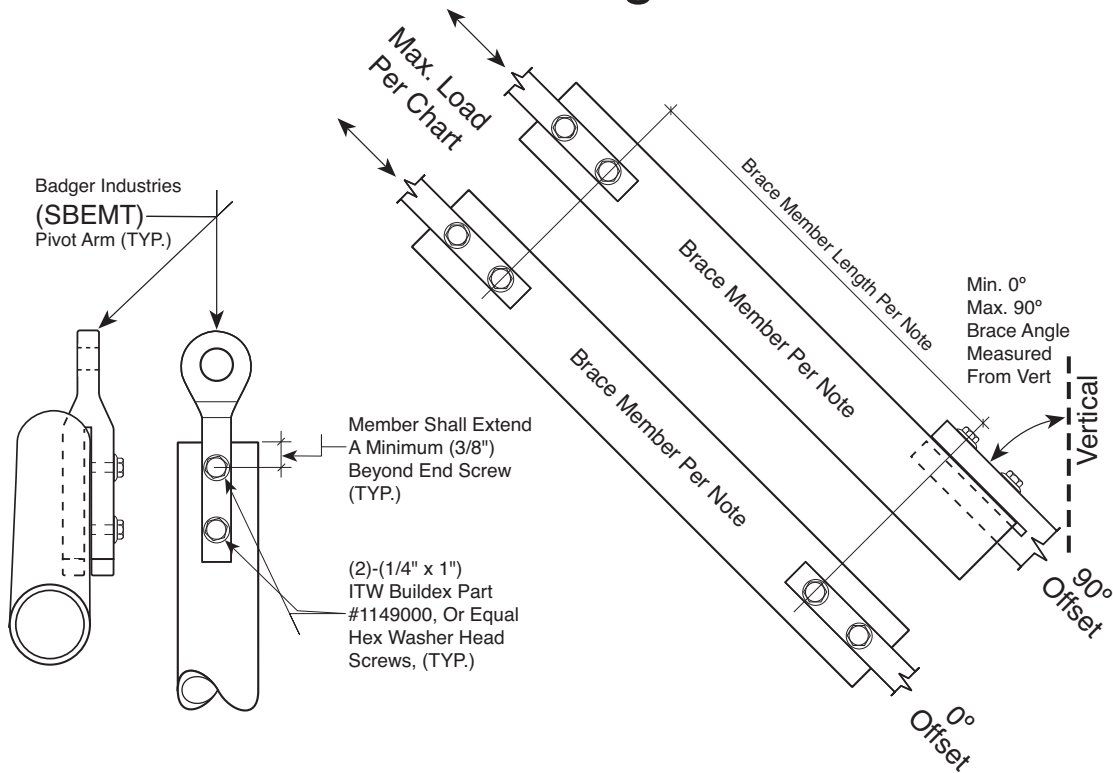


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# BADGER INDUSTRIES - Rigid Brace Member



**NOTES:**

Capacity based on seismic testing considering both tension and compression. To convert chart listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

Capacities listed within the chart on this sheet do not account for brace length compression capacity. Thus, calculations demonstrating the applied design demand loads are less than the brace member length compression capacity shall be submitted for plan check.

Brace member shall be EMT Conduit sizes (3/4" thru 2-1/2"). Conduit shall be steel tubing constructed to UL-797 Or ANSI C-80.3. Schedule 5 or schedule 7 steel pipe with an equal or larger nominal size, and a minimum yield strength of 30,000 psi can be used in place of conduit. Brace member shall be installed as a straight, (1) piece continuous member. Screws shall not be installed into brace member weld seam. 12 gauge strut or 90° angle can be used in place of conduit.

Allowable Load with Factor Of Safety = 3.0	
EMT Conduit Nominal Size	0° to 90°
3/4 in.	618 lbs.
1 in.	973 lbs.
1-1/4 in.	1,305 lbs.
1-1/2 in.	1,177 lbs.
2 in.	1,118 lbs.
2-1/2 in.	1,119 lbs.

(LRFD) Load with Factor Of Safety = 2.0	
EMT Conduit Nominal Size	0° to 90°
3/4 in.	927 lbs.
1 in.	1,459 lbs.
1-1/4 in.	1,958 lbs.
1-1/2 in.	1,765 lbs.
2 in.	1,677 lbs.
2-1/2 in.	1,678 lbs.



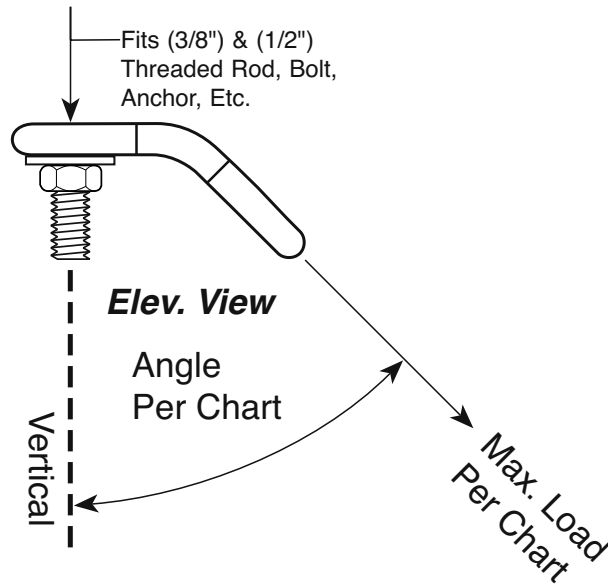
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# BADGER INDUSTRIES - Part SWB

Patent Pending

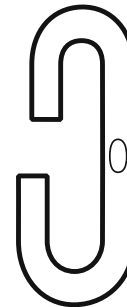


NOTES:  
Capacity of bracket based on testing considering tension only.  
To convert listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

Allowable Load with Factor Of Safety = 3.0		
Connection Size	Bracing Type	30° to 60°
3/8 In.	Tension	472 lbs.
1/2 In.	Tension	522 lbs.

(LRFD) Load with Factor Of Safety = 2.0		
Connection Size	Bracing Type	30° to 60°
3/8 In.	Tension	708 lbs.
1/2 In.	Tension	783 lbs.

## Badger SWB



(1) End Fits  
(3/8") Connection Size

### Plan View

(1) End Fits  
(1/2") Connection Size

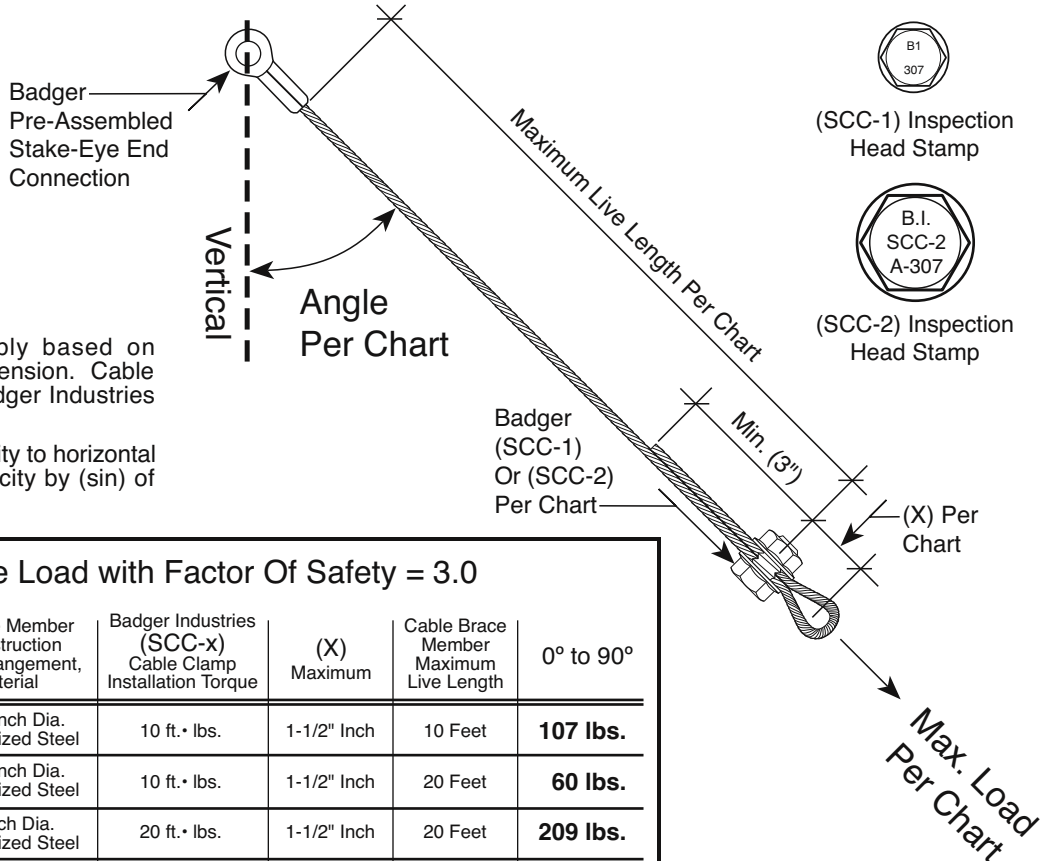


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# BADGER INDUSTRIES - Cable Brace Member



**NOTES:**  
Capacity of cable assembly based on seismic testing considering tension. Cable ends to be connected to Badger Industries COLA listed components.

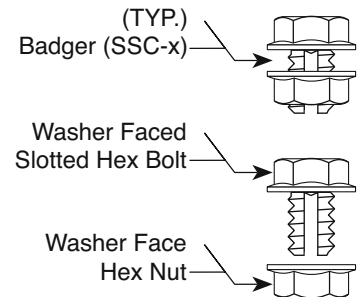
To convert listed angle capacity to horizontal capacity multiply listed capacity by (sin) of the angle.

## Allowable Load with Factor Of Safety = 3.0

Badger Industries (SCC-x) Cable Clamp Seismic Hardware Part Number	Cable Brace Member Size, Construction Strands / Arrangement, And Material	Badger Industries (SCC-x) Cable Clamp Installation Torque	(X) Maximum	Cable Brace Member Maximum Live Length	0° to 90°
SCC-1	Min. (1/16") Inch Dia. (7x7) Galvanized Steel	10 ft. • lbs.	1-1/2" Inch	10 Feet	<b>107 lbs.</b>
SCC-1	Min. (1/16") Inch Dia. (7x7) Galvanized Steel	10 ft. • lbs.	1-1/2" Inch	20 Feet	<b>60 lbs.</b>
SCC-2	Min. (1/8") Inch Dia. (7x7) Galvanized Steel	20 ft. • lbs.	1-1/2" Inch	20 Feet	<b>209 lbs.</b>
SCC-2	Min. (3/16") Inch Dia. (7x19) Galvanized Steel	30 ft. • lbs.	1-1/2" Inch	10 Feet	<b>513 lbs.</b>

## (LRFD) Load with Factor Of Safety = 2.0

Badger Industries (SCC-x) Cable Clamp Seismic Hardware Part Number	Cable Brace Member Size, Construction Strands / Arrangement, And Material	Badger Industries (SCC-x) Cable Clamp Installation Torque	(X) Maximum	Cable Brace Member Maximum Live Length	0° to 90°
SCC-1	Min. (1/16") Inch Dia. (7x7) Galvanized Steel	10 ft. • lbs.	1-1/2" Inch	10 Feet	<b>161 lbs.</b>
SCC-1	Min. (1/16") Inch Dia. (7x7) Galvanized Steel	10 ft. • lbs.	1-1/2" Inch	20 Feet	<b>90 lbs.</b>
SCC-2	Min. (1/8") Inch Dia. (7x7) Galvanized Steel	20 ft. • lbs.	1-1/2" Inch	20 Feet	<b>314 lbs.</b>
SCC-2	Min. (3/16") Inch Dia. (7x19) Galvanized Steel	30 ft. • lbs.	1-1/2" Inch	10 Feet	<b>769 lbs.</b>



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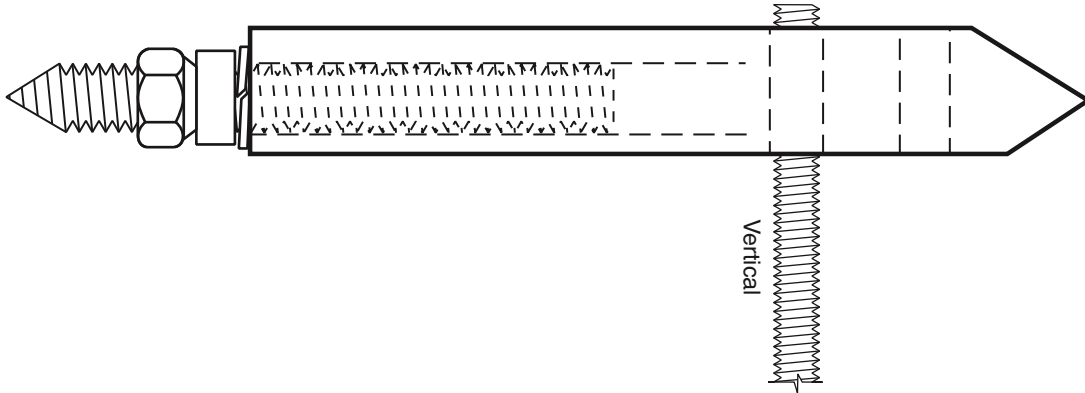
# BADGER INDUSTRIES - Part MDH3812

Patent #9,850,659

255 lbs Allowable Load with Factor Of Safety = 3

382 lbs (LRFD) Load with Factor Of Safety = 2

Capacity Of MDH3812 based on seismic testing considering both tension and compression.



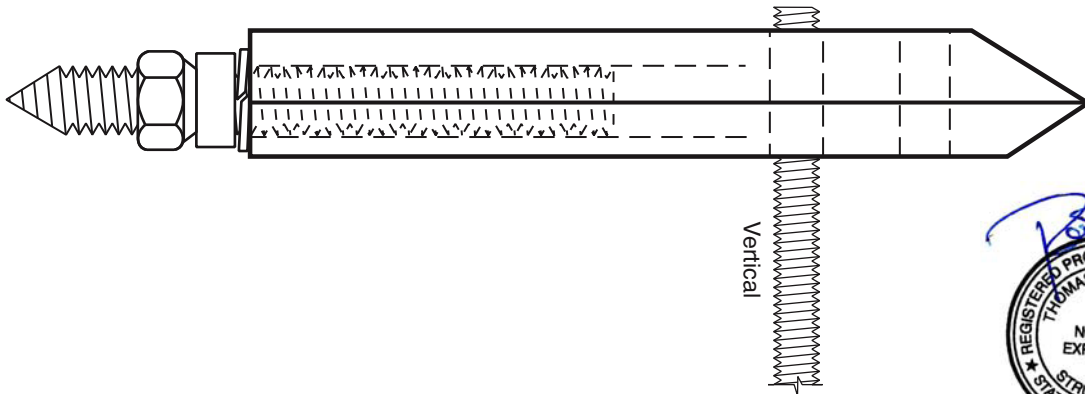
# BADGER INDUSTRIES - Part MDH1258 & MDH5834

Patent #9,850,659

537 lbs Allowable Load with Factor Of Safety = 3

806 lbs (LRFD) Load with Factor Of Safety = 2

Capacity Of MDH1258 based on seismic testing considering both tension and compression.



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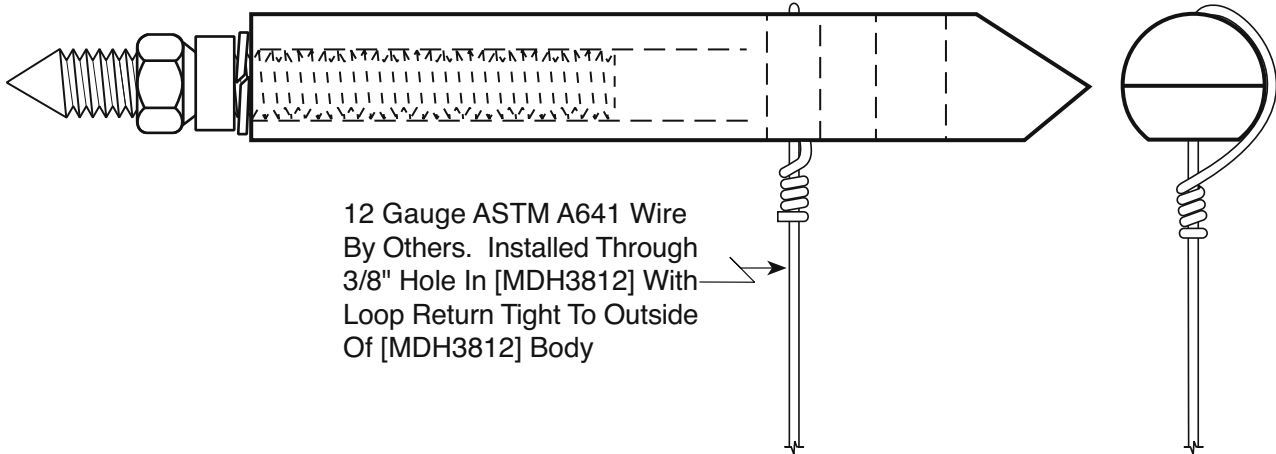
# BADGER INDUSTRIES - Part MDH3812

Patent #9,850,659

177 lbs Allowable Load with Factor Of Safety = 3

266 lbs (LRFD) Load with Factor Of Safety = 2

Capacity Of MDH3812 based on testing considering tension only.



12 Gauge ASTM A641 Wire  
By Others. Installed Through  
3/8" Hole In [MDH3812] With  
Loop Return Tight To Outside  
Of [MDH3812] Body

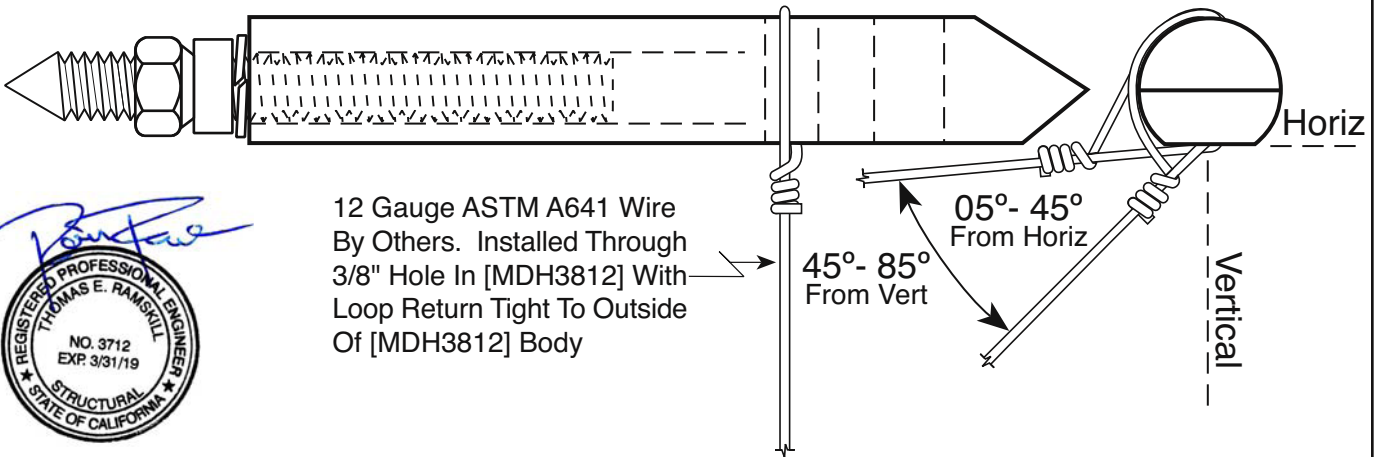
# BADGER INDUSTRIES - Part MDH3812

Patent #9,850,659

130 lbs Allowable Load with Factor Of Safety = 3

196 lbs (LRFD) Load with Factor Of Safety = 2

Capacity Of MDH3812 based on testing considering tension only.



12 Gauge ASTM A641 Wire  
By Others. Installed Through  
3/8" Hole In [MDH3812] With  
Loop Return Tight To Outside  
Of [MDH3812] Body



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# BADGER INDUSTRIES - Part SBC158

Patent Pending

NOTES:  
Capacity of beam clamp based on testing considering tension only.

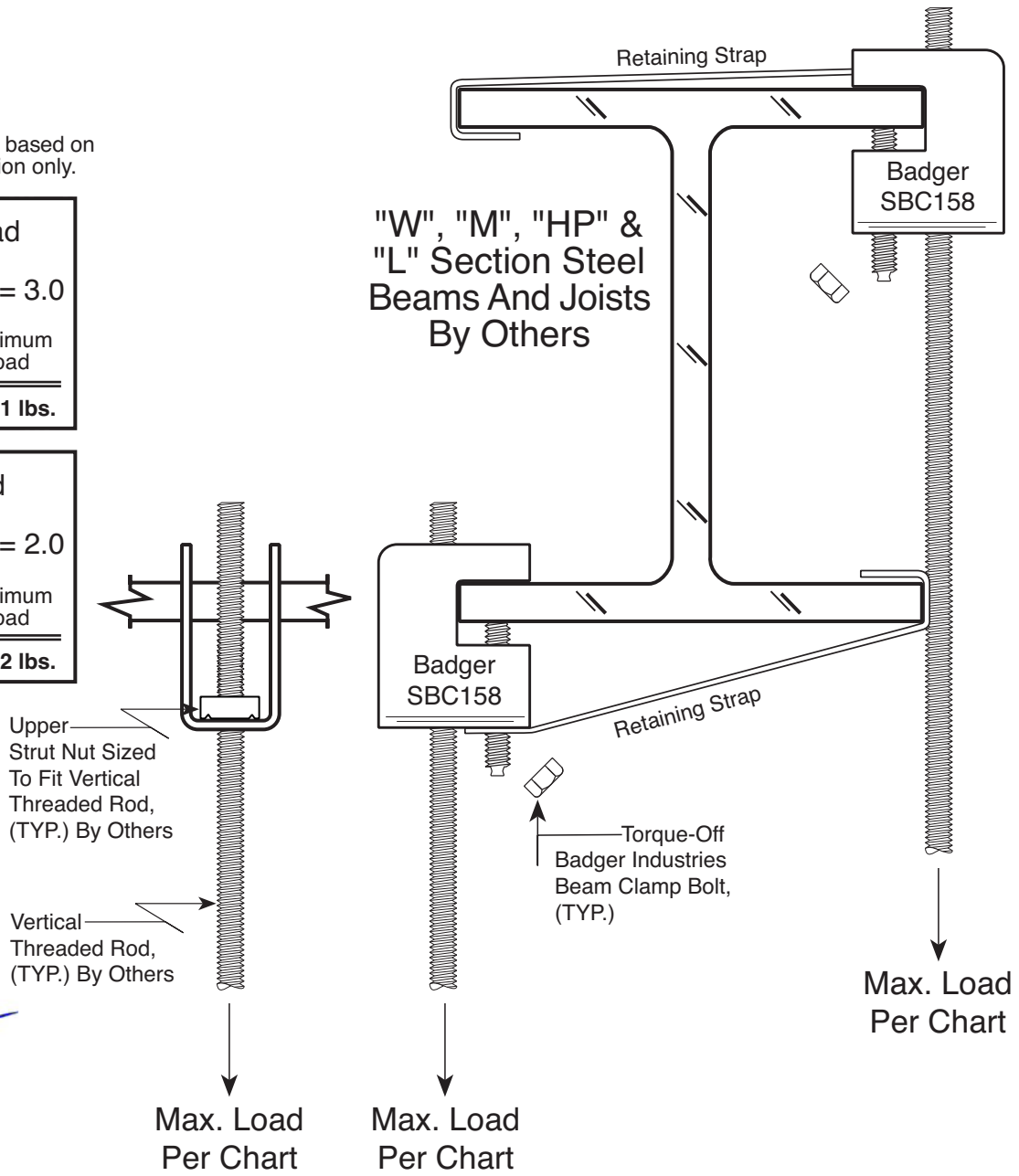
Allowable Load  
with  
Factor Of Safety = 3.0

Threaded Rod Sizes	Maximum Load
3/8", 1/2" & 5/8"	2,581 lbs.

(LRFD) Load  
with  
Factor Of Safety = 2.0

Threaded Rod Sizes	Maximum Load
3/8", 1/2" & 5/8"	3,872 lbs.

"W", "M", "HP" & "L" Section Steel Beams And Joists By Others



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# BADGER INDUSTRIES - Part SBC158

Patent Pending

"W", "M", "HP" &  
"L" Section Steel  
Beams And Joists  
By Others

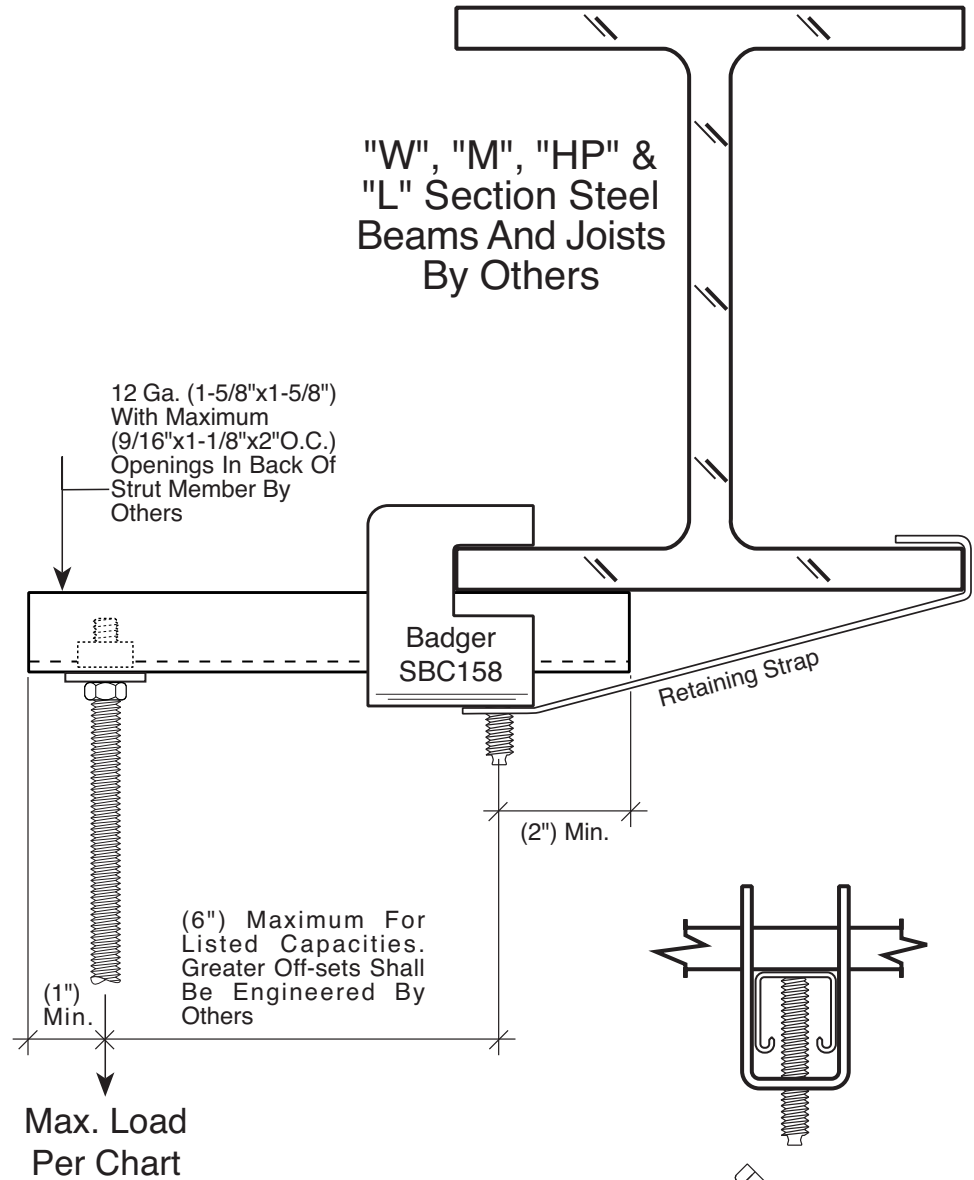
NOTES:  
Capacity of beam clamp based on  
testing considering tension only.

Allowable Load  
See Cantilevered  
Member Notice  
Detail (CMN)

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	304 lbs.

(LRFD) Load  
See Cantilevered  
Member Notice  
Detail (CMN)

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	364 lbs.



Torque-Off  
Badger Industries  
Beam Clamp Bolt,  
(TYP.)



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# BADGER INDUSTRIES - Part SBC158

Patent Pending

**NOTES:**

Capacity of beam clamp based on testing considering tension only.

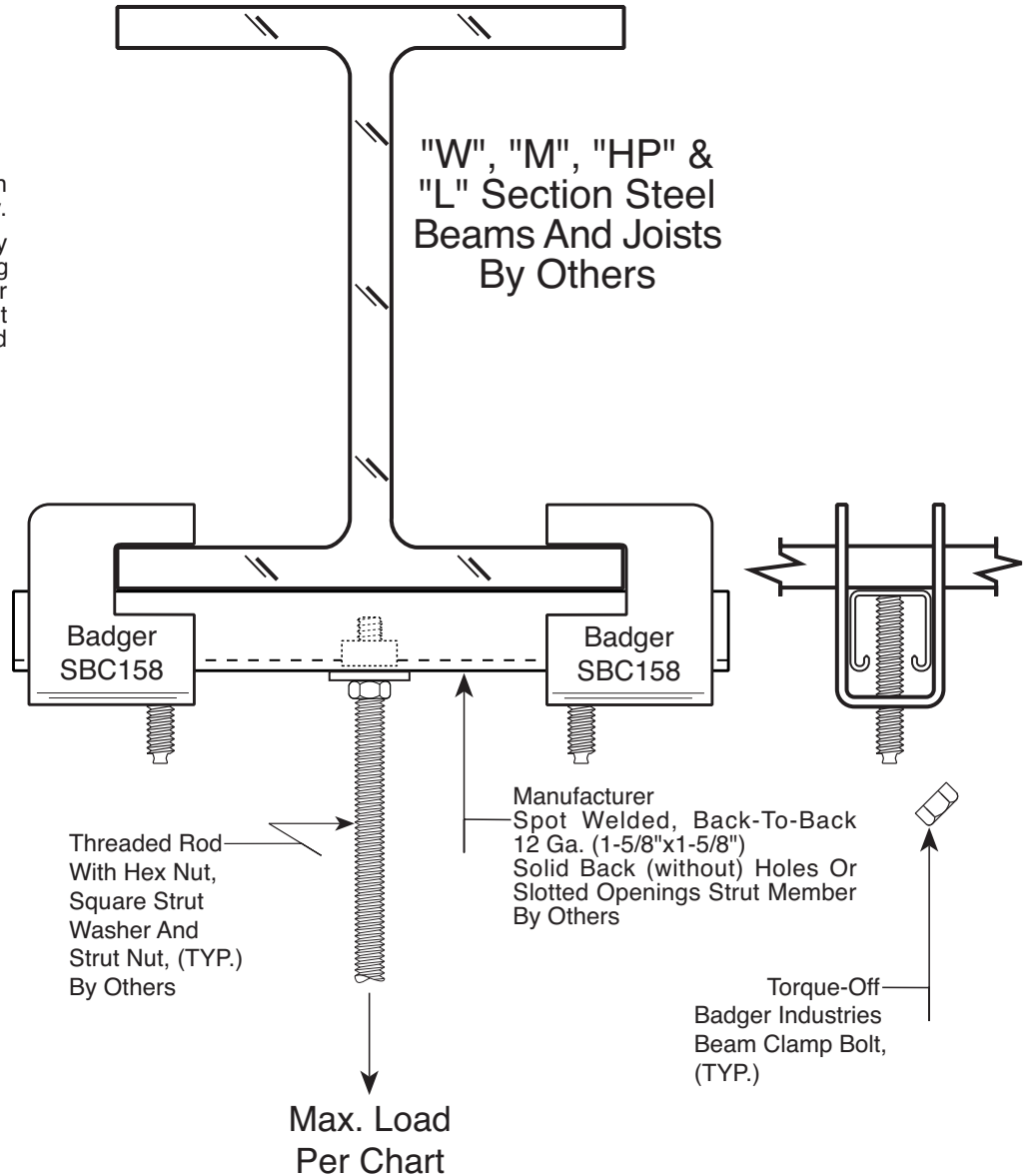
Reduce listed capacities to comply with design capacity limits, including but not limited to, strut member span length, load placement between beam clamps, threaded rod size, strut nut, etc.

Allowable Load with Factor Of Safety = 3.0

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	2,479 lbs.

(LRFD) Load with Factor Of Safety = 2.0

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	3,719 lbs.



Contact: Brad Lawhorn (714) 929-8668



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# BADGER INDUSTRIES - Part SBC158L

Patent Pending

NOTES:  
Capacity of beam clamp based on testing considering tension only.

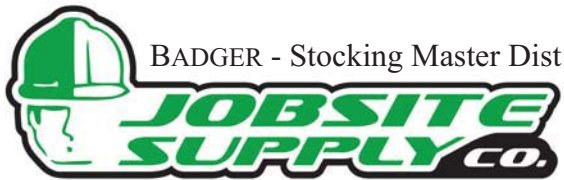
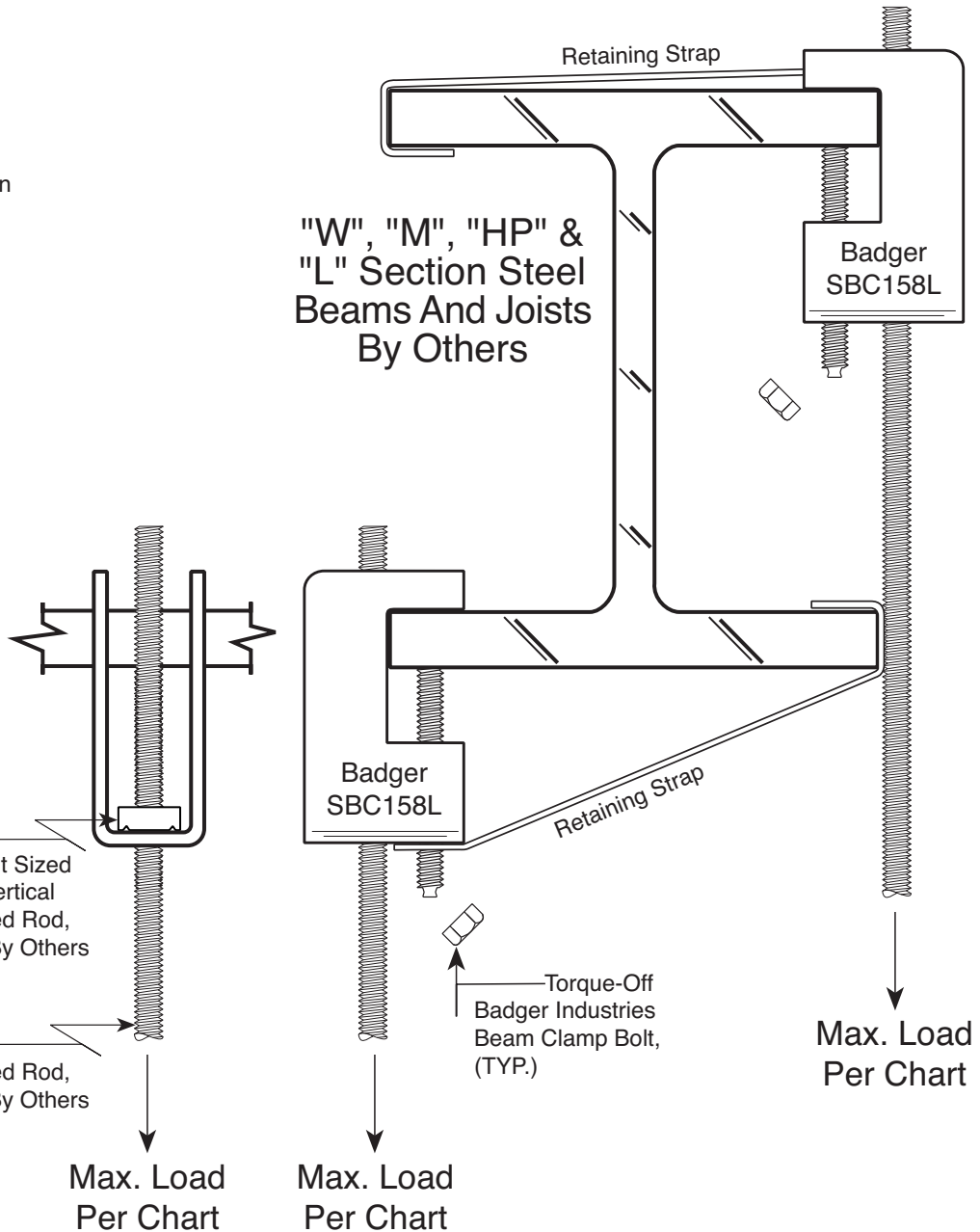
Allowable Load with Factor Of Safety = 3.0

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	3,247 lbs.

(LRFD) Load with Factor Of Safety = 2.0

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	4,871 lbs.

"W", "M", "HP" & "L" Section Steel Beams And Joists By Others



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# BADGER INDUSTRIES - Part SBC158L

Patent Pending

"W", "M", "HP" &  
"L" Section Steel  
Beams And Joists  
By Others

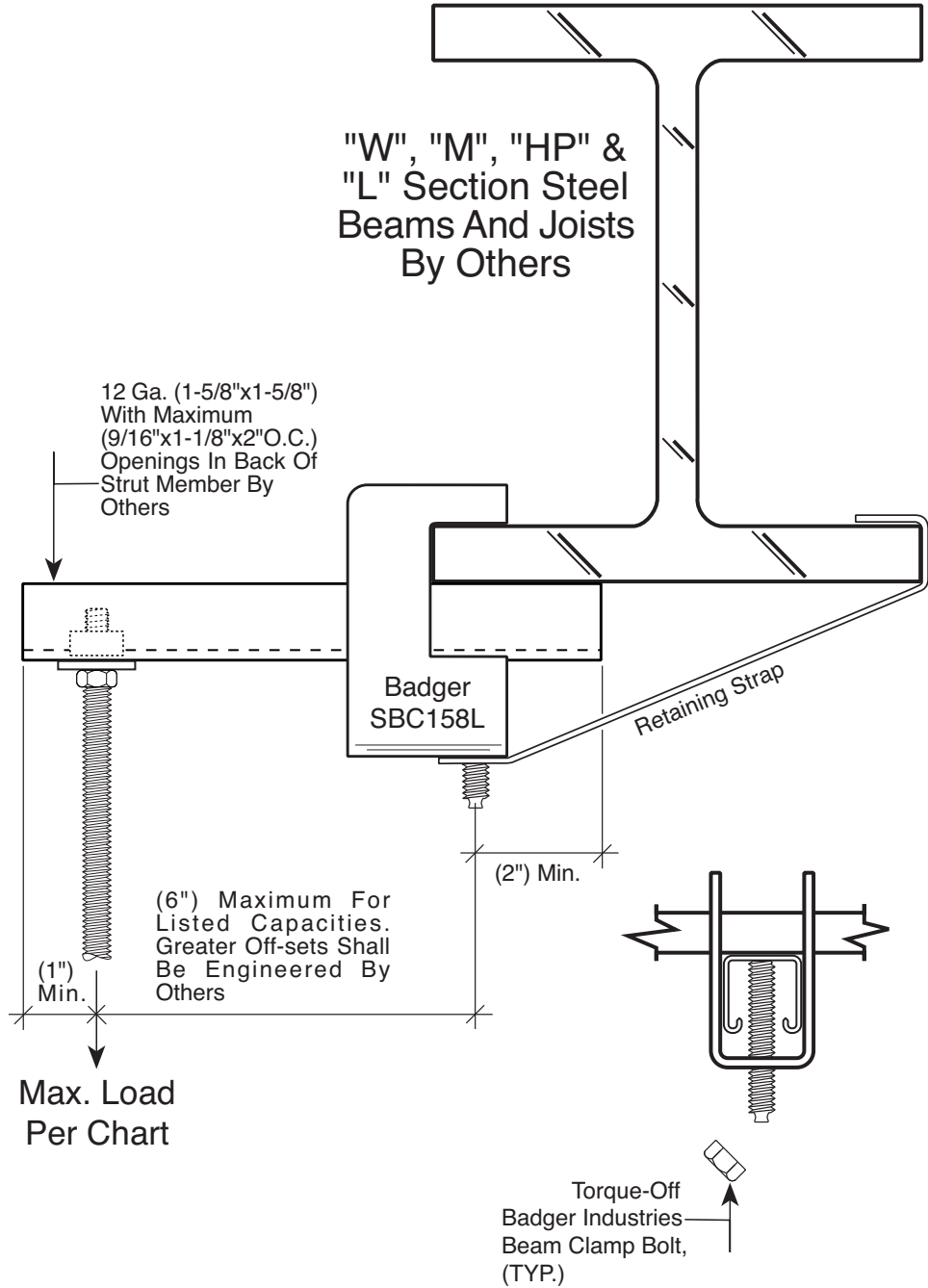
NOTES:  
Capacity of beam clamp based on  
testing considering tension only.

Allowable Load  
See Cantilevered  
Member Notice  
Detail (CMN)

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	304 lbs.

(LRFD) Load  
See Cantilevered  
Member Notice  
Detail (CMN)

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	364 lbs.



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# BADGER INDUSTRIES - Part SBC158L

Patent Pending

**NOTES:**

Capacity of beam clamp based on testing considering tension only.

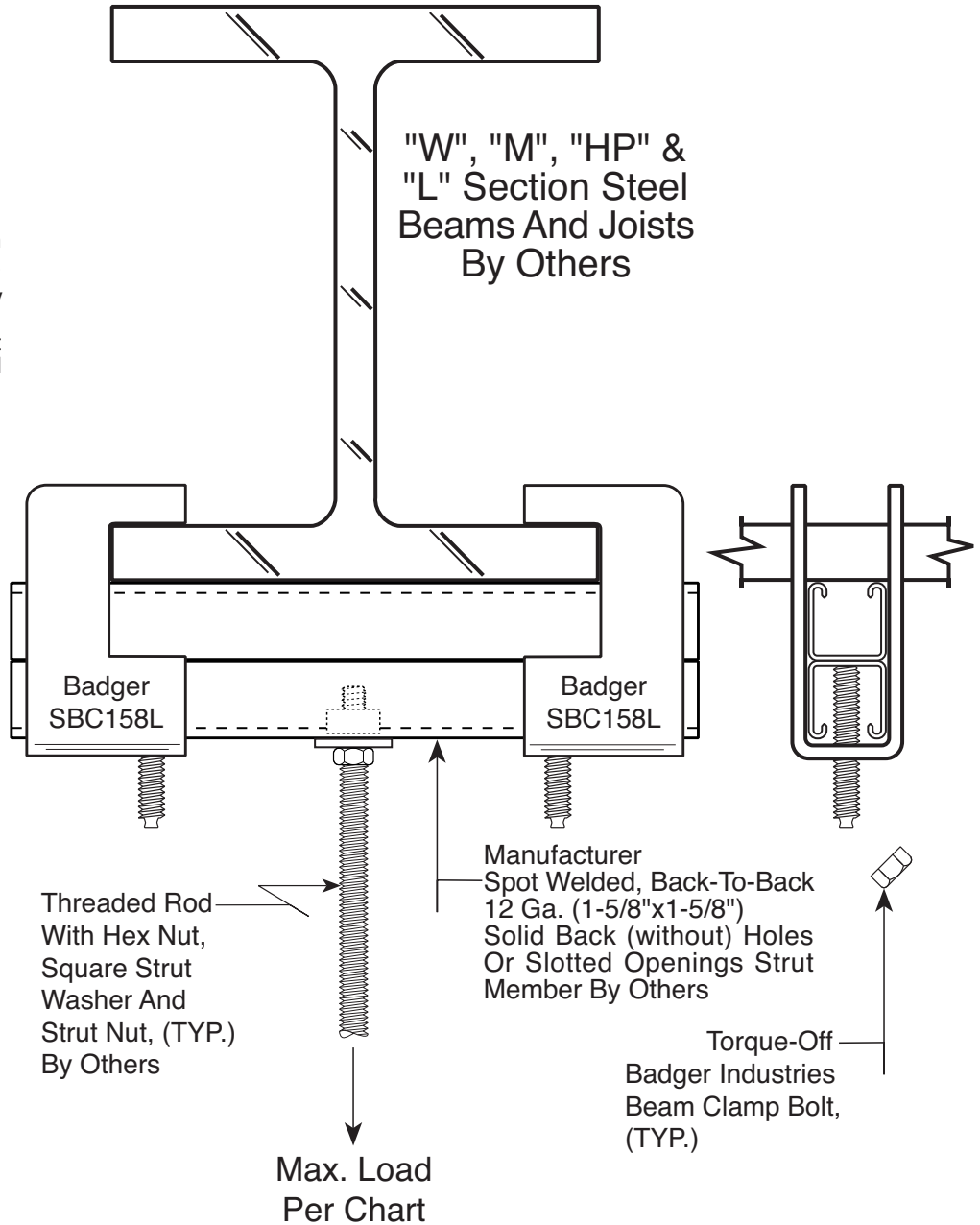
Reduce listed capacities to comply with design capacity limits, including but not limited to, strut member span length, load placement between beam clamps, threaded rod size, strut nut, etc.

**Allowable Load with Factor Of Safety = 3.0**

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	3,264 lbs.

**(LRFD) Load with Factor Of Safety = 2.0**

Threaded Rod Sizes	Maximum Load
3/8" thru 3/4"	4,896 lbs.

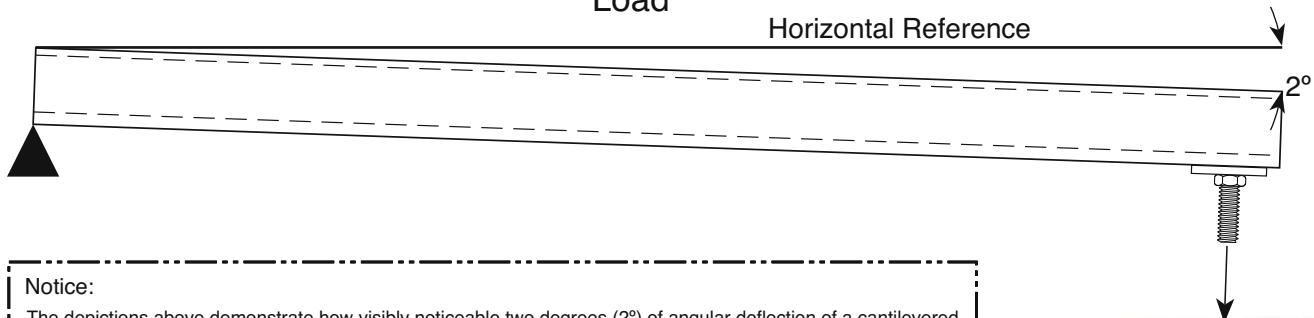
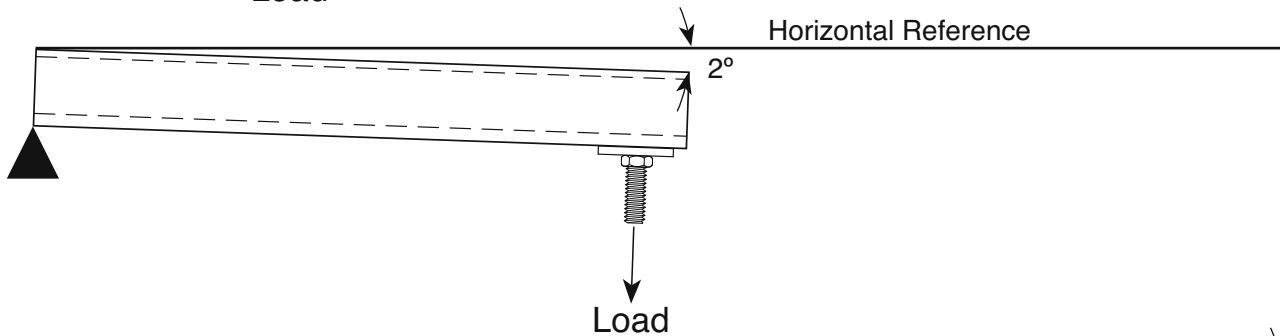
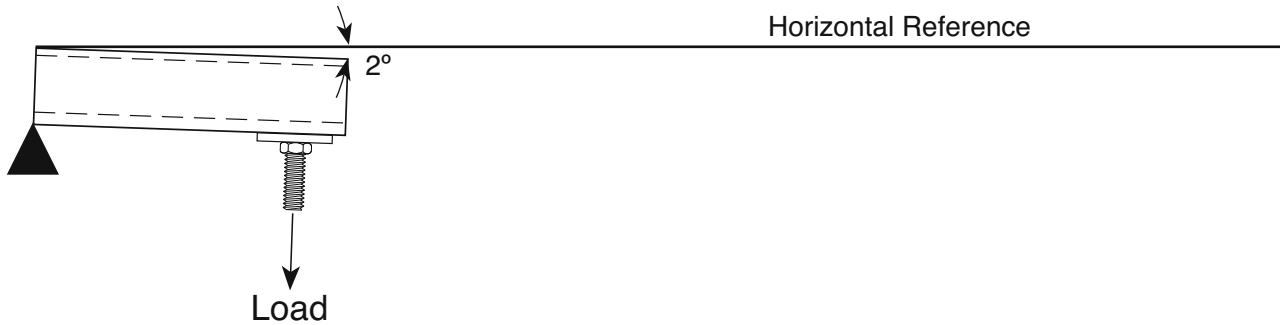


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# BADGER INDUSTRIES - (CMN) Cantilevered Member Notice



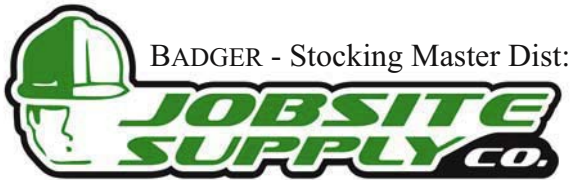
**Notice:**

The depictions above demonstrate how visibly noticeable two degrees (2°) of angular deflection of a cantilevered beam may be. The greater the length of the cantilever, the greater the linear offset from horizontal will become.

While such deflections may be structurally sound and within code allowance, they may be visibly concerning to those unfamiliar with the code calculations and standard beam deflection principles.

As such, Badger Industries Installation Details that reference this, Cantilever Member Notice Detail (CMN), have had their listed gravity capacities reduced to represent maximum allowable loads resulting in an average of one degree (1°) of angular deflection, as derived from independent lab testing.

Badger Industries believes these reductions will increase system safety factors, may prevent misalignment of the trade system, and may eliminate rod bending concerns.



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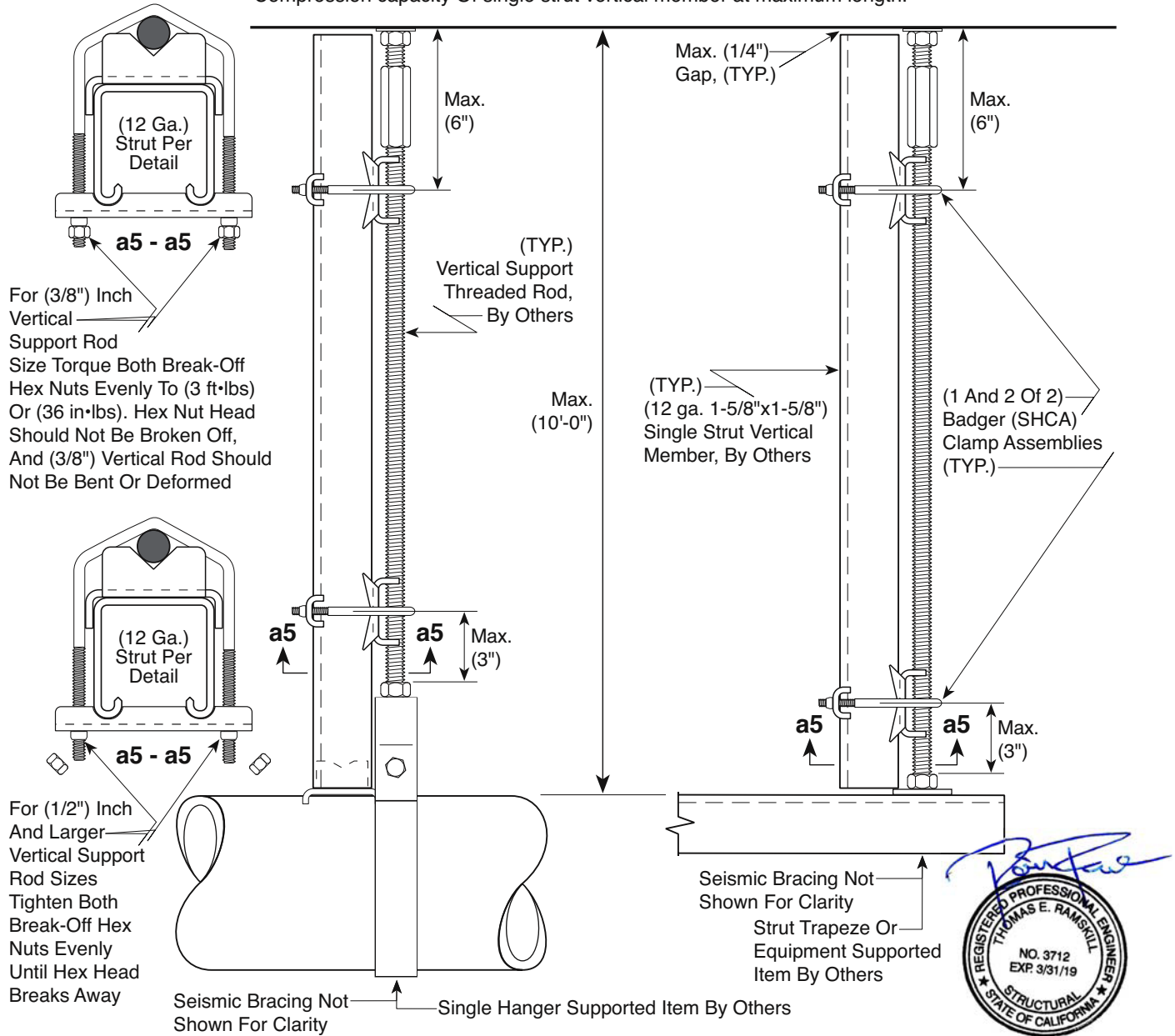
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# BADGER INDUSTRIES - Part SHCA Patent Pending

932 lbs Allowable Load with Factor Of Safety = 3

1,398 lbs (LRFD) Load with Factor Of Safety = 2

Compression capacity Of single strut vertical member at maximum length.

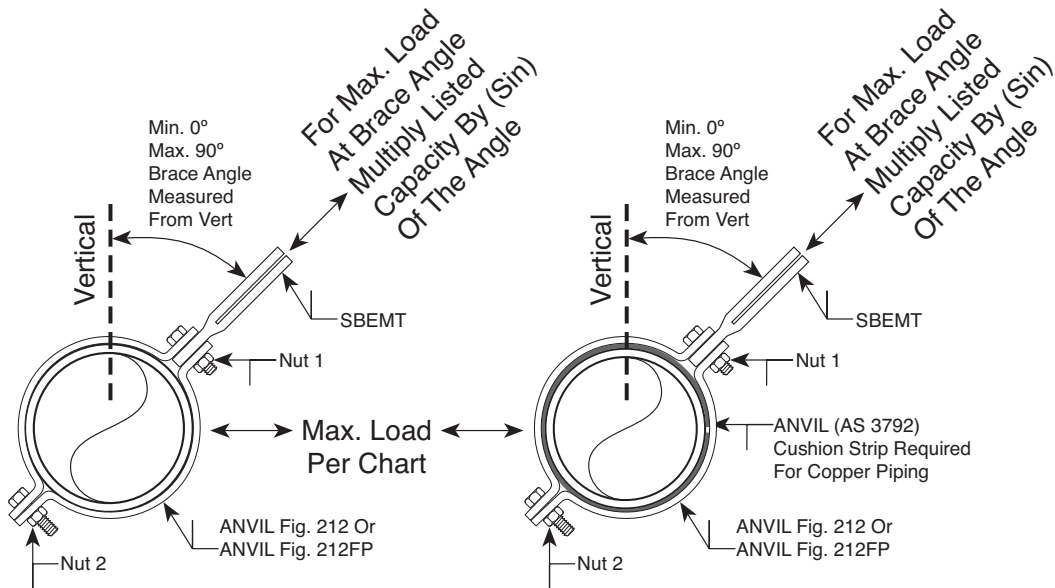


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# BADGER INDUSTRIES - Anvil FIG: 212 & FIG: 212FP



NOTES:  
Capacity based on seismic testing considering both tension and compression.  
To convert listed horizontal capacity to angle capacity multiply listed capacity by (sin) of the angle.

Transverse Brace - Allowable Load with Factor Of Safety = 3.0

ANVIL Fig. 212 Fig. 212FP Size	Piping Or Conduit Nominal Size	Steel Pipe, RMC Conduit	Cast-Iron Pipe	Copper Pipe	EMT Conduit	Sch 5 Steel Pipe
1" Fig. 212	1 in.	309 lbs.				
1-1/4" Fig. 212	1-1/4 in.	386 lbs.				
1-1/2" Fig. 212	1-1/2 in.	406 lbs.	739 lbs.			
2" Fig. 212	2 in.	650 lbs.	1,165 lbs.	650 lbs.	650 lbs.	650 lbs.
2-1/2" Fig. 212	2-1/2 in.	1,469 lbs.	Size N/A	400 lbs.	980 lbs.	980 lbs.
3" Fig. 212	3 in.	1,469 lbs.	1,008 lbs.	528 lbs.	1,255 lbs.	1,255 lbs.
3-1/2" Fig. 212	3-1/2 in.	1,213 lbs.	Size N/A	Not Tested	1,213 lbs.	1,213 lbs.
4" Fig. 212	4 in.	1,469 lbs.	1,265 lbs.	445 lbs.	742 lbs.	742 lbs.
5" Fig. 212FP	5 in.	1,469 lbs.	1,292 lbs.	409 lbs.		
6" Fig. 212FP	6 in.	1,469 lbs.	1,161 lbs.	368 lbs.		
8" Fig. 212FP	8 in.	1,574 lbs.	873 lbs.			
10" Fig. 212FP	10 in.	1,545 lbs.	900 lbs.			
12" Fig. 212FP	12 in.	978 lbs.	703 lbs.			



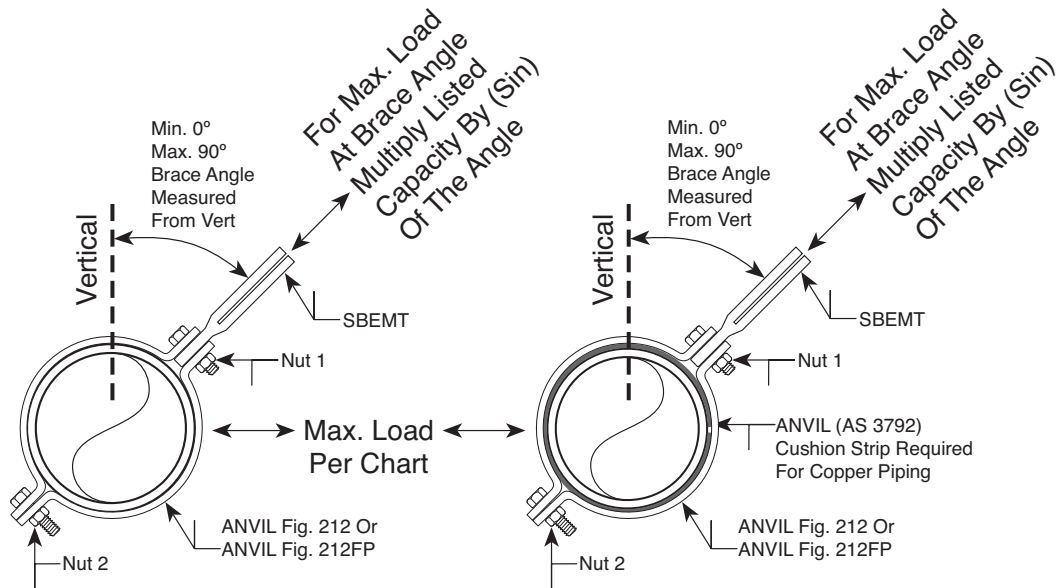
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# BADGER INDUSTRIES - Anvil FIG: 212 & FIG: 212FP



NOTES:  
Capacity based on seismic testing considering both tension and compression.  
To convert listed horizontal capacity to angle capacity multiply listed capacity by (sin) of the angle.

**Transverse Brace - (LRFD) Load with Factor Of Safety = 2.0**

ANVIL Fig. 212 Fig. 212FP Size	Piping Or Conduit Nominal Size	Steel Pipe, RMC Conduit	Cast-Iron Pipe	Copper Pipe	EMT Conduit	Sch 5 Steel Pipe
1" Fig. 212	1 in.	464 lbs.				
1-1/4" Fig. 212	1-1/4 in.	580 lbs.				
1-1/2" Fig. 212	1-1/2 in.	609 lbs.	1,108 lbs.			
2" Fig. 212	2 in.	975 lbs.	1,747 lbs.	975 lbs.	975 lbs.	975 lbs.
2-1/2" Fig. 212	2-1/2 in.	2,204 lbs.	Size N/A	601 lbs.	1,470 lbs.	1,470 lbs.
3" Fig. 212	3 in.	2,204 lbs.	1,513 lbs.	792 lbs.	1,883 lbs.	1,883 lbs.
3-1/2" Fig. 212	3-1/2 in.	1,820 lbs.	Size N/A	Not Tested	1,820 lbs.	1,820 lbs.
4" Fig. 212	4 in.	2,204 lbs.	1,897 lbs.	667 lbs.	1,114 lbs.	1,114 lbs.
5" Fig. 212FP	5 in.	2,204 lbs.	1,938 lbs.	614 lbs.		
6" Fig. 212FP	6 in.	2,204 lbs.	1,741 lbs.	553 lbs.		
8" Fig. 212FP	8 in.	2,361 lbs.	1,310 lbs.			
10" Fig. 212FP	10 in.	2,318 lbs.	1,350 lbs.			
12" Fig. 212FP	12 in.	1,467 lbs.	1,055 lbs.			

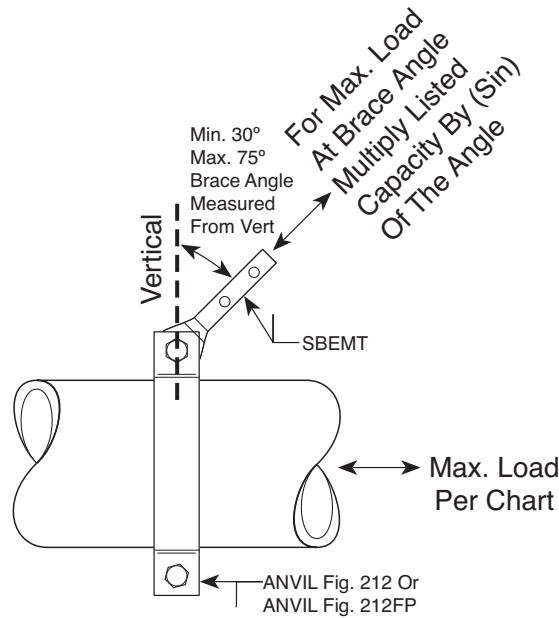


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# BADGER INDUSTRIES - Anvil FIG: 212 & FIG: 212FP



NOTES:  
 Capacity based on seismic testing considering both tension and compression.  
 To convert listed horizontal capacity to angle capacity multiply listed capacity by (sin) of the angle.

**Longitudinal Brace - Allowable Load with Factor Of Safety = 3.0**

ANVIL Fig. 212 Fig. 212FP Size	Piping Or Conduit Nominal Size	Steel Pipe, RMC Conduit	Cast-Iron Pipe	Copper Pipe	EMT Conduit	Sch 5 Steel Pipe
1" Fig. 212	1 in.	(1)				
1-1/4" Fig. 212	1-1/4 in.	(1)				
1-1/2" Fig. 212	1-1/2 in.	(1)	369 lbs.			
2" Fig. 212	2 in.	600 lbs.	582 lbs.	(1)	(1)	(1)
2-1/2" Fig. 212	2-1/2 in.	734 lbs.	Size N/A	(1)	490 lbs.	490 lbs.
3" Fig. 212	3 in.	734 lbs.	504 lbs.	(1)	628 lbs.	628 lbs.
3-1/2" Fig. 212	3-1/2 in.	553 lbs.	Size N/A	Not Tested	553 lbs.	553 lbs.
4" Fig. 212	4 in.	504 lbs.	376 lbs.	(1)	371 lbs.	371 lbs.
5" Fig. 212FP	5 in.	734 lbs.	550 lbs.	(1)		
6" Fig. 212FP	6 in.	734 lbs.	580 lbs.	(1)		
8" Fig. 212FP	8 in.	787 lbs.	436 lbs.			
10" Fig. 212FP	10 in.	707 lbs.	450 lbs.			
12" Fig. 212FP	12 in.	489 lbs.	351 lbs.			

(1) Design and located transverse bracing at changes in direction to provided longitudinal restraint.

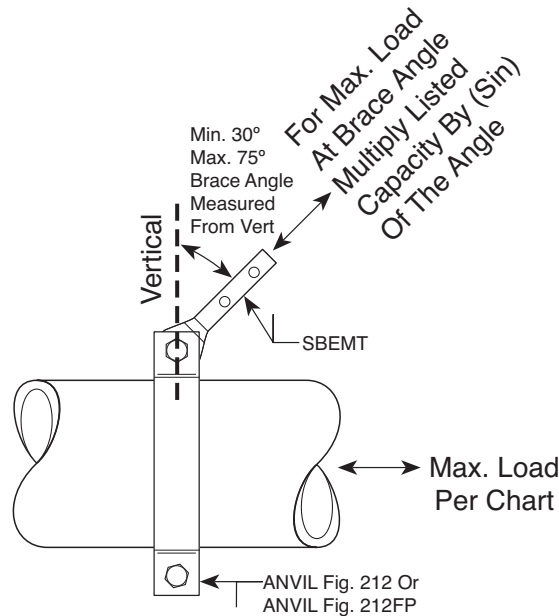


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# BADGER INDUSTRIES - Anvil FIG: 212 & FIG: 212FP



NOTES:  
 Capacity based on seismic testing considering both tension and compression.  
 To convert listed horizontal capacity to angle capacity multiply listed capacity by (sin) of the angle.

Longitudinal Brace - (LRFD) Load with Factor Of Safety = 2.0						
ANVIL Fig. 212 Fig. 212FP Size	Piping Or Conduit Nominal Size	Steel Pipe, RMC Conduit	Cast-Iron Pipe	Copper Pipe	EMT Conduit	Sch 5 Steel Pipe
1" Fig. 212	1 in.	(1)				
1-1/4" Fig. 212	1-1/4 in.	(1)				
1-1/2" Fig. 212	1-1/2 in.	(1)	554 lbs.			
2" Fig. 212	2 in.	900 lbs.	874 lbs.	(1)	(1)	(1)
2-1/2" Fig. 212	2-1/2 in.	1,102 lbs.	Size N/A	(1)	735 lbs.	735 lbs.
3" Fig. 212	3 in.	1,102 lbs.	756 lbs.	(1)	942 lbs.	942 lbs.
3-1/2" Fig. 212	3-1/2 in.	829 lbs.	Size N/A	Not Tested	829 lbs.	829 lbs.
4" Fig. 212	4 in.	75 lbs.	564 lbs.	(1)	557 lbs.	557 lbs.
5" Fig. 212FP	5 in.	1,102 lbs.	825 lbs.	(1)		
6" Fig. 212FP	6 in.	1,102 lbs.	871 lbs.	(1)		
8" Fig. 212FP	8 in.	1,181 lbs.	655 lbs.			
10" Fig. 212FP	10 in.	1,061 lbs.	675 lbs.			
12" Fig. 212FP	12 in.	734 lbs.	527 lbs.			

(1) Design and located transverse bracing at changes in direction to provided longitudinal restraint.



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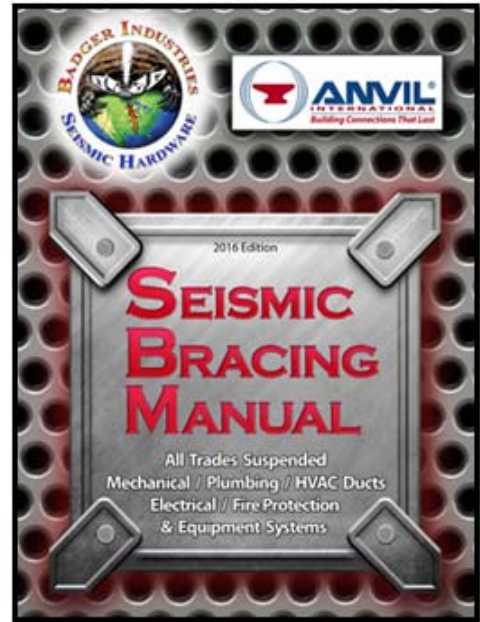
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