



**BADGER  
INDUSTRIES**

**NUSIG**

[www.NUSIG.com](http://www.NUSIG.com)

# **SEISMIC BRACING MANUAL**

**ALL TRADES SUSPENDED  
MECHANICAL / PLUMBING / HVAC DUCTS  
ELECTRICAL / FIRE PROTECTION  
& EQUIPMENT SYSTEMS**

2019 Edition



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# GENERAL NOTES



- (GN1). Neither NUSIG nor Badger Industries is responsible for engineering or detailing the use of NUSIG, Badger Industries and/or other products and components for a specific project and/or application. All such engineering is to be performed by an engineer, retained by others, who is licensed to perform the necessary engineering, and who is insured to provide these "Responsible Engineer" engineering services. All design submittals specifying NUSIG / Badger Industries products and components must be sealed and signed by the Responsible Engineer, and submitted for review and approval to the project S.E.O.R. (Structural Engineer Of Record) and when required, the A.H.J. (Authority Having Jurisdiction).

The details, data, information, capacities, etc., within this document are not necessarily indicative of actual project specific application usage conditions. The usage, design, engineering, installation, inspection, etc., of construction assemblies using NUSIG and/or Badger Industries components shall take into account the limits of the weakest components and conditions within the overall assembly, including but not limited to the building structure. Such shall be the responsibility of non NUSIG and/or non Badger Industries others.

NUSIG / Badger Industries documents are subject to change without notice.

#### LIMITATION OF LIABILITY

To the fullest extent permissible by law, NUSIG, Badger Industries, Anvil International, LLC and, their respective owners, officers, directors, employees, agents and representatives (collective, the "Parties") excludes all liability except liability that is directly attributable to the willful negligence of the Parties. Should the Parties be held liable, under any theory, the aggregate liability of all of them is limited to the total purchase price of the Parties products that caused the injury or loss. In addition to the foregoing, THE PARTIES ARE IN NO EVENT LIABLE FOR ANY LOSS OF BUSINESS OR PROFITS, LOSS OF USE, LOSS OF OPPORTUNITIES, DOWNTIME OR DELAY, LABOR, REPAIR OR MATERIAL COST OR ANY OTHER SIMILAR OR DISSIMILAR, INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE INCURRED BY BUYER. By purchasing the Parties products, you agree to this limitation of liability on your behalf, and on behalf of the person or organization purchasing the products.

#### WARRANTY

NUSIG and/or Badger Industries products are warranted to be free from defects in material and workmanship at the time of shipment. NO OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF ANY NUSIG AND/OR BADGER INDUSTRIES PRODUCTS. Products claimed to be defective or nonconforming must be identified in writing and returned (within 30 calendar days) to NUSIG / Badger Industries for inspection. Notice of a warranty claim within this 30 day period is a condition precedent to this Warranty. In no event shall NUSIG / Badger Industries be responsible if the products have been improperly stored, improperly used, abused or misused. NUSIG / Badger Industries will, at its option, either repair or replace defective or nonconforming products for which it is responsible or return the purchase price to the BUYER. THE FOREGOING STATES BUYER'S EXCLUSIVE REMEDY FOR ANY BREACH OF THE NUSIG AND/OR BADGER INDUSTRIES WARRANTY AND FOR ANY CLAIM, WHETHER SOUNDING IN CONTRACT, TORT OR NEGLIGENCE, FOR LOSS OR INJURY CAUSED BY THE SALE OR USE OF ANY NUSIG AND/OR BADGER INDUSTRIES PRODUCT(S).

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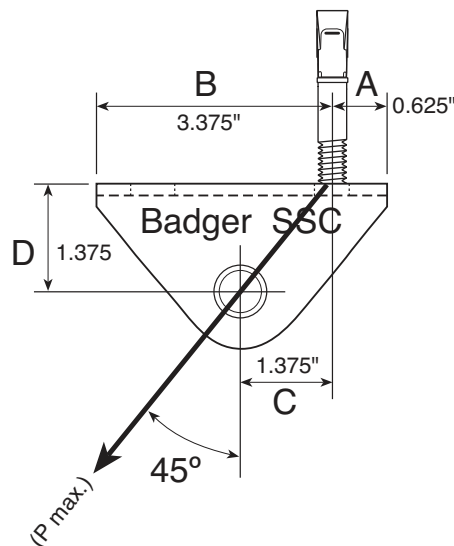
(GN1). Continued:  
**ANVIL PRODUCTS**  
 Additional information on Anvil products, including warranties can be found at [www.anvilintl.com](http://www.anvilintl.com)

**WARNING**

The improper use, misuse and/or misapplication of these documents and/or NUSIG / Badger Industries products may cause product malfunction, property damage, bodily injury and death.

(GN2). The project S.E.O.R., shall qualify that the building structure capacity is adequate to handle the design demand forces. Caution shall be used when reviewing the usability of this document singularly or in combination with other connections / loads / forces / etc., so that the building structure and/or other connections are not overloaded or compromised.

(GN3). Connections to the building structure and their associated component assembly configurations must account for the standard engineering practices of geometry prying and eccentricity. These can greatly effect the overall capacity of a given anchorage / structure connection assembly and the accountable design demand point loading to the building structure. All applicable geometry prying and eccentricity shall be accounted by the Responsible Engineer sealing and signing submittals using these documents. See geometry prying example below. Applicable individual components and/or component assemblies may differ from the depicted example.



$$\text{Eccentricity @ } 45^\circ: e = 1.375 - (1.375 * \tan 45^\circ) = 0.00$$

$$T_x = P \cos 45^\circ * \left( \frac{e + 0.625}{0.625} \right) = 0.707P$$

$$V_x = P \sin 45^\circ = 0.707P$$

interaction eqn. in terms of P max, T allow & V allow

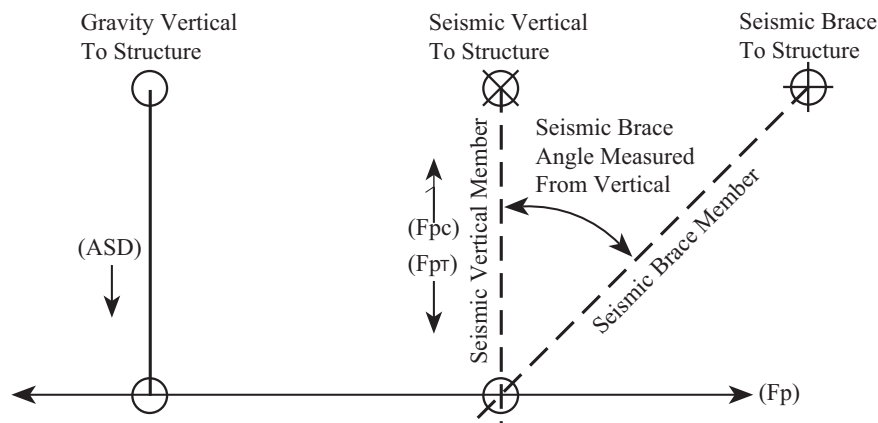
$$P \text{ max} = \frac{1.2}{\left[ \frac{0.707}{T_{\text{allow}} \text{ (LRFD)}} + \frac{0.707}{V_{\text{allow}} \text{ (LRFD)}} \right]}$$

Equation Accounts For ACI 318 Combined Tension And Shear Loads Utilization Check.

Continued Next Page.



- (GN4). Concrete anchors identified within a given detail shall not be substituted. Concrete anchorage spacing coordination requirements for cast-in-place inserts and/or drill-in anchors and that required for all adjacent anchorages is an all trades / all usage, seismic and non-seismic design, installation and inspection responsibility that shall be maintained. When installing post installed anchors into non-prestressed reinforced concrete, use care and caution to avoid cutting or damaging reinforcing. When installing anchors into prestressed concrete, locate the prestressed tendons by using a non-destructive method and do not cut or damage the tendons during installation.
- (GN5). Installations that require a specified torque shall be tightened using tools / devices properly calibrated for such use. Do not over tighten during installation and/or testing. Installations that require locking hex nuts can be performed using double back-to-back regular hex nuts.
- (GN6). Welding shall be performed by a certified welder, and in accordance with the latest edition of the structural welding code of the American Welding Society. After welding check for proper installation tightness / torque on assemblies that were subjected to welding heat. Welds shall use minimum E70xx electrode. Capacitor discharge stud welding shall comply with manufacturer requirements. Welding inspections and testing shall be as required by the project S.E.O.R.
- (GN7). Material specifications including but not limited to threaded rods, bolts, hex nuts, coupler nuts, etc., and additional project / application specific general notes shall be engineered and provided by the Responsible Engineer sealing and signing submittals using these documents.
- (GN8). Selected NUSIG / Badger Industries and Anvil components have been identified as "(No Substitutions)", and the substitution of any such components is not allowed.
- (GN9). The maximum seismic vertical, seismic transverse and/or seismic longitudinal brace spacing of a given item or trade system shall be as engineered by others. Brace angles referenced within this document are measured from vertical, unless indicated otherwise.
- (GN10). NUSIG / Badger Industries component capacities references.  
 (F<sub>pc</sub>) = Seismic Vertical Compression, (F<sub>pt</sub>) = Seismic Vertical Tension.  
 (F<sub>p</sub>) = Seismic Horizontal, (ASD) = Gravity Vertical Tension.



Continued Next Page.



- (GN11). When the seismic vertical components and/or assemblies identified within this document are used for gravity only and/or combination gravity plus seismic design demand usage, the gravity (ASD) design demand load shall not exceed the identified gravity (ASD) capacity identified within this document.
- (GN12). A load path for the seismic design demand force shall be maintained. Thus components, including but not limited to, roller hangers, insulation inserts, etc., shall not be used within the design and/or assembly of seismic vertical hangers and/or seismic transverse or longitudinal bracing, unless such components have been seismically tested and/or engineered by others for such seismic assembly conditions.
- (GN13). Installer shall clean seismic hardware and trade systems of dirt, water, oils, greases, lubricants, fluxes, etc., prior to assembly.
- (GN14). Do not brace to different parts of the building that may act differently during an earthquake, unless bracing and trade system have been designed to account for differential movements.
- (GN15). Bracing shall not cross through a building seismic joint. When trade systems pass through a building seismic joint, flexibility shall be designed into the trade system to accommodate the movements (relative displacements as determined by the project S.E.O.R.) of the building seismic joint the trade system is passing through. On each side of the building seismic joint the trade system shall be transversely braced within (24") inches of the flexible portion of the trade system. Bracing shall not be connected to the flexible portions of the trade system. Said transverse and/or the associated longitudinal bracing for the trade system shall be designed to account for the weight and operating forces of the flexible trade system. Deviation to the (24") shall be engineered on an application specific basis.
- (GN16). Construction, inspections, reviews, verifications, maintenance, etc., of any and all items / designs / conditions / etc., including but not limited to qualification of the building structure, anchorage coordination, non-braced components, brace installations, and continued use, repair, replacement and/or abandonment of existing installations before and/or after any and all events (seismic or otherwise), etc., is by others.

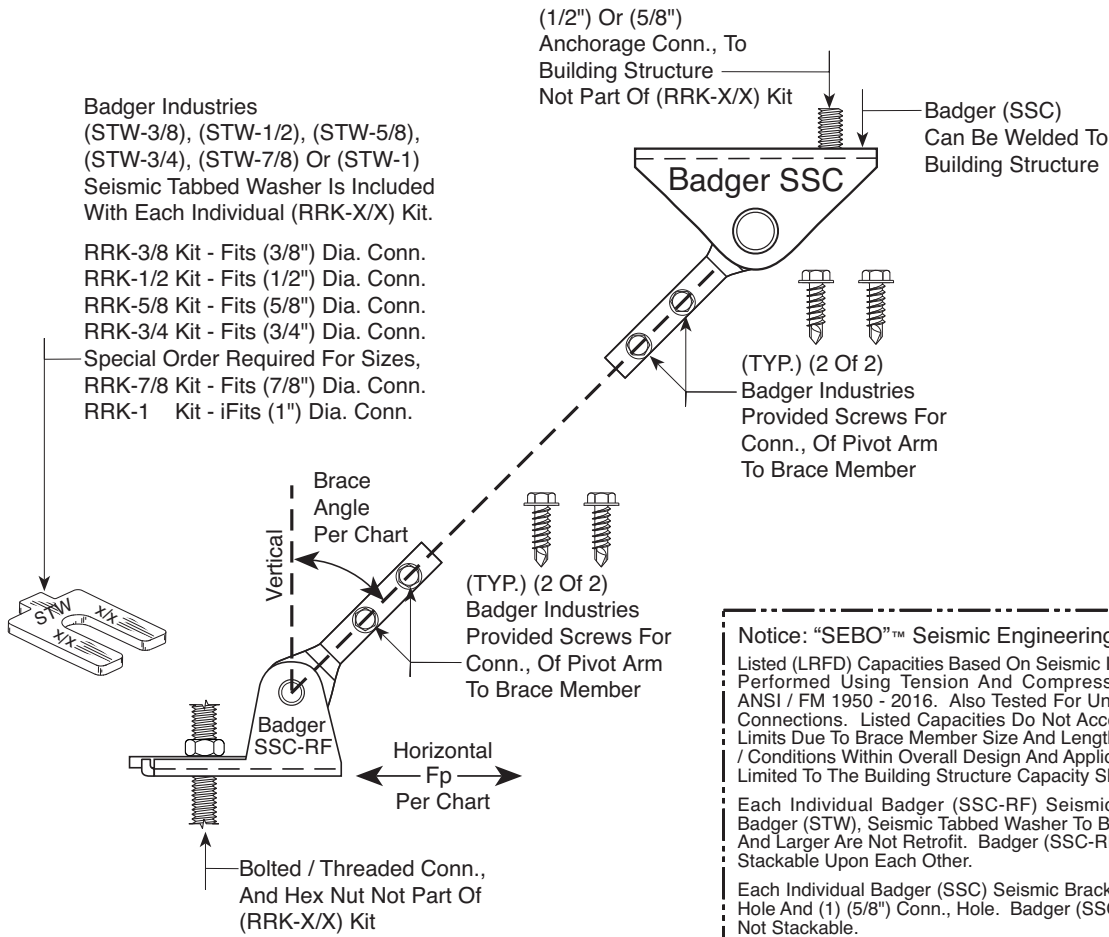
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**BADGER INDUSTRIES**  
**SEISMIC HARDWARE**  
**CAPACITY DETAILS**





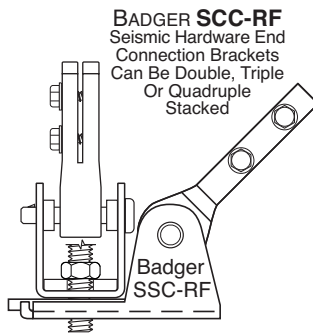
~ BADGER INDUSTRIES ~  
[RRK-3/8, RRK-1/2, RRK-5/8, RRK-3/4, RRK-7/8, RRK-1]  
Seismic Hardware Kits



**Notice: "SEBO"™ Seismic Engineering By Others**  
Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension And Compression Cyclic Loads Per ANSI / FM 1950 - 2016. Also Tested For Unsupported Cantilevered Connections. Listed Capacities Do Not Account For Capacity Load Limits Due To Brace Member Size And Length. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Each Individual Badger (SSC-RF) Seismic Bracket Requires (1) Badger (STW), Seismic Tabbed Washer To Be Installed. Sizes (3/4") And Larger Are Not Retrofit. Badger (SSC-RF) Seismic Brackets Are Stackable Upon Each Other.

Each Individual Badger (SSC) Seismic Bracket Has (1) (1/2") Conn., Hole And (1) (5/8") Conn., Hole. Badger (SSC) Seismic Brackets Are Not Stackable.



~ BADGER INDUSTRIES ~  
Detail (RRK-X/X Kits)

BADGER INDUSTRIES Seismic Hardware Kit Numbers	Brace Angle From Vertical			
	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	76° to 90° Maximum Fp (LRFD)
<b>RRK-3/8, RRK-1/2, RRK-5/8, RRK-3/4, RRK-7/8, RRK-1</b>	<b>1,469 lbs.</b>	<b>2,018 lbs.</b>	<b>1,812 lbs.</b>	<b>1,726 lbs.</b>

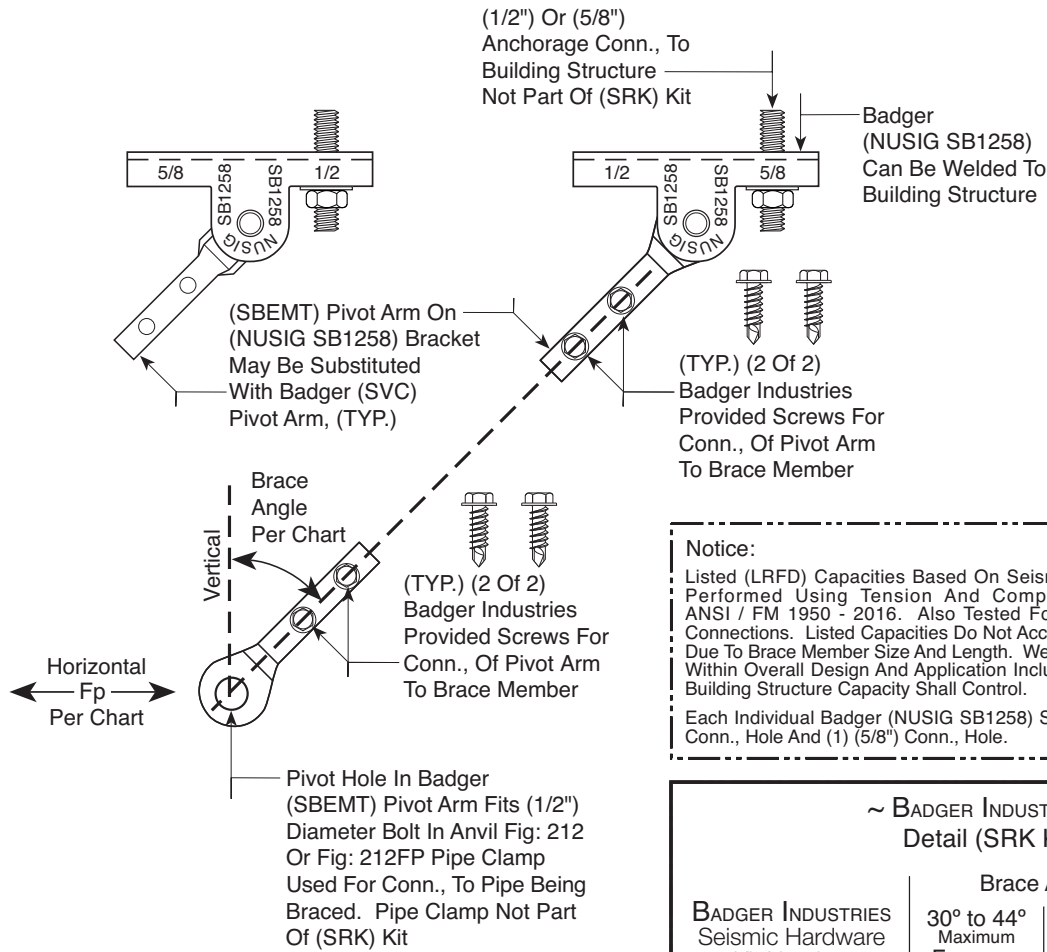
RRK-X/X Kits

~ BADGER INDUSTRIES ~  
RRK-X/X Kits Seismic Hardware - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ **BADGER INDUSTRIES** ~  
**[SRK]**  
Seismic Hardware Kit

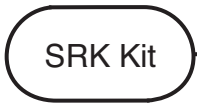


**Notice:**  
Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension And Compression Cyclic Loads Per ANSI / FM 1950 - 2016. Also Tested For Unsupported Cantilevered Connections. Listed Capacities Do Not Account For Capacity Load Limits Due To Brace Member Size And Length. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Each Individual Badger (NUSIG SB1258) Seismic Bracket Has (1) (1/2") Conn., Hole And (1) (5/8") Conn., Hole.

~ **BADGER INDUSTRIES** ~  
**Detail (SRK Kit)**

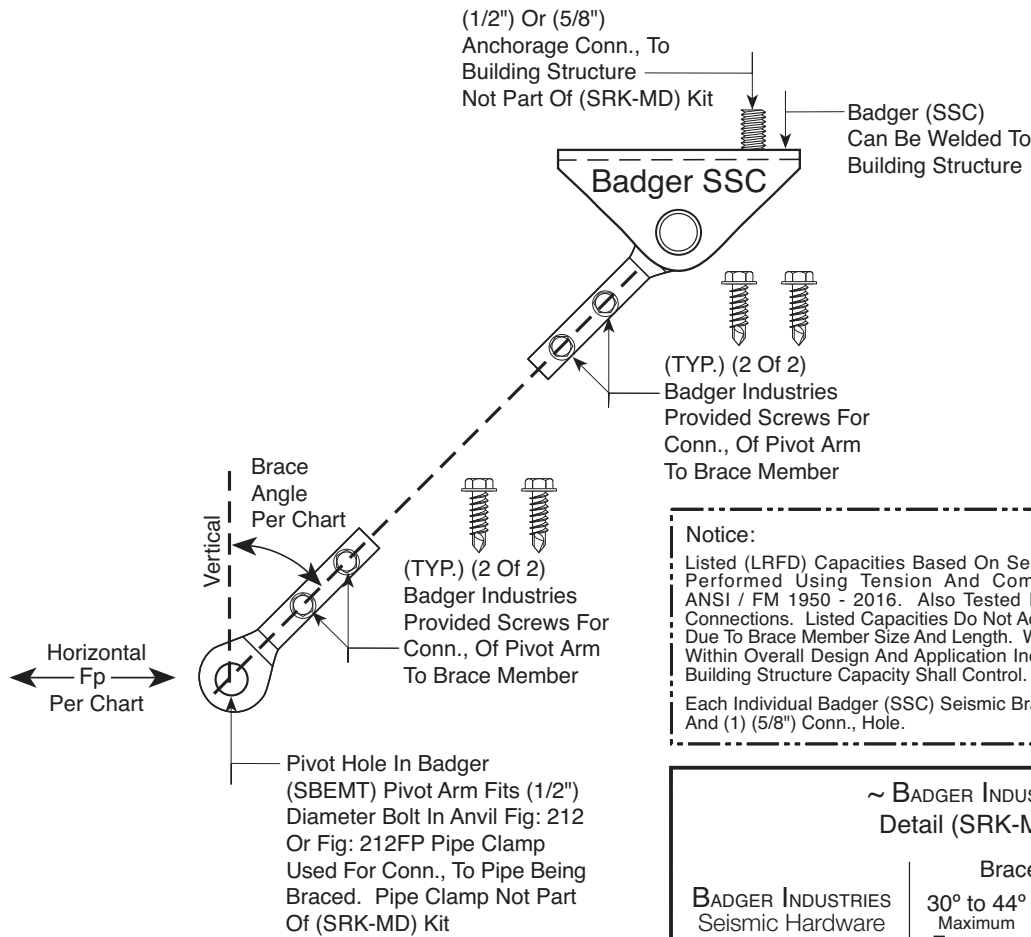
BADGER INDUSTRIES Seismic Hardware Kit Number	Brace Angle From Vertical		
	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)
<b>SRK</b>	<b>1,174 lbs.</b>	<b>1,145 lbs.</b>	<b>1,102 lbs.</b>

~ **BADGER INDUSTRIES** ~  
**SRK Kit Seismic Hardware - Design Demand Capacity Limits**  
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





~ BADGER INDUSTRIES ~  
**[SRK-MD]**  
Seismic Hardware Kit



~ BADGER INDUSTRIES ~  
Detail (SRK-MD Kit)

BADGER INDUSTRIES Seismic Hardware Kit Number	Brace Angle From Vertical		
	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)
<b>SRK-MD</b>	<b>1,574 lbs.</b>	<b>2,380 lbs.</b>	<b>2,436 lbs.</b>

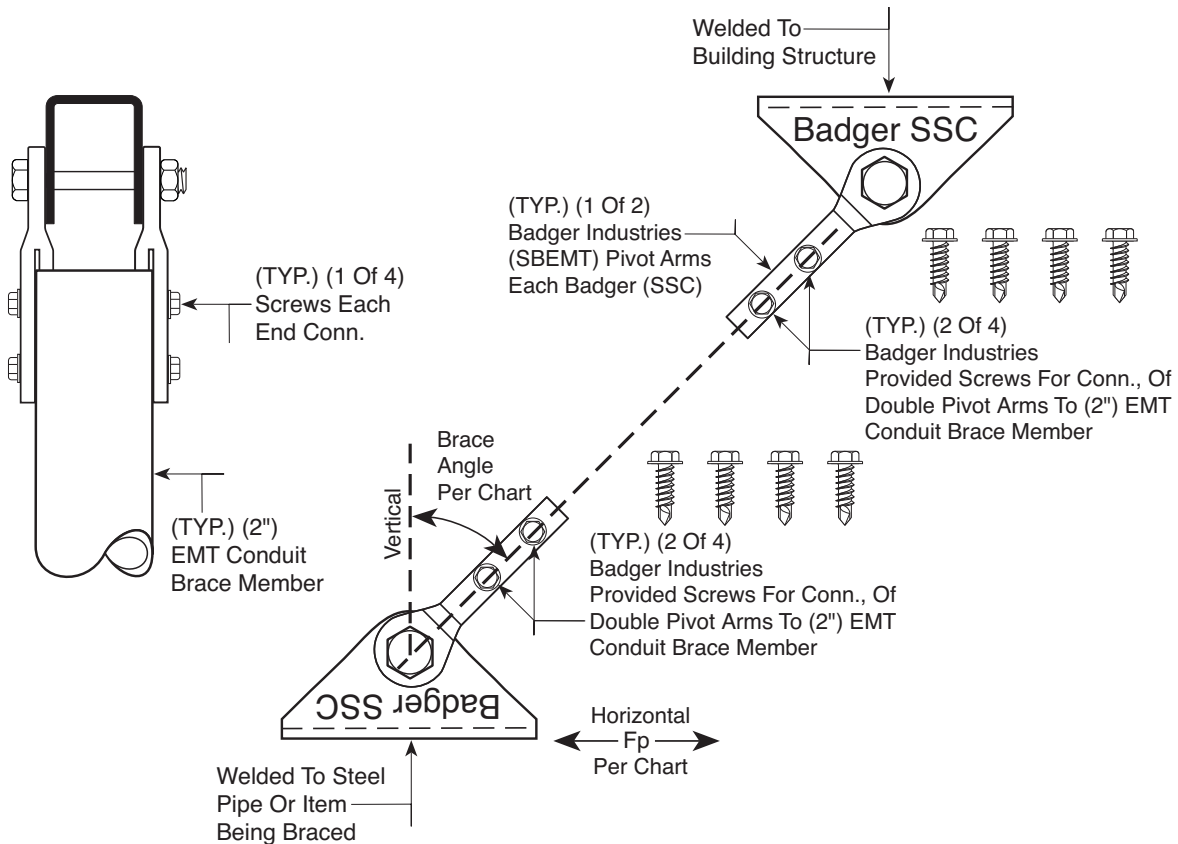
**SRK-MD Kit**

~ BADGER INDUSTRIES ~  
**SRK-MD Kit Seismic Hardware - Design Demand Capacity Limits**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~  
**[SRK-HD]**  
Seismic Hardware Kit



~ BADGER INDUSTRIES ~  
Detail (SRK-HD Kit)

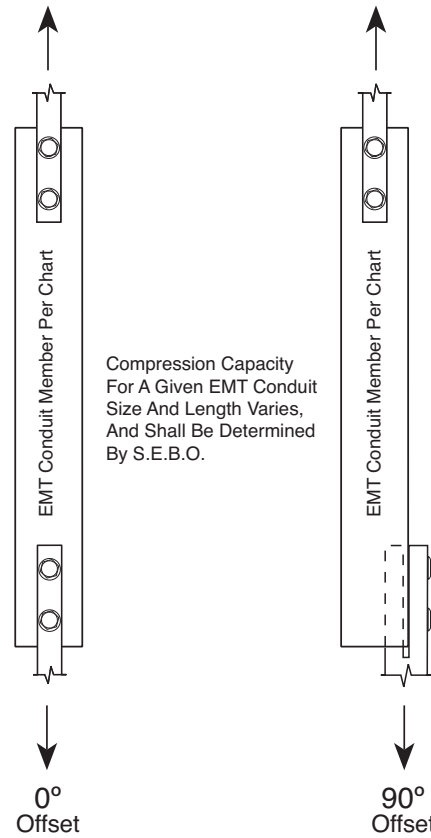
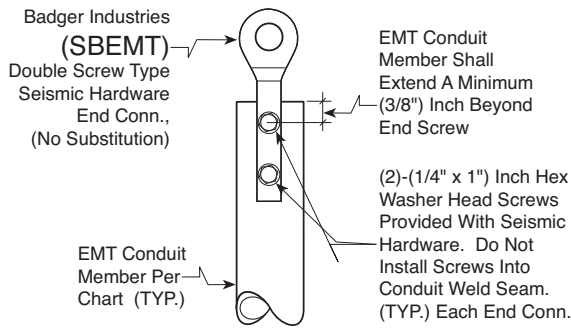
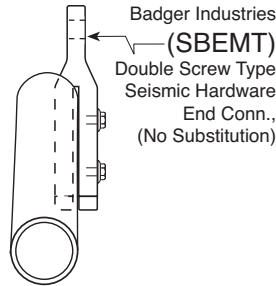
BADGER INDUSTRIES Seismic Hardware Kit Number	Brace Angle From Vertical		
	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	0° Maximum Fp (LRFD)
<b>SRK-HD</b>	<b>2,626 lbs.</b>	<b>3,714 lbs.</b>	<b>5,253 lbs.</b>

**Notice:**  
Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension And Compression Cyclic Loads Per ANSI / FM 1950 - 2016. Also Tested For Unsupported Cantilevered Connections. Listed Capacities Do Not Account For Capacity Load Limits Due To EMT Conduit Brace Member Size And Length. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

**SRK-HD Kit**

~ BADGER INDUSTRIES ~  
**SRK-HD Kit Seismic Hardware - Design Demand Capacity Limits**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~  
Detail (SBEMT)

BADGER INDUSTRIES Seismic Hardware Part Number	EMT Conduit Member Size	End-To-End Alignment	
		0° Offset (LRFD)	90° Offset (LRFD)
<b>(SBEMT)</b> Double Screw End Connection	3/4" EMT Conduit	<b>1,875 lbs.</b>	<b>1,295 lbs.</b>
	1" EMT Conduit	<b>2,265 lbs.</b>	<b>2,040 lbs.</b>
	1-1/4" EMT Conduit	<b>3,370 lbs.</b>	<b>2,740 lbs.</b>
	1-1/2" EMT Conduit	<b>3,370 lbs.</b>	<b>2,470 lbs.</b>
	2" EMT Conduit	<b>3,370 lbs.</b>	<b>2,345 lbs.</b>
	2-1/2" EMT Conduit	<b>3,370 lbs.</b>	<b>2,345 lbs.</b>

**Notice: "SEBO"™ Seismic Engineering By Others**

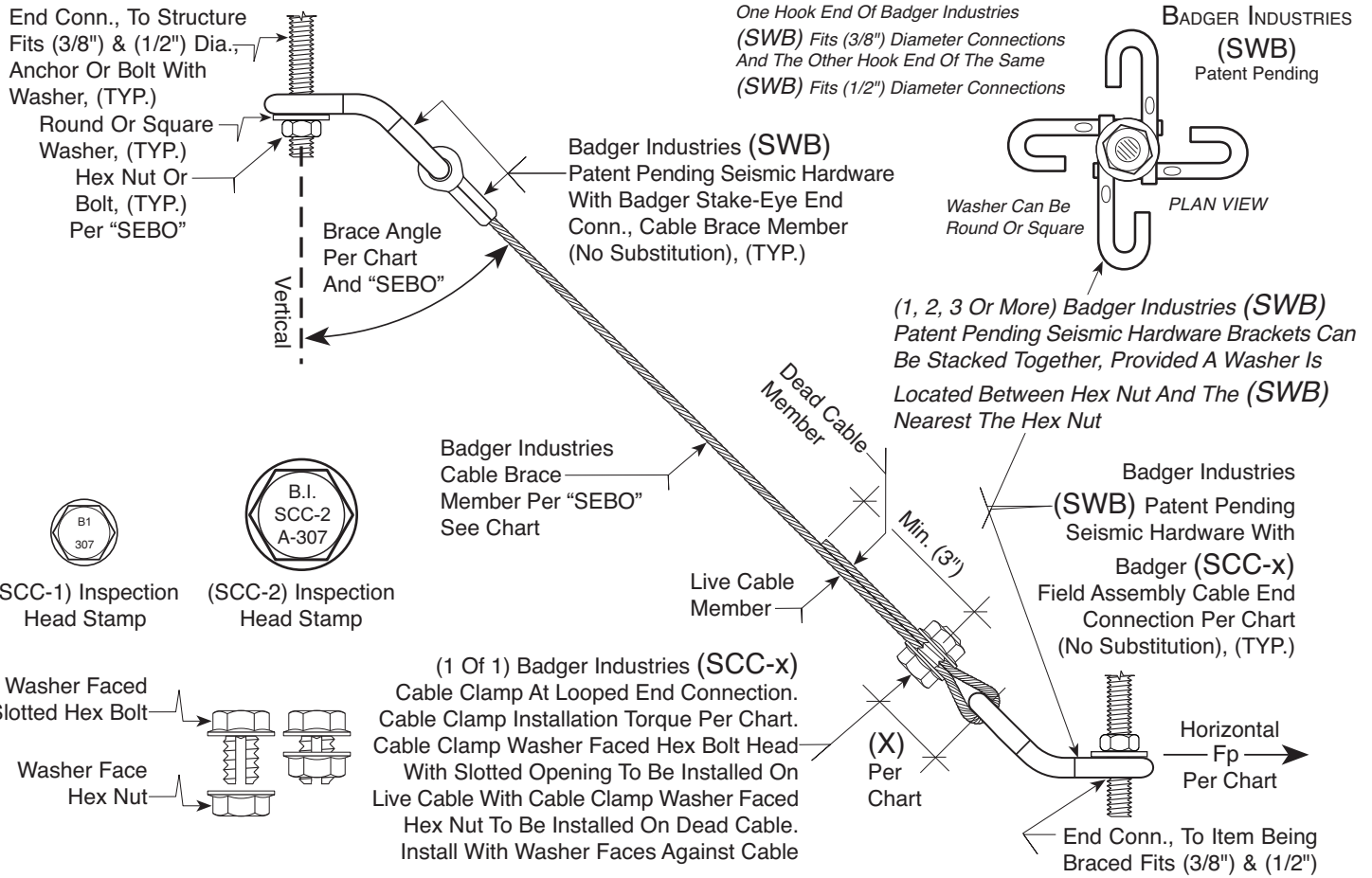
Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension And Compression Cyclic Loads Per ANSI / FM 1950 - 2016. Listed Capacities Do Not Account For Compression Load Limits Due To EMT Conduit Member Size And Length. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Conduit Shall Be Steel Tubing Constructed To UL-797 Or ANSI C-80.3 With A Minimum Yield Strength Of 30,000 PSI.

EMT Conduit Member Shall Be Installed As A Straight, (1) Piece Continuous Member. EMT Conduit Member Ends Shall Be Installed Onto Slotted End Of A Badger Industries (SBEMT) Seismic Hardware With One Of The Arms Inside The EMT Conduit Member And The Other Arm Outside Of The EMT Conduit Member. Depth Of EMT Conduit Member Installation Into The Seismic Hardware Shall Be Per This Detail. Screws Connecting Brace Member To The (SBEMT) Seismic Hardware Shall Be Installed Through Pilot Holes And Tightened Until Screw Washer Head Is Flat-To-Flat With (SBEMT) Seismic Hardware. Do Not Install Screws Into Conduit Weld Seam.



~ BADGER INDUSTRIES ~  
**SBEMT Seismic Hardware - Design Demand Capacity Limits**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~  
**Detail (SWB Kits)**

BADGER INDUSTRIES Seismic Hardware Part Number	Cable Brace Member Size, Construction Strands / Arrangement, And Material	(SCC-x) Cable Clamp Size	(SCC-x) Installation Torque	(X) Maximum	Cable Brace Member Maximum Live Length	Brace Angle From Vertical	
						30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)
<b>SWBx116 - 10</b>	Min. (1/16") Inch Dia. (7x7) Galvanized Steel	SCC-1	10 ft. • lbs.	1-1/2" Inch	10 Feet	<b>112 lbs.</b>	<b>159 lbs.</b>
<b>SWBx118 - 10</b> <b>SWBx118 - 20</b>	Min. (1/8") Inch Dia. (7x7) Galvanized Steel	SCC-2	20 ft. • lbs.	1-1/2" Inch	10 Feet 20 Feet	<b>219 lbs.</b>	<b>310 lbs.</b>
<b>SWBx316 - 10</b>	Min. (3/16") Inch Dia. (7x19) Galvanized Steel	SCC-2	30 ft. • lbs.	1-1/2" Inch	10 Feet	<b>528 lbs.</b>	<b>771 lbs.</b>

**Notice: "SEBO"™ Seismic Engineering By Others**

Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension Only Cyclic Loads Per ANSI / FM 1950 - 2016. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Torque Setting Of Badger (SCC-x) Cable Clamp Assembly With Both Live And Dead Cable Brace Members Will Cause Nesting Of The Cable Brace Members Within The (SCC-x) Cable Clamp, That May Result In An (SCC-x) Orientation Different Than That Depicted. Field Installed Cable Loop Shall Fit Tight To The Badger Seismic Hardware, Not Bulging Or Oversized. Cable Brace Member Shall Be Installed As A (1) Piece Continuous Taut Straight Member, EXCEPTION: For Item Suspended By Vibration Isolation Devices, Cable Brace Member Slack Shall Be As Determined By The Vibration Isolation Engineer.



~ BADGER INDUSTRIES ~  
**SWB Cable Kits Seismic Hardware - Design Demand Capacity Limits**

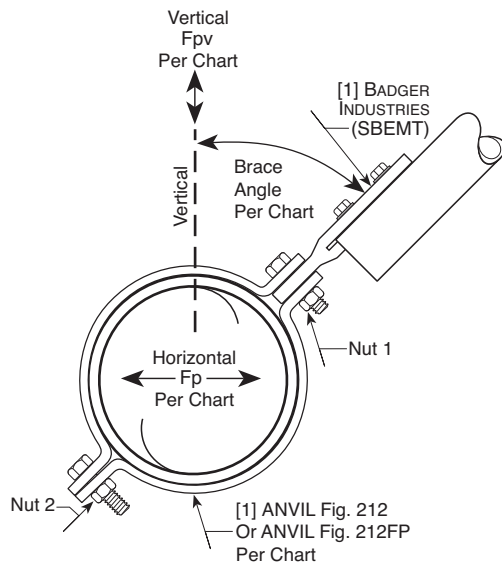
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

**ANVIL FIG: 212**  
**AND**  
**ANVIL FIG: 212FP**  
**SEISMIC HARDWARE**  
**CAPACITY DETAILS**



~ BADGER INDUSTRIES ~ Detail (SHVT-SPCA) Anvil			[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical				
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[3] [4] Steel Schedule (7 thru 80) Pipe And RMC Conduit Nominal Size	0° = Vert. Maximum Fpv (LRFD)	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	90° Maximum Fp (LRFD)
1" Fig. 212	SBEMT	1 in.	925 lbs.	462 lbs.	653 lbs.	801 lbs.	925 lbs.
1-1/4" Fig. 212	SBEMT	1-1/4 in.	1,155 lbs.	577 lbs.	816 lbs.	1,000 lbs.	1,155 lbs.
1-1/2" Fig. 212	SBEMT	1-1/2 in.	1,215 lbs.	607 lbs.	859 lbs.	1,052 lbs.	1,215 lbs.
2" Fig. 212	SBEMT	2 in.	1,945 lbs.	972 lbs.	1,375 lbs.	1,684 lbs.	1,945 lbs.
2-1/2" Fig. 212	SBEMT	2-1/2 in.	4,405 lbs.	2,202 lbs.	3,114 lbs.	3,814 lbs.	4,405 lbs.
3" Fig. 212	SBEMT	3 in.	4,405 lbs.	2,202 lbs.	3,114 lbs.	3,814 lbs.	4,405 lbs.
3-1/2" Fig. 212	SBEMT	3-1/2 in.	3,635 lbs.	1,817 lbs.	2,569 lbs.	3,147 lbs.	3,635 lbs.
4" Fig. 212	SBEMT	4 in.	4,405 lbs.	2,202 lbs.	3,114 lbs.	3,814 lbs.	4,405 lbs.
5" Fig. 212FP	SBEMT	5 in.	4,405 lbs.	2,202 lbs.	3,114 lbs.	3,814 lbs.	4,405 lbs.
6" Fig. 212FP	SBEMT	6 in.	4,405 lbs.	2,202 lbs.	3,114 lbs.	3,814 lbs.	4,405 lbs.
8" Fig. 212FP	SBEMT	8 in.	4,720 lbs.	2,360 lbs.	3,337 lbs.	4,087 lbs.	4,720 lbs.
10" Fig. 212FP	SBEMT	10 in.	4,630 lbs.	2,315 lbs.	3,273 lbs.	4,009 lbs.	4,630 lbs.
12" Fig. 212FP	SBEMT	12 in.	2,930 lbs.	1,465 lbs.	2,071 lbs.	2,537 lbs.	2,930 lbs.

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [3] (1" thru 6") Schedule 7 (Or Thicker Wall) Pipe Conforming To ASTM A-53 Grade A, Or B With A Minimum (30,000 psi) Yield Strength Or Equivalent.  
 (8" thru 12") Schedule 10 (Or Thicker Wall) Pipe Conforming To ASTM A-53 Grade A, Or B With A Minimum (30,000 psi) Yield Strength Or Equivalent.  
 [4] (1" thru 6") RIGID Conduit Conforming To UL-6 Or ANSI C-80.3 With A Minimum (30,000 psi) Yield Strength Or Equivalent.



## FOR BRACING OF STEEL PIPING AND RMC CONDUIT:

ANVIL Fig. 212 And FIG. 212FP Assembly:  
Anvil International LLC referred to as ANVIL

For Sizes (1" thru 2"):

- 1.) Tighten Hex Nut 1, Until Clamp Ears Contact Badger SBEMT.
- 2.) Tighten Hex Nut 2, Until Clamp Ears Contact Each Other.

For Sizes (2-1/2" thru 12"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 and Hex Nut 2, Every (1) Turn.

SHVT-SPCA

~ BADGER INDUSTRIES ~  
Single Hanger Vertical & Transverse - Design Demand Capacity Limits

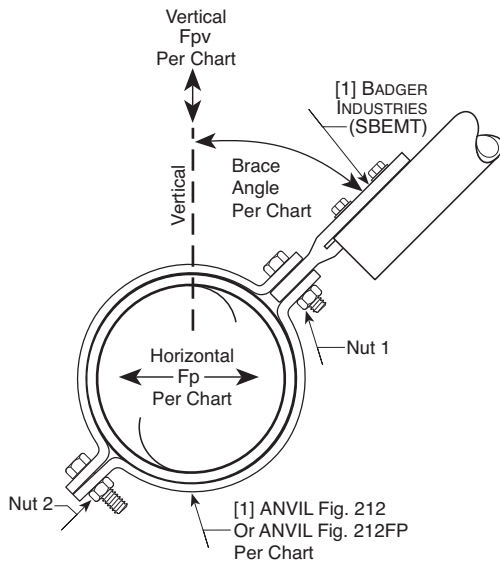
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





~ BADGER INDUSTRIES ~ Detail (SHVT-CIPA) Anvil			[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical				
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[7] No Hub Cast-Iron Pipe Nominal Size	0° = Vert. Maximum Fpv (LRFD)	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	90° Maximum Fp (LRFD)
1-1/2" Fig. 212	SBEMT	1-1/2 in.	2,210 lbs.	1,105 lbs.	1,562 lbs.	1,913 lbs.	2,210 lbs.
2" Fig. 212	SBEMT	2 in.	3,490 lbs.	1,745 lbs.	2,467 lbs.	3,022 lbs.	3,490 lbs.
3" Fig. 212	SBEMT	3 in.	3,020 lbs.	1,510 lbs.	2,135 lbs.	2,615 lbs.	3,020 lbs.
4" Fig. 212	SBEMT	4 in.	3,790 lbs.	1,895 lbs.	2,679 lbs.	3,282 lbs.	3,790 lbs.
5" Fig. 212FP	SBEMT	5 in.	3,870 lbs.	1,935 lbs.	2,736 lbs.	3,351 lbs.	3,870 lbs.
6" Fig. 212FP	SBEMT	6 in.	3,480 lbs.	1,740 lbs.	2,460 lbs.	3,013 lbs.	3,480 lbs.
8" Fig. 212FP	SBEMT	8 in.	2,615 lbs.	1,307 lbs.	1,848 lbs.	2,264 lbs.	2,615 lbs.
10" Fig. 212FP	SBEMT	10 in.	2,695 lbs.	1,347 lbs.	1,905 lbs.	2,333 lbs.	2,695 lbs.
12" Fig. 212FP	SBEMT	12 in.	2,105 lbs.	1,052 lbs.	1,488 lbs.	1,822 lbs.	2,105 lbs.

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [7] No Hub Cast-Iron Piping Conforming To ASTM A888 / CISPI 301 Standards With A Minimum (21,000 psi) Tensile Strength.



## FOR BRACING OF CAST-IRON PIPING:

ANVIL Fig. 212 And FIG. 212FP Assembly:  
Anvil International LLC referred to as ANVIL

For Sizes (1-1/2" and 2"):

- 1.) Tighten Hex Nut 1, Until Clamp Ears Contact Badger SBEMT.
- 2.) Tighten Hex Nut 2, Until Clamp Ears Contact Each Other.

For Sizes (3" thru 12"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 and Hex Nut 2, Every (1) Turn.

SHVT-CIPA

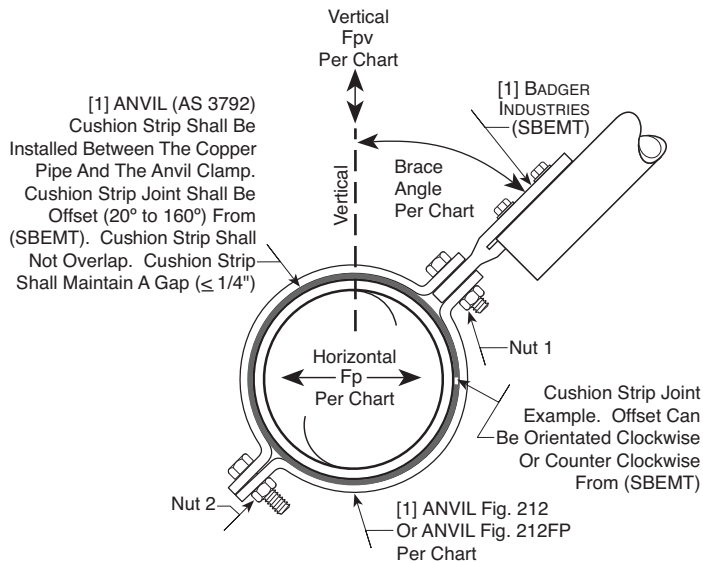
~ BADGER INDUSTRIES ~  
Single Hanger Vertical & Transverse - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SHVT-COPA) Anvil			[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical				
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[8] Copper Pipe, Type L Or Type K, Annealed Or Drawn Nominal Size	0° = Vert. Maximum Fpv (LRFD)	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	90° Maximum Fp (LRFD)
1" Fig. 212	SBEMT	1 in.	925 lbs.	462 lbs.	653 lbs.	801 lbs.	925 lbs.
1-1/4" Fig. 212	SBEMT	1-1/4 in.	1,155 lbs.	577 lbs.	816 lbs.	1,000 lbs.	1,155 lbs.
1-1/2" Fig. 212	SBEMT	1-1/2 in.	1,215 lbs.	607 lbs.	859 lbs.	1,052 lbs.	1,215 lbs.
2" Fig. 212	SBEMT	2 in.	1,945 lbs.	972 lbs.	1,375 lbs.	1,684 lbs.	1,945 lbs.
2-1/2" Fig. 212	SBEMT	2-1/2 in.	1,195 lbs.	597 lbs.	844 lbs.	1,034 lbs.	1,195 lbs.
3" Fig. 212	SBEMT	3 in.	1,580 lbs.	790 lbs.	1,117 lbs.	1,368 lbs.	1,580 lbs.
		3-1/2 in.	<i>Not Rated</i>	<i>Not Rated</i>	<i>Not Rated</i>	<i>Not Rated</i>	<i>Not Rated</i>
4" Fig. 212	SBEMT	4 in.	1,330 lbs.	665 lbs.	940 lbs.	1,151 lbs.	1,330 lbs.
5" Fig. 212FP	SBEMT	5 in.	1,225 lbs.	612 lbs.	866 lbs.	1,060 lbs.	1,225 lbs.
6" Fig. 212FP	SBEMT	6 in.	1,100 lbs.	550 lbs.	777 lbs.	952 lbs.	1,100 lbs.

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [8] (1" thru 3") and (4" thru 6") Type L Or Type K, Annealed Or Drawn Copper Piping Conforming To ASTM B88.



## FOR BRACING OF COPPER PIPING:

ANVIL Fig. 212 And FIG. 212FP Assembly:  
Anvil International LLC referred to as ANVIL

### For Sizes (1" thru 2"):

- 1.) Tighten Hex Nut 1, Until Clamp Ears Contact Badger SBEMT.
- 2.) Tighten Hex Nut 2, Until Clamp Ears Contact Each Other.

### For Sizes (2-1/2", 3" and 4" thru 6"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 and Hex Nut 2, Every (1) Turn.

~ BADGER INDUSTRIES ~

## Single Hanger Vertical & Transverse - Design Demand Capacity Limits

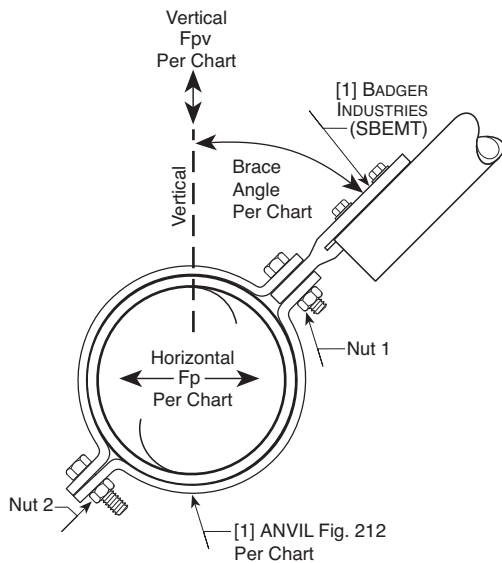
SHVT-COPA

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SHVT-EMT5A) Anvil				[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical				
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[5] Steel EMT Conduit Nominal Size	[6] Steel Schedule 5 Pipe Nominal Size	0° = Vert. Maximum F <sub>pv</sub> (LRFD)	30° to 44° Maximum F <sub>p</sub> (LRFD)	45° to 60° Maximum F <sub>p</sub> (LRFD)	61° to 75° Maximum F <sub>p</sub> (LRFD)	90° Maximum F <sub>p</sub> (LRFD)
1" Fig. 212	SBEMT	N / A	1 in.	925 lbs.	462 lbs.	653 lbs.	801 lbs.	925 lbs.
1-1/4" Fig. 212	SBEMT	N / A	1-1/4 in.	1,155 lbs.	577 lbs.	816 lbs.	1,000 lbs.	1,155 lbs.
1-1/4" Fig. 212	SBEMT	1-1/2 in.	N / A	1,215 lbs.	607 lbs.	859 lbs.	1,052 lbs.	1,215 lbs.
1-1/2" Fig. 212	SBEMT	N / A	1-1/2 in.	1,215 lbs.	607 lbs.	859 lbs.	1,052 lbs.	1,215 lbs.
2" Fig. 212	SBEMT	2 in.	2 in.	1,945 lbs.	972 lbs.	1,375 lbs.	1,684 lbs.	1,945 lbs.
2-1/2" Fig. 212	SBEMT	2-1/2 in.	2-1/2 in.	2,935 lbs.	1,467 lbs.	2,075 lbs.	2,541 lbs.	2,935 lbs.
3" Fig. 212	SBEMT	3 in.	3 in.	3,765 lbs.	1,882 lbs.	2,661 lbs.	3,260 lbs.	3,765 lbs.
3-1/2" Fig. 212	SBEMT	3-1/2 in.	3-1/2 in.	3,635 lbs.	1,817 lbs.	2,569 lbs.	3,147 lbs.	3,635 lbs.
4" Fig. 212	SBEMT	4 in.	4 in.	2,225 lbs.	1,112 lbs.	1,573 lbs.	1,926 lbs.	2,225 lbs.

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [5] (1" thru 4") EMT Conduit Shall Conform To UL-797 Or ANSI C-80.3 With A Minimum (30,000 psi) Yield Strength Or Equivalent.  
 [6] (1" thru 4") Schedule 5 (Or Thicker) Pipe Conforming To ASTM A-53 Grade A, Or B With A Minimum (30,000 psi) Yield Strength Or Equivalent.



## FOR BRACING OF EMT CONDUIT AND Sch. 5 STEEL PIPING:

ANVIL Fig. 212 Assembly:  
Anvil International LLC referred to as ANVIL

For Pipe Sizes (1" thru 2"):

- 1.) Tighten Hex Nut 1, Until Clamp Ears Contact Badger SBEMT.
- 2.) Tighten Hex Nut 2, Until Clamp Ears Contact Each Other.

For Pipe Sizes (2-1/2" thru 4"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 And Hex Nut 2, Every (1) Turn.

SHVT-EMT5A

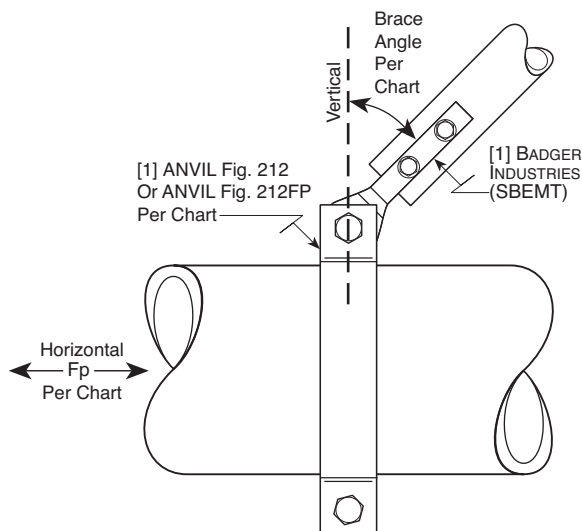
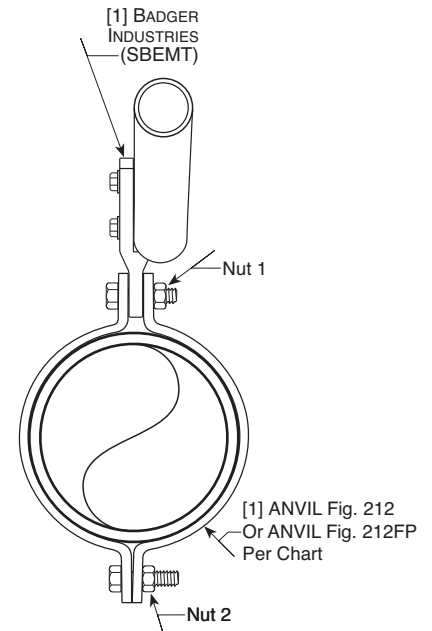
~ BADGER INDUSTRIES ~  
Single Hanger Vertical & Transverse - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SHL-SPCA) Anvil			[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical			
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[3] [4] Steel Schedule (7 thru 80) Pipe And RMC Conduit Nominal Size	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	90° Maximum Fp (LRFD)
1" Fig. 212	SBEMT	1 in. Use Limited To Sch., 40 Or Thicker Steel Pipe Or RMC Conduit	577 lbs.	549 lbs.	396 lbs.	Not Rated
1-1/4" Fig. 212	SBEMT	1-1/4 in.	Not Rated	Not Rated	Not Rated	Not Rated
1-1/2" Fig. 212	SBEMT	1-1/2 in.	840 lbs.	957 lbs.	908 lbs.	Not Rated
2" Fig. 212	SBEMT	2 in.	1,795 lbs.	1,795 lbs.	1,844 lbs.	Not Rated
2-1/2" Fig. 212	SBEMT	2-1/2 in.	2,202 lbs.	3,220 lbs.	3,970 lbs.	Not Rated
3" Fig. 212	SBEMT	3 in.	2,202 lbs.	3,110 lbs.	3,320 lbs.	Not Rated
3-1/2" Fig. 212	SBEMT	3-1/2 in.	1,815 lbs.	1,655 lbs.	1,655 lbs.	Not Rated
4" Fig. 212	SBEMT	4 in.	1,917 lbs.	1,910 lbs.	1,510 lbs.	Not Rated
5" Fig. 212FP	SBEMT	5 in.	2,202 lbs.	2,995 lbs.	2,995 lbs.	Not Rated
6" Fig. 212FP	SBEMT	6 in.	2,202 lbs.	3,220 lbs.	3,815 lbs.	Not Rated
8" Fig. 212FP	SBEMT	8 in.	2,360 lbs.	3,335 lbs.	4,085 lbs.	Not Rated
10" Fig. 212FP	SBEMT	10 in.	2,315 lbs.	2,120 lbs.	2,120 lbs.	Not Rated
12" Fig. 212FP	SBEMT	12 in.	1,465 lbs.	1,780 lbs.	1,780 lbs.	Not Rated

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [3] Use Of (1") Anvil Fig 212 Limited To (1") Schedule 40 (Or Thicker Wall) Pipe Conforming To ASTM A-53 Grade A, Or B With A Minimum (30,000 psi) Yield Strength Or Equivalent.  
 [3] (1-1/2" thru 6") Schedule 7, (1-1/2" thru 12") Schedule 10, And (1" and 1-1/2" thru 12") Schedule 40 (Or Thicker Wall) Pipe Conforming To ASTM A-53 Grade A, Or B With A Minimum (30,000 psi) Yield Strength Or Equivalent.  
 [4] (1" and 1-1/2" thru 6") RIGID Conduit Conforming To UL-6 Or ANSI C-80.3 With A Minimum (30,000 psi) Yield Strength Or Equivalent.



## FOR BRACING OF STEEL PIPING AND RMC CONDUIT:

ANVIL Fig. 212 And FIG. 212FP Assembly:  
Anvil International LLC referred to as ANVIL

For Sizes (1", 1-1/4" and 1-1/2"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (12 ft. • lbs.), Using (6 ft. • lb.) Torque Increases.

For Sizes (2" thru 12"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft. • lbs.), Using (10 - 15 ft. • lb.) Torque Increases.

**SHL-SPCA**

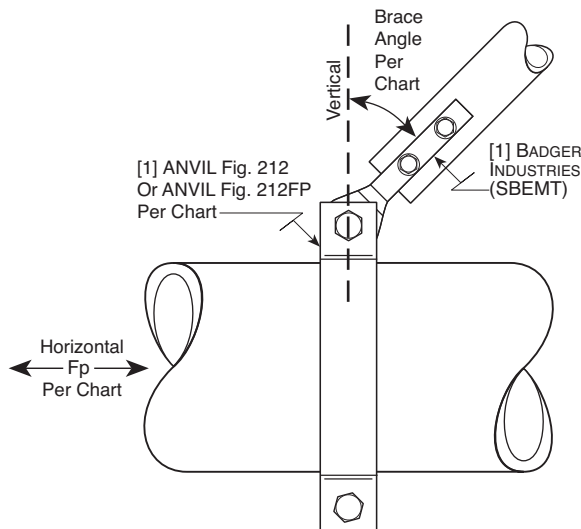
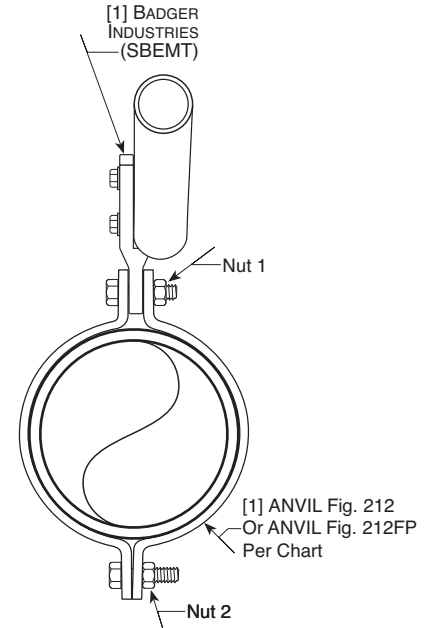
~ BADGER INDUSTRIES ~  
Single Hanger Longitudinal - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SHL-CIPA) Anvil			[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical			
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[7] No Hub Cast-Iron Pipe Nominal Size	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	90° Maximum Fp (LRFD)
1-1/2" Fig. 212	SBEMT	1-1/2 in.	1,105 lbs.	1,339 lbs.	1,584 lbs.	Not Rated
2" Fig. 212	SBEMT	2 in.	1,745 lbs.	1,788 lbs.	1,788 lbs.	Not Rated
3" Fig. 212	SBEMT	3 in.	1,510 lbs.	1,918 lbs.	1,918 lbs.	Not Rated
4" Fig. 212	SBEMT	4 in.	1,124 lbs.	1,124 lbs.	1,324 lbs.	Not Rated
5" Fig. 212FP	SBEMT	5 in.	1,932 lbs.	2,004 lbs.	1,647 lbs.	Not Rated
6" Fig. 212FP	SBEMT	6 in.	1,740 lbs.	1,831 lbs.	1,831 lbs.	Not Rated
8" Fig. 212FP	SBEMT	8 in.	1,307 lbs.	1,470 lbs.	1,593 lbs.	Not Rated
10" Fig. 212FP	SBEMT	10 in.	1,347 lbs.	1,431 lbs.	1,434 lbs.	Not Rated
12" Fig. 212FP	SBEMT	12 in.	1,052 lbs.	1,226 lbs.	1,420 lbs.	Not Rated

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [7] No Hub Cast-Iron Piping Conforming To ASTM A888 / CISPI 301 Standards With A Minimum (21,000 psi) Tensile Strength.



## FOR BRACING OF CAST-IRON PIPING:

ANVIL Fig. 212 And FIG. 212FP Assembly:  
Anvil International LLC referred to as ANVIL

### For Sizes (1-1/2"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (12 ft. • lbs.), Using (6 ft. • lb.) Torque Increases.

### For Sizes (2", 3" and 4" thru 12"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft. • lbs.), Using (10 - 15 ft. • lb.) Torque Increases.

**SHL-CIPA**

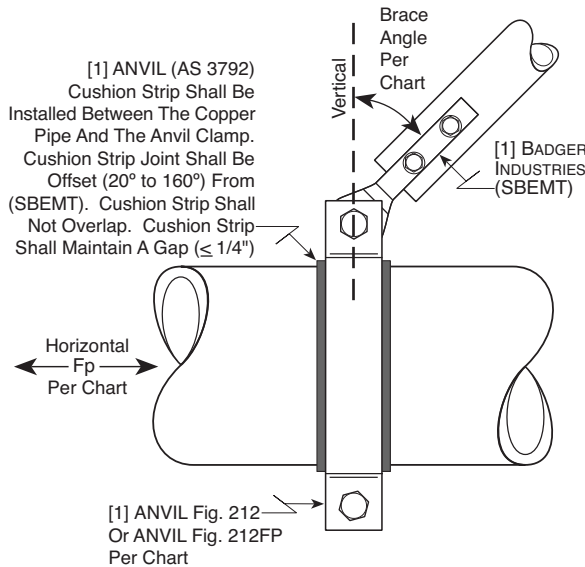
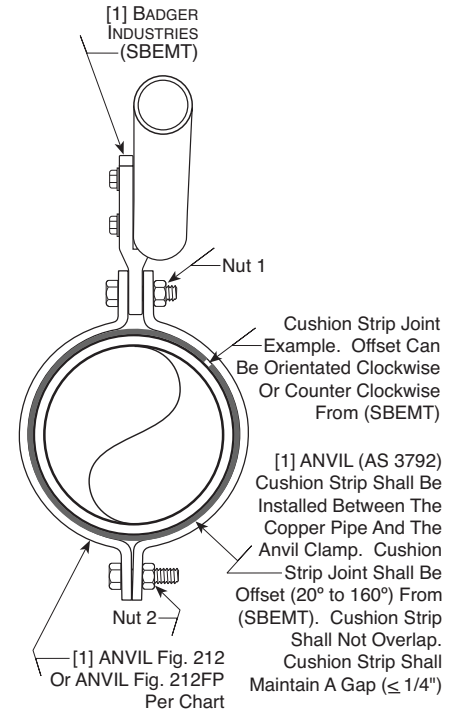
## ~ BADGER INDUSTRIES ~ Single Hanger Longitudinal - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SHL-COPA) Anvil			[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical			
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[8] Copper Pipe Type L Or Type K, Annealed Or Drawn Nominal Size	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	90° Maximum Fp (LRFD)
1" Fig. 212	SBEMT	1 in.	Not Rated	Not Rated	Not Rated	Not Rated
1-1/4" Fig. 212	SBEMT	1-1/4 in.	Not Rated	Not Rated	Not Rated	Not Rated
1-1/2" Fig. 212	SBEMT	1-1/2 in.	Not Rated	Not Rated	Not Rated	Not Rated
2" Fig. 212	SBEMT	2 in.	222 lbs.	90 lbs.	90 lbs.	Not Rated
2-1/2" Fig. 212	SBEMT	2-1/2 in.	515 lbs.	650 lbs.	697 lbs.	Not Rated
3" Fig. 212	SBEMT	3 in.	844 lbs.	775 lbs.	700 lbs.	Not Rated
		3-1/2 in.	Not Rated	Not Rated	Not Rated	Not Rated
4" Fig. 212	SBEMT	4 in.	353 lbs.	281 lbs.	231 lbs.	Not Rated
5" Fig. 212FP	SBEMT	5 in.	1,258 lbs.	982 lbs.	Not Rated	Not Rated
6" Fig. 212FP	SBEMT	6 in.	1,134 lbs.	1,134 lbs.	Not Rated	Not Rated

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [8] (1" thru 3") and (4" thru 6") Type L Or Type K, Annealed Or Drawn Copper Piping Conforming To ASTM B88.



## FOR BRACING OF COPPER PIPING:

ANVIL Fig. 212 And FIG. 212FP Assembly:  
Anvil International LLC referred to as ANVIL

For Sizes (2" thru 3" and 4" thru 6"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft.· lbs.), Using (10 - 15 ft.· lb.) Torque Increases.

SHL-COPA

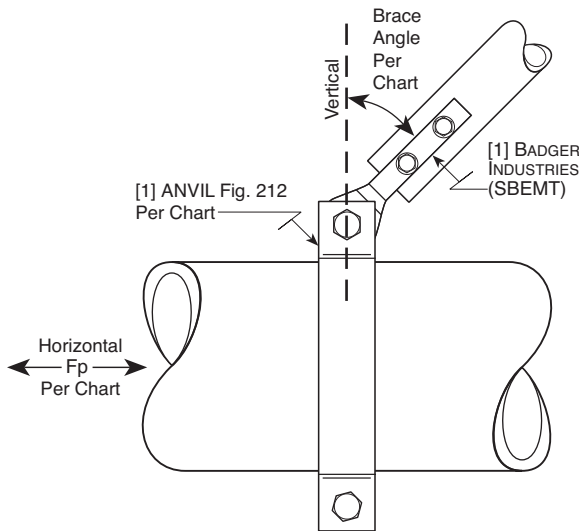
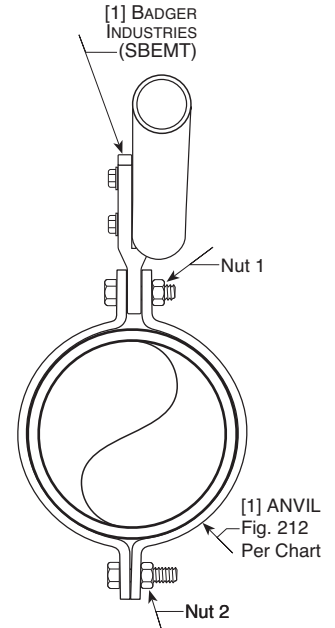
~ BADGER INDUSTRIES ~  
Single Hanger Longitudinal - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SHL-EMT5A) Anvil				[2] FM Global 1950-10 & 1950-13 Brace Angle From Vertical			
[1] ANVIL Fig. 212 Fig. 212FP Size & Clamp Part Number	[1] BADGER INDUSTRIES Seismic Hardware Part Number	[5] Steel EMT Conduit Nominal Size	[6] Steel Schedule 5 Pipe Nominal Size	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)	90° Maximum Fp (LRFD)
1" Fig. 212	SBEMT	N / A	1 in.	Not Rated	Not Rated	Not Rated	Not Rated
1-1/4" Fig. 212	SBEMT	N / A	1-1/4 in.	Not Rated	Not Rated	Not Rated	Not Rated
1-1/4" Fig. 212	SBEMT	1-1/2 in.	N / A	1,227 lbs.	1,332 lbs.	1,376 lbs.	Not Rated
1-1/2" Fig. 212	SBEMT	N / A	1-1/2 in.	Not Rated	Not Rated	Not Rated	Not Rated
2" Fig. 212	SBEMT	2 in.	2 in.	Not Rated	Not Rated	Not Rated	Not Rated
2-1/2" Fig. 212	SBEMT	2-1/2 in.	2-1/2 in.	1,467 lbs.	1,493 lbs.	1,493 lbs.	Not Rated
3" Fig. 212	SBEMT	3 in.	3 in.	1,882 lbs.	2,230 lbs.	2,361 lbs.	Not Rated
3-1/2" Fig. 212	SBEMT	3-1/2 in.	3-1/2 in.	1,817 lbs.	1,654 lbs.	1,654 lbs.	Not Rated
4" Fig. 212	SBEMT	4 in.	4 in.	1,112 lbs.	1,269 lbs.	1,303 lbs.	Not Rated

[1] No Substitution  
 [2] Per FM, (ASD) = (LRFD / 1.5).  
 [5] (1-1/2" and 2-1/2" thru 4") EMT Conduit Shall Conform To UL-797 Or ANSI C-80.3 With A Minimum (30,000 psi) Yield Strength Or Equivalent.  
 [6] (2-1/2" thru 4") Schedule 5 (Or Thicker) Pipe Conforming To ASTM A-53 Grade A, Or B With A Minimum (30,000 psi) Yield Strength Or Equivalent.



## FOR BRACING OF EMT CONDUIT AND Sch. 5 STEEL PIPING:

ANVIL Fig. 212 Assembly:  
Anvil International LLC referred to as ANVIL

For Size (1-1/2" EMT Conduit):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (12 ft. • lbs.), Using (6 ft. • lb.) Torque Increases.

For Sizes (2-1/2" thru 4"):

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft. • lbs.), Using (10 - 15 ft. • lb.) Torque Increases.

SHL-EMT5A

~ BADGER INDUSTRIES ~  
Single Hanger Longitudinal - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

**BADGER [EMT-RSC]  
EMT CONDUIT ROD STIFFENER**

**BADGER [RS-1]  
STRUT ROD STIFFENER**

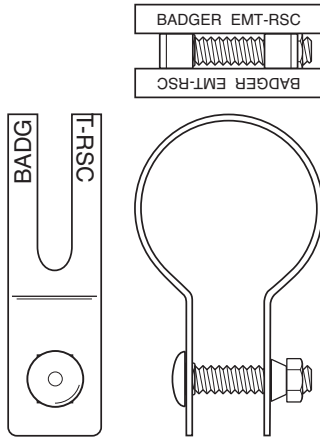
**AND BADGER [SHCA]  
VERTICAL COMPRESSION MEMBER**

**INSTALLATION DETAILS**





# INSTALLATION DETAIL



~ BADGER INDUSTRIES ~  
[EMT-RSC] Patent Pending

~ BADGER INDUSTRIES ~  
Detail (EMT-RSC)

Vertical Member No.	Stiffener Vertical Member Steel Conduit Nominal Size	Vertical Member Maximum Length	(3/8") Rod Dia. (X) Maximum	(1/2") Rod Dia. (X) Maximum	(5/8") Rod Dia. (X) Maximum	With Stiffener Maximum Compression Fpc (LRFD)
[V-1]	(1") EMT	9 ft. - 9 in.	13 in.	18 in.	23 in.	<b>440 lbs.</b>
[V-2]	(1") EMT	8 ft. - 0 in.	13 in.	18 in.	23 in.	<b>700 lbs.</b>
[V-3]	(1") EMT	6 ft. - 4 in.	(3/8") Dia. Rod Size Not Usable	18 in.	23 in.	<b>1,100 lbs.</b>
[V-4]	(1") EMT	5 ft. - 5 in.		18 in.	23 in.	<b>1,500 lbs.</b>

**Notice: "SEBO"™ Seismic Engineering By Others**

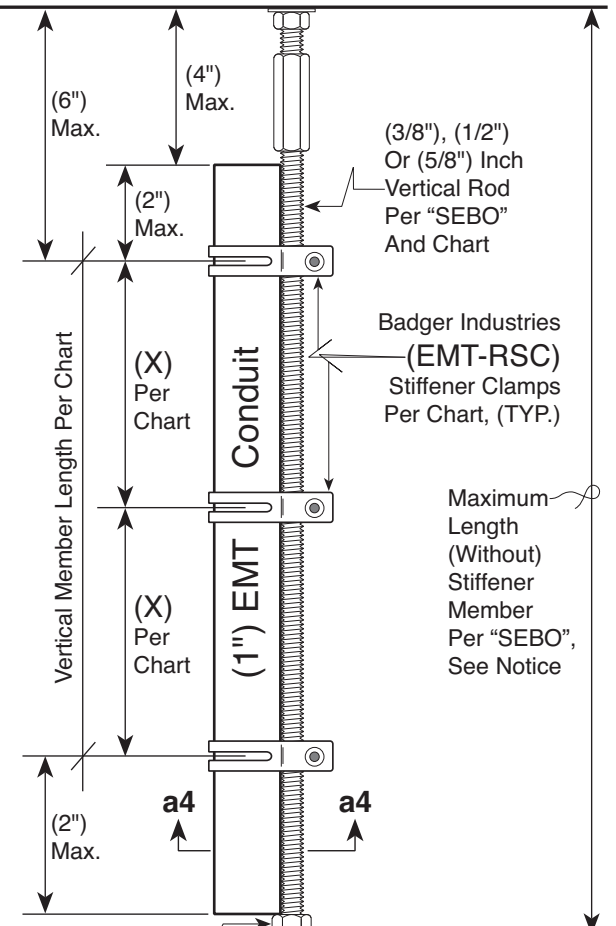
Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Conduit Shall Be Steel Tubing Constructed To UL-797 Or ANSI C-80.3 With A Minimum Yield Strength Of 30,000 PSI. Conduit Shall Be Installed As A Straight, (1) Piece Continuous Member. A Minimum Of (2) Badger Industries (EMT-RSC) Rod Stiffener Clamps Required Per Assembly. Seismic Bracing Not Shown For Clarity.

(1") Schedule 5, Schedule 7 Or Schedule 40 Steel Pipe With An Equal Or Greater Yield Strength Can Be Used In Place Of Conduit, Provided Vertical Support Rod Size Is Limited To (3/8") or (1/2") Inch.

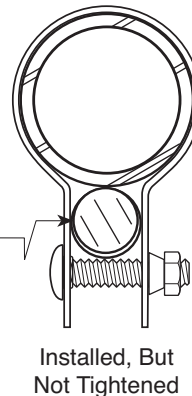
Application Specific Seismic Vertical Support Rod Length (Without) Rod Stiffener Per "SEBO".

The FpT Tension Capacity Per "SEBO".

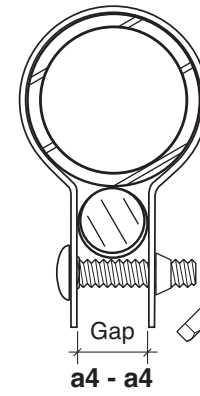
Various Seismic Vertical Hanger  
To Building Structure Connections Per "SEBO"



(1") EMT Conduit Vertical Member Sits On Top Of Hex Nut  
Item Being Supported By Threaded Rod. Strut Trapeze, HVAC Duct, Equipment, Piping Or Other Per "SEBO"  
Fpc Per Chart



Installed, But Not Tightened



a4 - a4

Tighten Torque-Off Hex Nut Until Hex Head Breaks Away. Gap Will Vary And Deform Other Than Depicted Due To Stiffener Member And Vertical Support Rod Combinations

One Size (EMT-RSC) Clamp Fits (3/8"), (1/2") And (5/8") Vertical Rod Diameter

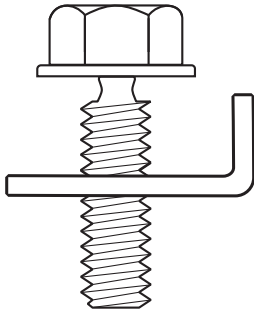
~ BADGER INDUSTRIES ~  
EMT - Rod Stiffener Clamp

EMT-RSC

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~  
**[RS-1]**  
Rod Stiffener Bolt



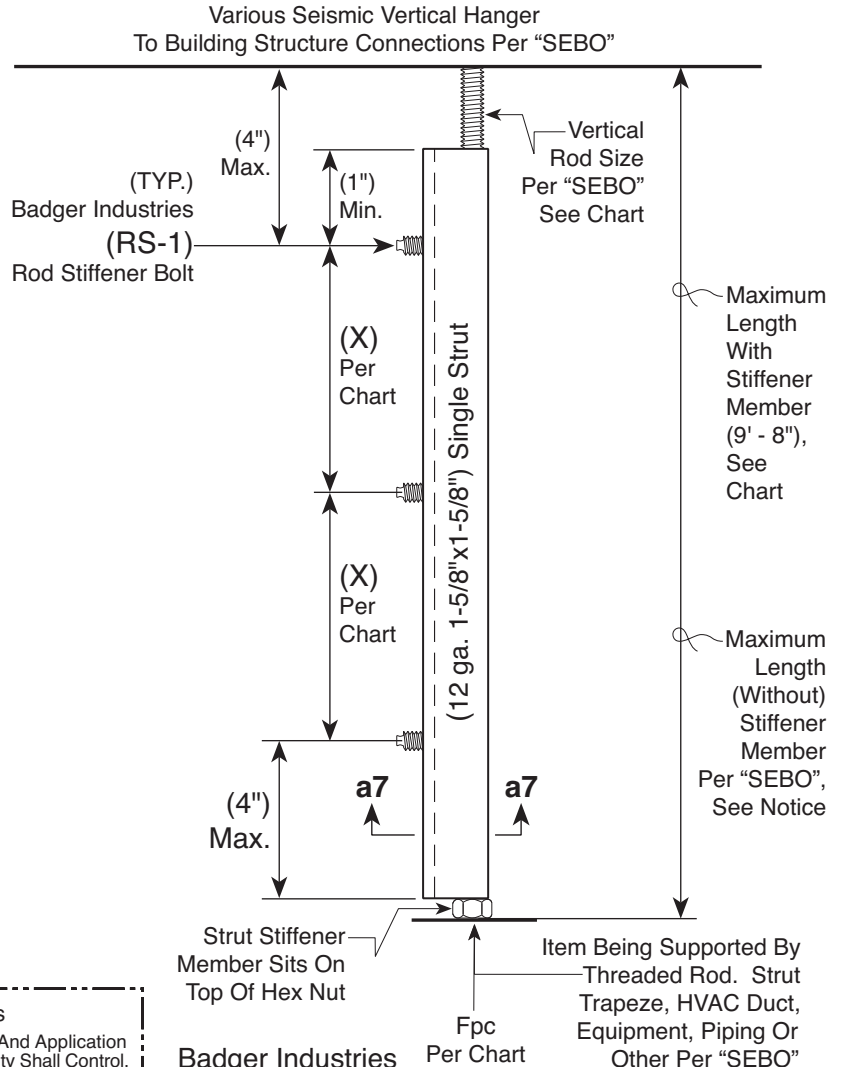
~ BADGER INDUSTRIES ~  
Detail (RVM-7)

Vertical Member No.	Vertical Rod Size	(X) Maximum	With Stiffener Maximum Compression Fpc (LRFD)
[V-3]	3/8 in.	13 in.	<b>1,100 lbs.</b>
[V-5]	1/2 in.	18 in.	<b>1,900 lbs.</b>
[V-6]	5/8 in.	23 in.	<b>2,600 lbs.</b>
[V-6]	3/4 in.	28 in.	<b>2,600 lbs.</b>
[V-6]	7/8 in.	33 in.	<b>2,600 lbs.</b>

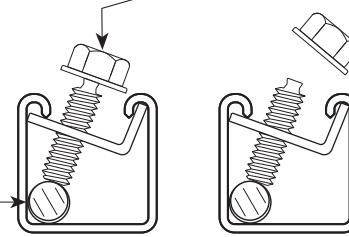
Notice: "SEBO"™ Seismic Engineering By Others

Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Vertical Member Shall Be Installed As A Straight, (1) Piece Continuous Member. A Minimum Of (2) Badger Industries (RS-1) Rod Stiffener Bolts Required Per Assembly. Seismic Bracing Not Shown For Clarity. Application Specific Seismic Vertical Support Rod Length (Without) Rod Stiffener Per "SEBO".

The FpT Tension Capacity Per "SEBO".



**Badger Industries (RS-1) Rod Stiffener**



**a7 - a7**

One Size (RS-1) Bolt Fits (3/8"), (1/2"), (5/8"), (3/4") And (7/8") Vertical Rod Diameter

**RS-1**

~ BADGER INDUSTRIES ~  
**Rod Stiffener - TYPE 1**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



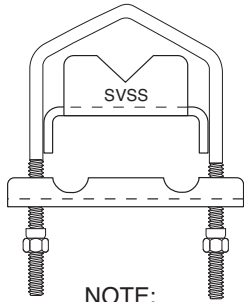
~ BADGER INDUSTRIES ~  
[SHCA] Kit  
Clamp Assembly  
Patent #10,281,062

Notice: "SEBO"™ Seismic Engineering By Others

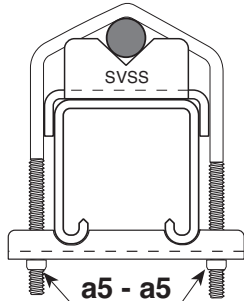
Only (2) Badger (SHCA) Clamp Assemblies Required Per Strut Vertical Member. Strut Member Shall Be Installed As A Straight, (1) Piece Continuous Member. Seismic Bracing Not Shown For Clarity. When Badger (SVSS) Bracket Is Not Installed Into End Of Strut Vertical Member, Assembly Can Be S.E.B.O., For Non-Single Hanger Supports Applications Like Trapeze Supports, Equipment Supports, Etc. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Application Specific Seismic Vertical Support Rod Length (Without) Strut Vertical Member Per "SEBO".

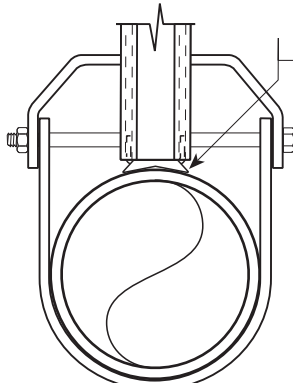
The FpT Tension Capacity Per "SEBO".



**NOTE:**  
Badger (SHCA) Is Packaged As A "KIT".  
Each Single SHCA Kit Contains;  
(3) SVSS Brackets,  
(2) SVSU Brackets,  
(2) V-BOLTS,  
(4) Break-Off Hex Nuts.

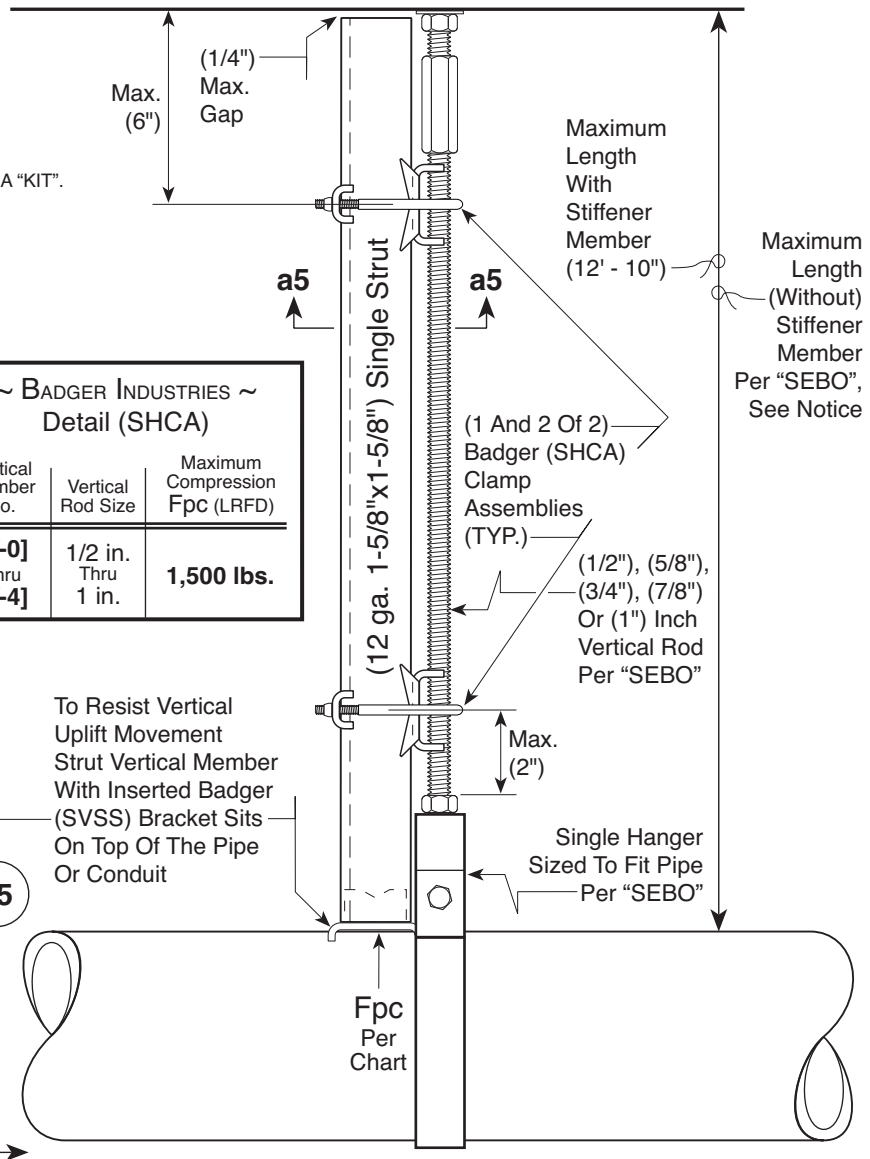


Tighten Both Break-Off Hex Nuts Evenly Until Hex Head Breaks Away



b5 - b5

Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"



~ BADGER INDUSTRIES ~  
Detail (SHCA)

Vertical Member No.	Vertical Rod Size	Maximum Compression Fpc (LRFD)
[V-0] Thru [V-4]	1/2 in. Thru 1 in.	1,500 lbs.

SHCA

~ BADGER INDUSTRIES ~  
SHCA - Single Hanger Compression Assembly

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

# **RIGID BRACING**

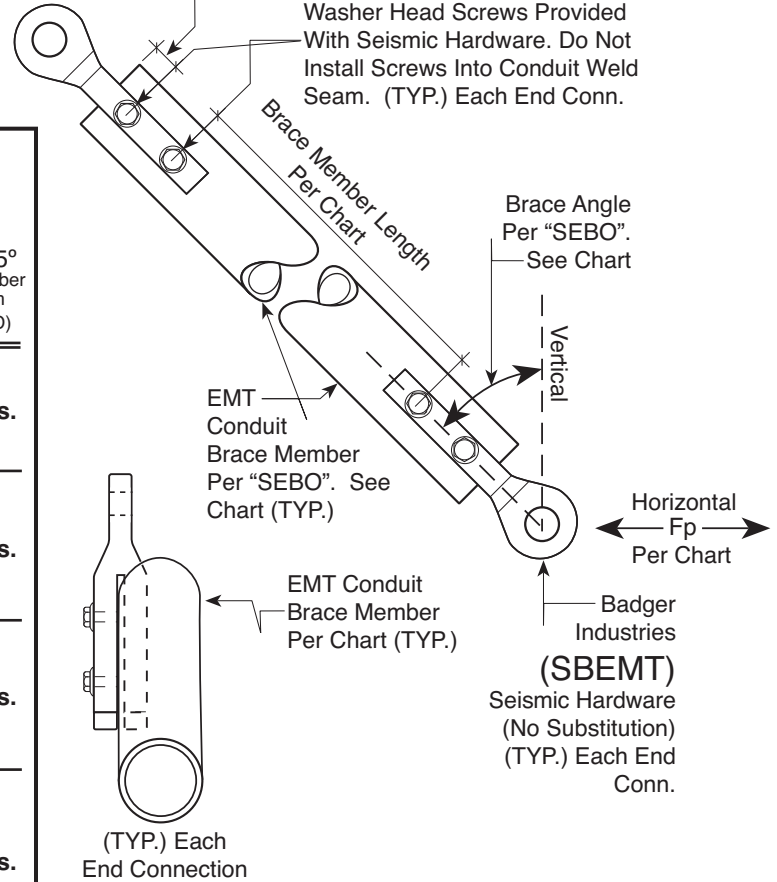
## **INSTALLATION DETAILS**



# INSTALLATION DETAIL

Brace Member Shall Extend A Min. (3/8") Inch Beyond End Screws.  
(TYP.) Each End Conn.

(1 Of 2) (1/4" x 1") Inch Hex Washer Head Screws Provided With Seismic Hardware. Do Not Install Screws Into Conduit Weld Seam. (TYP.) Each End Conn.



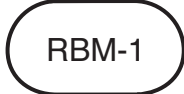
~ BADGER INDUSTRIES ~ Detail (RBM-1)					
Brace Member No.	Brace Member Steel Conduit Nominal Sizes	Brace Member Maximum Length	Brace Angle From Vertical		
			30° to 44° Brace Member Maximum Fp (LRFD)	45° to 60° Brace Member Maximum Fp (LRFD)	61° to 75° Brace Member Maximum Fp (LRFD)
<b>[B-0]</b>	(3/4") EMT	7 ft. - 5 in.	<b>152 lbs.</b>	<b>216 lbs.</b>	<b>264 lbs.</b>
	(1") EMT	9 ft. - 9 in.			
	(1-1/4") EMT	12 ft. - 9 in.			
	(1-1/2") EMT	14 ft. - 9 in.			
<b>[B-1]</b>	(3/4") EMT	6 ft. - 0 in.	<b>220 lbs.</b>	<b>311 lbs.</b>	<b>381 lbs.</b>
	(1") EMT	9 ft. - 7 in.			
	(1-1/4") EMT	12 ft. - 9 in.			
	(1-1/2") EMT	14 ft. - 9 in.			
	(2") EMT	18 ft. - 10 in.			
<b>[B-2]</b>	(3/4") EMT	4 ft. - 4 in.	<b>350 lbs.</b>	<b>494 lbs.</b>	<b>606 lbs.</b>
	(1") EMT	7 ft. - 3 in.			
	(1-1/4") EMT	12 ft. - 0 in.			
	(1-1/2") EMT	14 ft. - 9 in.			
	(2") EMT	18 ft. - 10 in.			
<b>[B-3]</b>	(3/4") EMT	2 ft. - 8 in.	<b>550 lbs.</b>	<b>777 lbs.</b>	<b>952 lbs.</b>
	(1") EMT	5 ft. - 4 in.			
	(1-1/4") EMT	9 ft. - 1 in.			
	(1-1/2") EMT	11 ft. - 8 in.			
	(2") EMT	17 ft. - 2 in.			
	(2-1/2") EMT	20 ft. - 0 in.			
<b>[B-4]</b>	(1") EMT	3 ft. - 11 in.	<b>750 lbs.</b>	<b>1,060 lbs.</b>	<b>1,299 lbs.</b>
	(1-1/4") EMT	7 ft. - 5 in.			
	(1-1/2") EMT	9 ft. - 6 in.			
	(2") EMT	14 ft. - 2 in.			
	(2-1/2") EMT	20 ft. - 0 in.			
<b>[B-5]</b>	(1-1/4") EMT	6 ft. - 2 in.	<b>950 lbs.</b>	<b>1,343 lbs.</b>	<b>1,645 lbs.</b>
	(1-1/2") EMT	8 ft. - 1 in.			
	(2") EMT	12 ft. - 2 in.			
	(2-1/2") EMT	20 ft. - 0 in.			
<b>[B-6]</b>	(1-1/4") EMT	3 ft. - 9 in.	<b>1,300 lbs.</b>	<b>1,838 lbs.</b>	<b>2,251 lbs.</b>
	(1-1/2") EMT	6 ft. - 0 in.			
	(2") EMT	9 ft. - 9 in.			
	(2-1/2") EMT	16 ft. - 8 in.			

**Notice: "SEBO"™ Seismic Engineering By Others**

Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension And Compression Cyclic Loads Per ANSI / FM 1950 - 2016. Listed Capacities Do Not Account For Compression Load Limits Due To EMT Conduit Member Size And Length. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Conduit Shall Be Steel Tubing Constructed To UL-797 Or ANSI C-80.3 With A Minimum Yield Strength Of 30,000 PSI.

EMT Conduit Member Shall Be Installed As A Straight, (1) Piece Continuous Member. EMT Conduit Member Ends Shall Be Installed Onto Slotted Ends Of (SBEMT) Seismic Hardware With One Of The Arm Of Each (SBEMT) Inside The EMT Conduit Member And The Other Arm Of Each (SBEMT) Outside Of The EMT Conduit Member. Depth Of EMT Conduit Member Installation Into The (SBEMT) Seismic Hardware Shall Be Per This Detail. Screws Connecting Brace Member To The (SBEMT) Seismic Hardware Shall Be Installed Through Pilot Holes And Tightened Until Screw Washer Head Is Flat-To-Flat With (SBEMT) Seismic Hardware. Do Not Install Screws Into Conduit Weld Seam. Badger (SBEMT) Seismic Hardware Depicted In-Line, Can Be Installed With A Maximum End-To-End, Upper To Lower Seismic Hardware Off-Set Of 90°Degrees.

~ BADGER INDUSTRIES ~  
**Rigid Brace Member - 1**

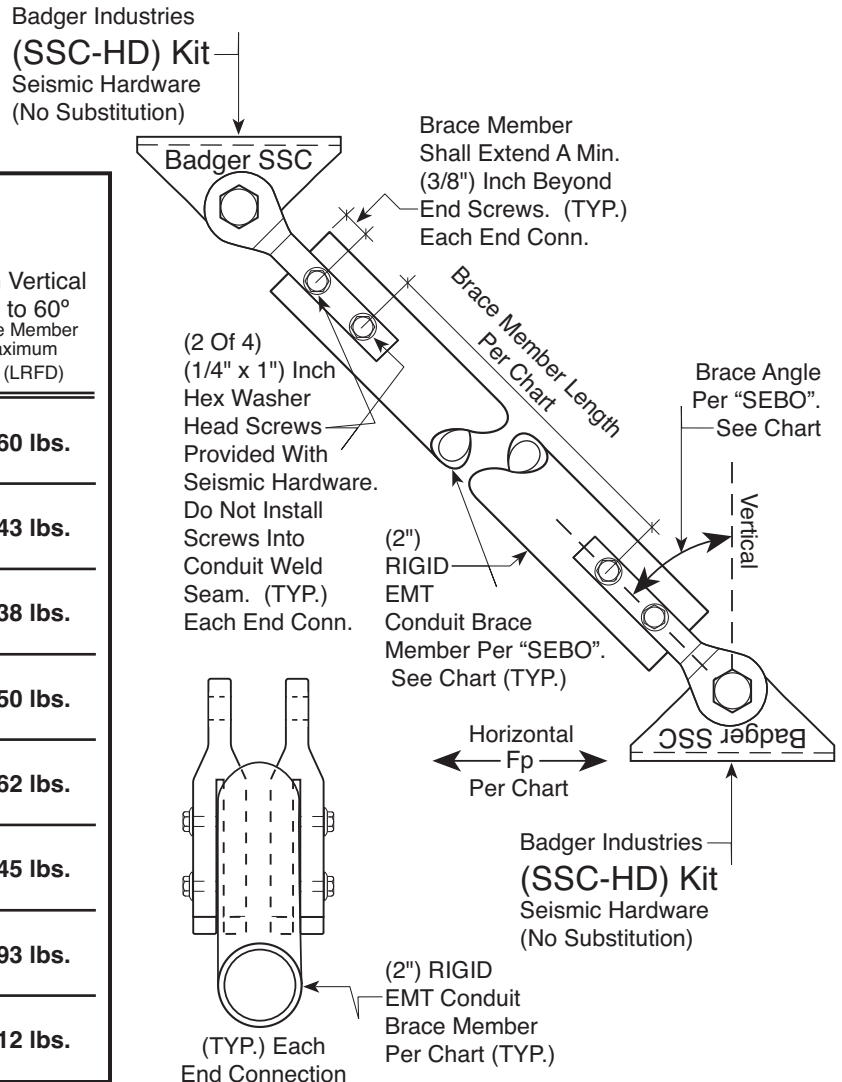


(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~  
Detail (RBM-HD)

Brace Member No.	Brace Member Steel Conduit Nominal Size	Brace Member Maximum Length	Brace Angle From Vertical	
			30° to 44° Brace Member Maximum Fp (LRFD)	45° to 60° Brace Member Maximum Fp (LRFD)
[B-4]	(2") EMT	15 ft. - 7 in.	750 lbs.	1,060 lbs.
[B-5]	(2") EMT	13 ft. - 10 in.	950 lbs.	1,343 lbs.
[B-6]	(2") EMT	11 ft. - 10 in.	1,300 lbs.	1,838 lbs.
[B-7]	(2") EMT	11 ft. - 3 in.	1,450 lbs.	2,050 lbs.
[B-8]	(2") EMT	10 ft. - 8 in.	1,600 lbs.	2,262 lbs.
[B-9]	(2") EMT	10 ft. - 0 in.	1,800 lbs.	2,545 lbs.
[B-10]	(2") EMT	8 ft. - 8 in.	2,400 lbs.	3,393 lbs.
[B-11]	(2") EMT	7 ft. - 9 in.	3,050 lbs.	4,312 lbs.



Notice: "SEBO"™ Seismic Engineering By Others

Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension And Compression Cyclic Loads Per ANSI / FM 1950 - 2016. Listed Capacities Do Not Account For Compression Load Limits Due To EMT Conduit Member Size And Length. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Conduit Shall Be Steel Tubing Constructed To UL-797 Or ANSI C-80.3 With A Minimum Yield Strength Of 30,000 PSI.

EMT Conduit Member Shall Be Installed As A Straight, (1) Piece Continuous Member. EMT Conduit Member Ends Shall Be Installed Onto Slotted Ends Of (SBEMT) Seismic Hardware With One Of The Arm Of Each (SBEMT) Inside The EMT Conduit Member And The Other Arm Of Each (SBEMT) Outside Of The EMT Conduit Member. Depth Of EMT Conduit Member Installation Into The (SBEMT) Seismic Hardware Shall Be Per This Detail. Screws Connecting Brace Member To The (SBEMT) Seismic Hardware Shall Be Installed Through Pilot Holes And Tightened Until Screw Washer Head Is Flat-To-Flat With (SBEMT) Seismic Hardware. Do Not Install Screws Into Conduit Weld Seam. Badger Seismic Hardware Depicted In-Line, Can Be Installed With Any End-To-End, Upper Seismic Hardware To Lower Seismic Hardware Off-Set.



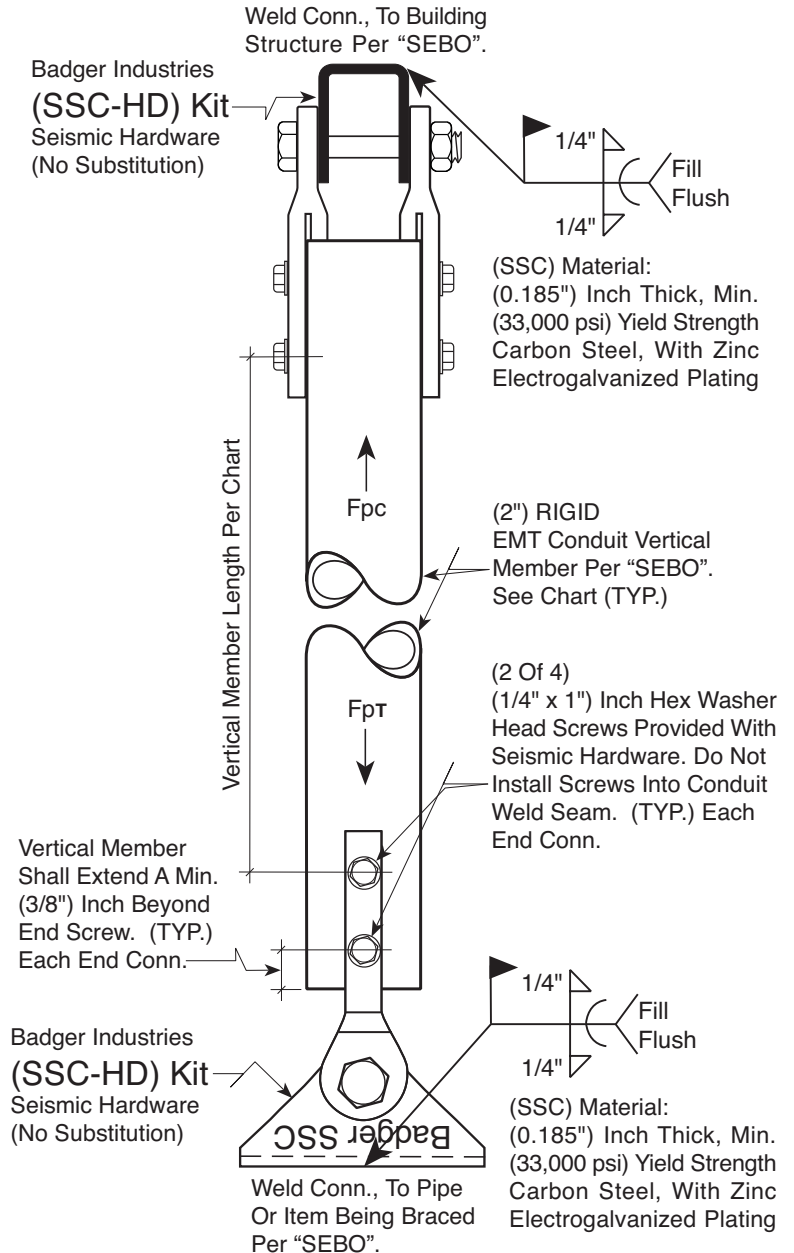
~ BADGER INDUSTRIES ~  
**Rigid Brace Member - Heavy Duty**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL

~ BADGER INDUSTRIES ~ Detail (RVM-HD)			
Vertical Member No.	Vertical Member Steel Conduit Nominal Sizes	Vertical Member Maximum Length	Maximum {Gravity (ASD)} Fpc (LRFD) [FpT (LRFD)]
[V-4]	(2") EMT	15 ft. - 7 in.	{3,000 lbs.} 1,500 lbs. [7,500 lbs.]
[V-5]	(2") EMT	13 ft. - 10 in.	{3,000 lbs.} 1,900 lbs. [7,500 lbs.]
[V-6]	(2") EMT	11 ft. - 10 in.	{3,000 lbs.} 2,600 lbs. [7,500 lbs.]
[V-7]	(2") EMT	11 ft. - 3 in.	{3,000 lbs.} 2,900 lbs. [7,500 lbs.]
[V-8]	(2") EMT	10 ft. - 8 in.	{3,000 lbs.} 3,200 lbs. [7,500 lbs.]
[V-9]	(2") EMT	10 ft. - 0 in.	{3,000 lbs.} 3,600 lbs. [7,500 lbs.]
[V-10]	(2") EMT	8 ft. - 8 in.	{3,000 lbs.} 4,800 lbs. [7,500 lbs.]
[V-11]	(2") EMT	7 ft. - 9 in.	{3,000 lbs.} 6,100 lbs. [7,500 lbs.]



**Notice: "SEBO"™ Seismic Engineering By Others**

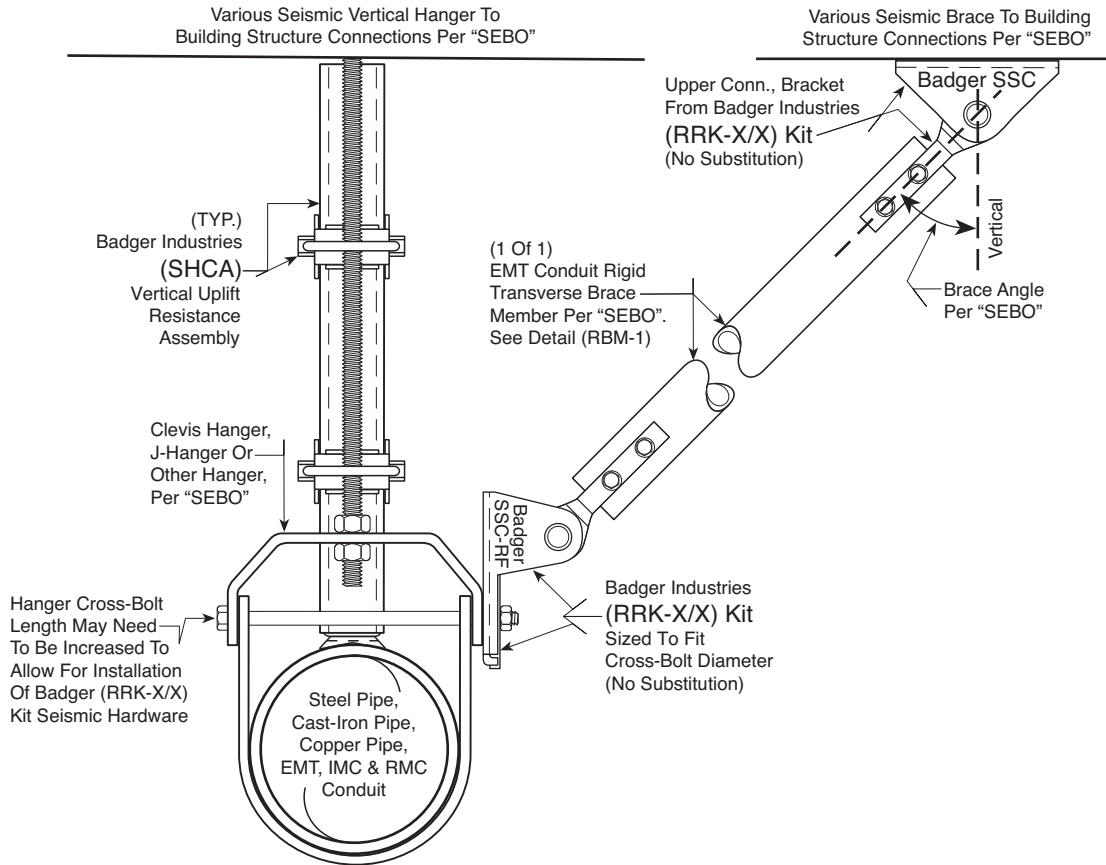
Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension And Compression Cyclic Loads Per ANSI / FM 1950 - 2016. Listed Capacities Do Not Account For Compression Load Limits Due To EMT Conduit Member Size And Length. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Conduit Shall Be Steel Tubing Constructed To UL-797 Or ANSI C-80.3 With A Minimum Yield Strength Of 30,000 PSI.

EMT Conduit Member Shall Be Installed As A Straight, (1) Piece Continuous Member. EMT Conduit Member Ends Shall Be Installed Onto Slotted Ends Of (SBEMT) Seismic Hardware With One Of The Arm Of Each (SBEMT) Inside The EMT Conduit Member And The Other Arm Of Each (SBEMT) Outside Of The EMT Conduit Member. Depth Of EMT Conduit Member Installation Into The (SBEMT) Seismic Hardware Shall Be Per This Detail. Screws Connecting Brace Member To The (SBEMT) Seismic Hardware Shall Be Installed Through Pilot Holes And Tightened Until Screw Washer Head Is Flat-To-Flat With (SBEMT) Seismic Hardware. Do Not Install Screws Into Conduit Weld Seam. Badger Seismic Hardware Can Be Installed With Any End-To-End, Upper Seismic Hardware To Lower Seismic Hardware Off-Set.



~ BADGER INDUSTRIES ~  
**Rigid Vertical Member - HD**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



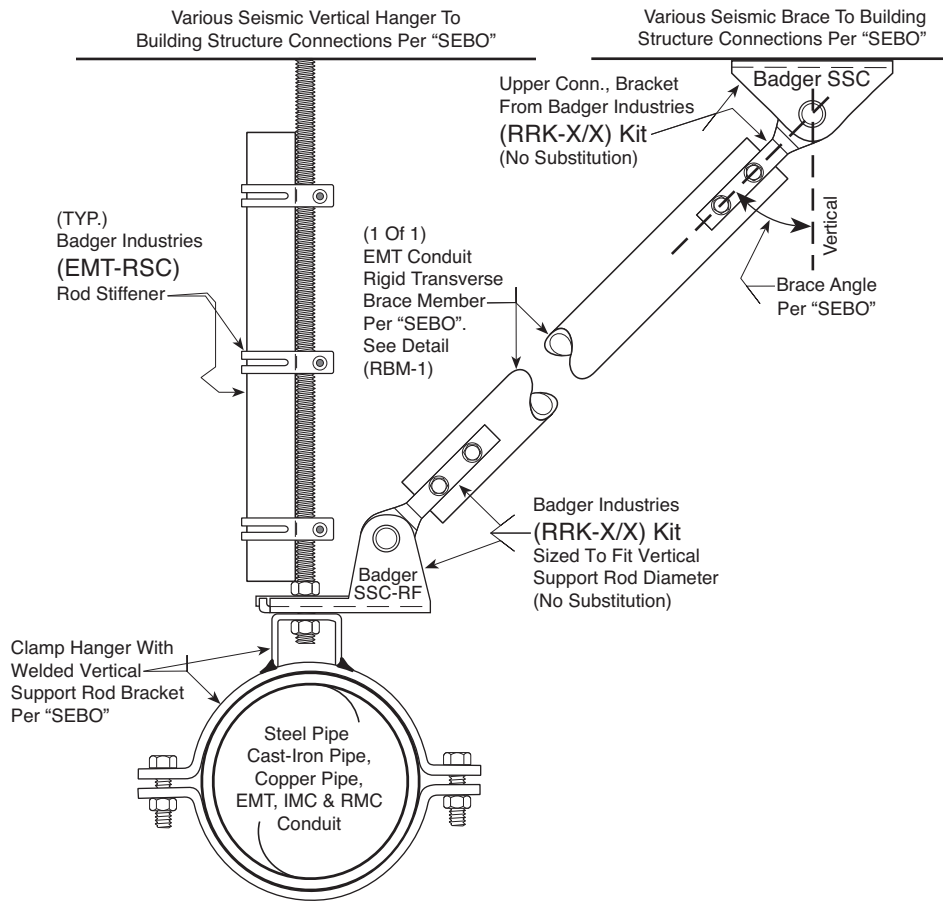
**Notice: "SEBO"™ Seismic Engineering By Others**  
Seismic Capacity And Load Path Integrity Of Clevis Hanger Shall Be Determined By SEBO.  
Cross-Bolt Type, Diameter And Length Vary Among Hanger Manufacturers. Length May Need To Be Increased To Allow For Installation Of Seismic Hardware. Tighten Hex Nut On Cross-Bolt Per SEBO Requirements.  
Cross-Bolt Stiffener Not Depicted For Clarity. Need And Type Of Cross-Bolt Stiffener Shall Be As Determined By SEBO.

**SHT-RH**

~ **BADGER INDUSTRIES** ~  
**Single Hanger Transverse Bracing**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





Notice: "SEBO"™ Seismic Engineering By Others  
Seismic Capacity And Load Path Integrity Of Clamp Hanger  
Shall Be Determined By SEBO.

~ BADGER INDUSTRIES ~

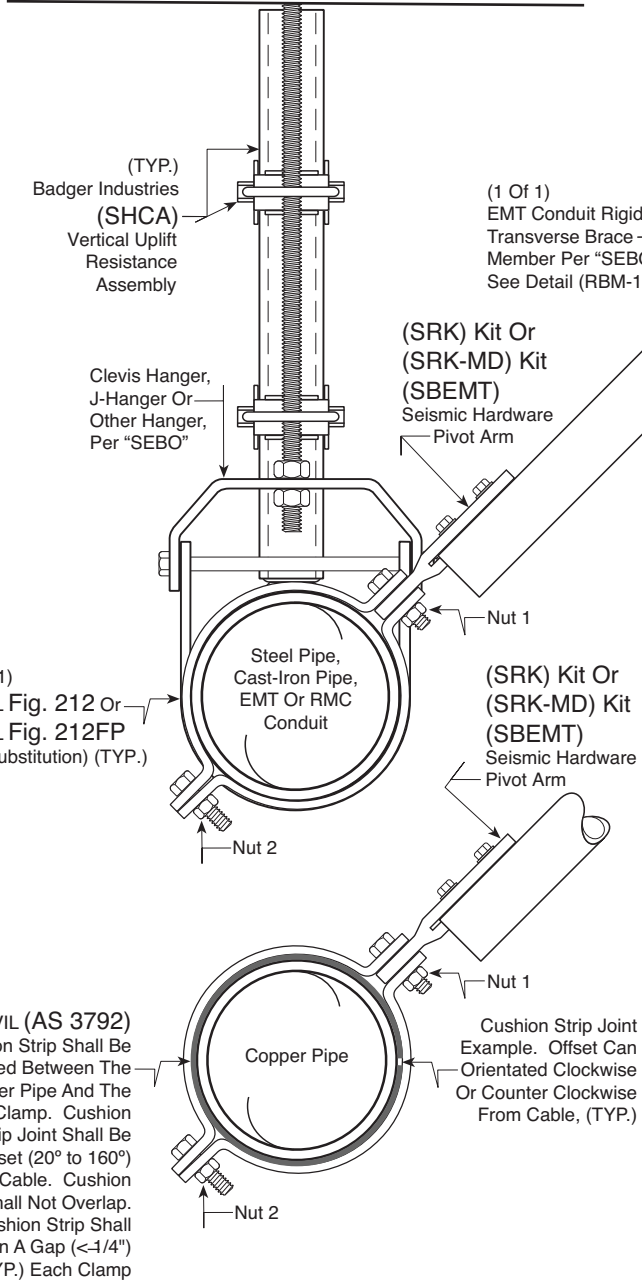
## Single Hanger Transverse Bracing

SHT-CH

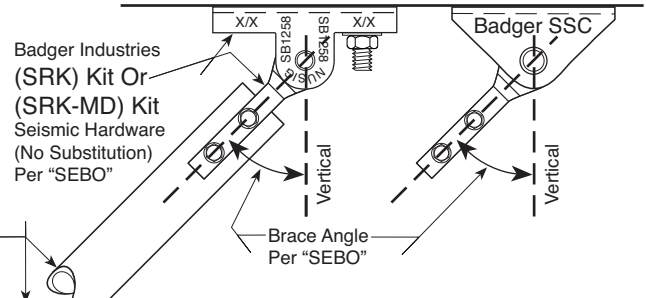
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

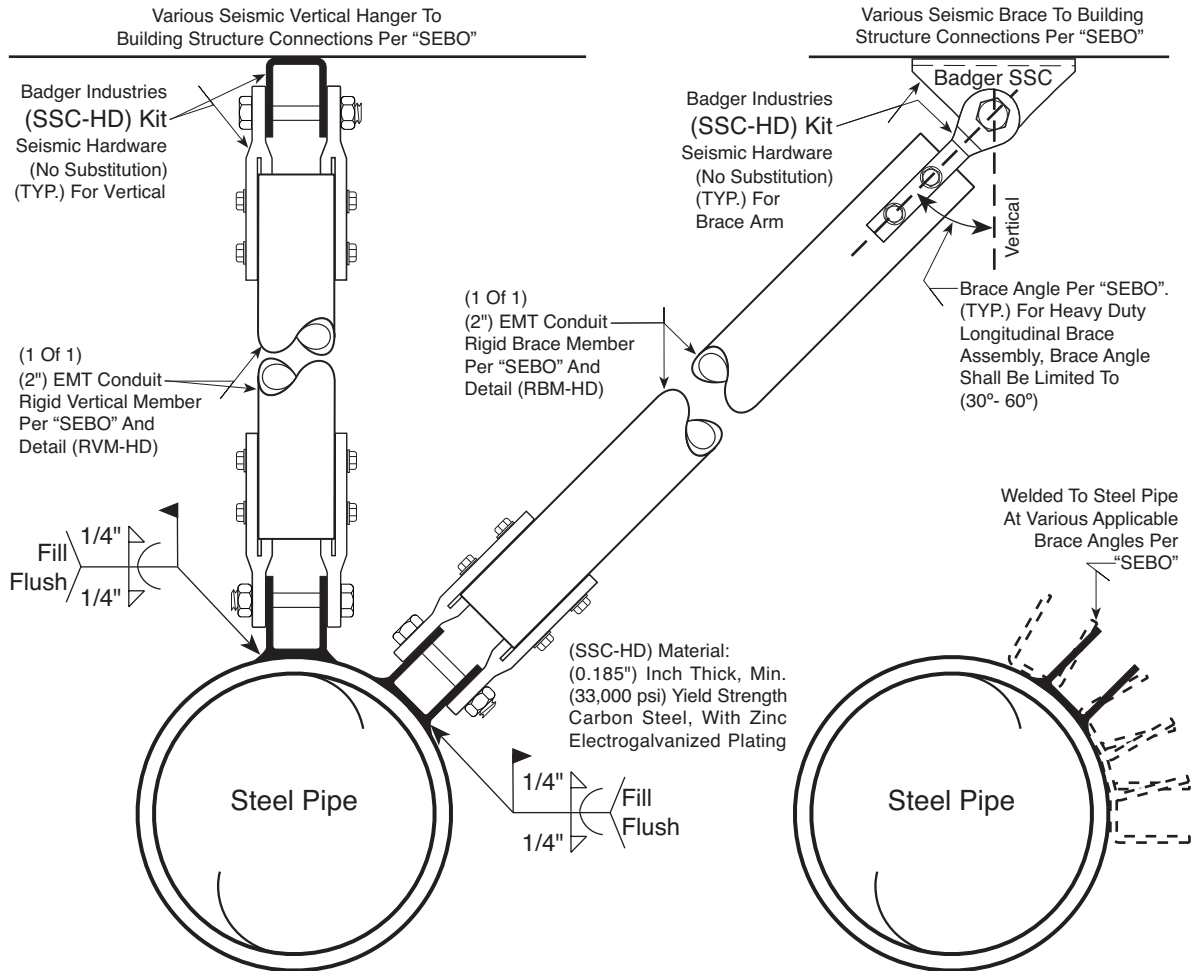


Various Seismic Brace To Building Structure Connections Per "SEBO"



**Notice: "SEBO"™ Seismic Engineering By Others**  
Seismic Capacity And Load Path Integrity Of Depicted Clevis, Or Other Type Of Vertical Hanger Shall Be Determined By SEBO.  
For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details.  
For Schedule 7 And Thicker Steel Pipe And RMC Conduit See Detail (SHVT-SPCA).  
For Cast-Iron Pipe See Detail (SHVT-CIPA).  
For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHVT-COPA).  
For Schedule 5 Steel Pipe And EMT Conduit See Detail (SHVT-EMT5A).

For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.  
Use ANVIL Fig. 212 Clamps For Pipe And Conduit Sizes (2-1/2" thru 4").  
Use ANVIL Fig. 212FP Clamps For Pipe And Conduit Sizes (5" thru 12").  
**ANVIL Fig. 212 And FIG. 212FP Assembly:**  
Anvil International LLC referred to as ANVIL  
**For Pipe Sizes (2-1/2" thru 12"):**  
1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).  
2.) Tighten (Alternately) Hex Nuts 1 And Hex Nut 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 And Hex Nut 2, Every (1) Turn.

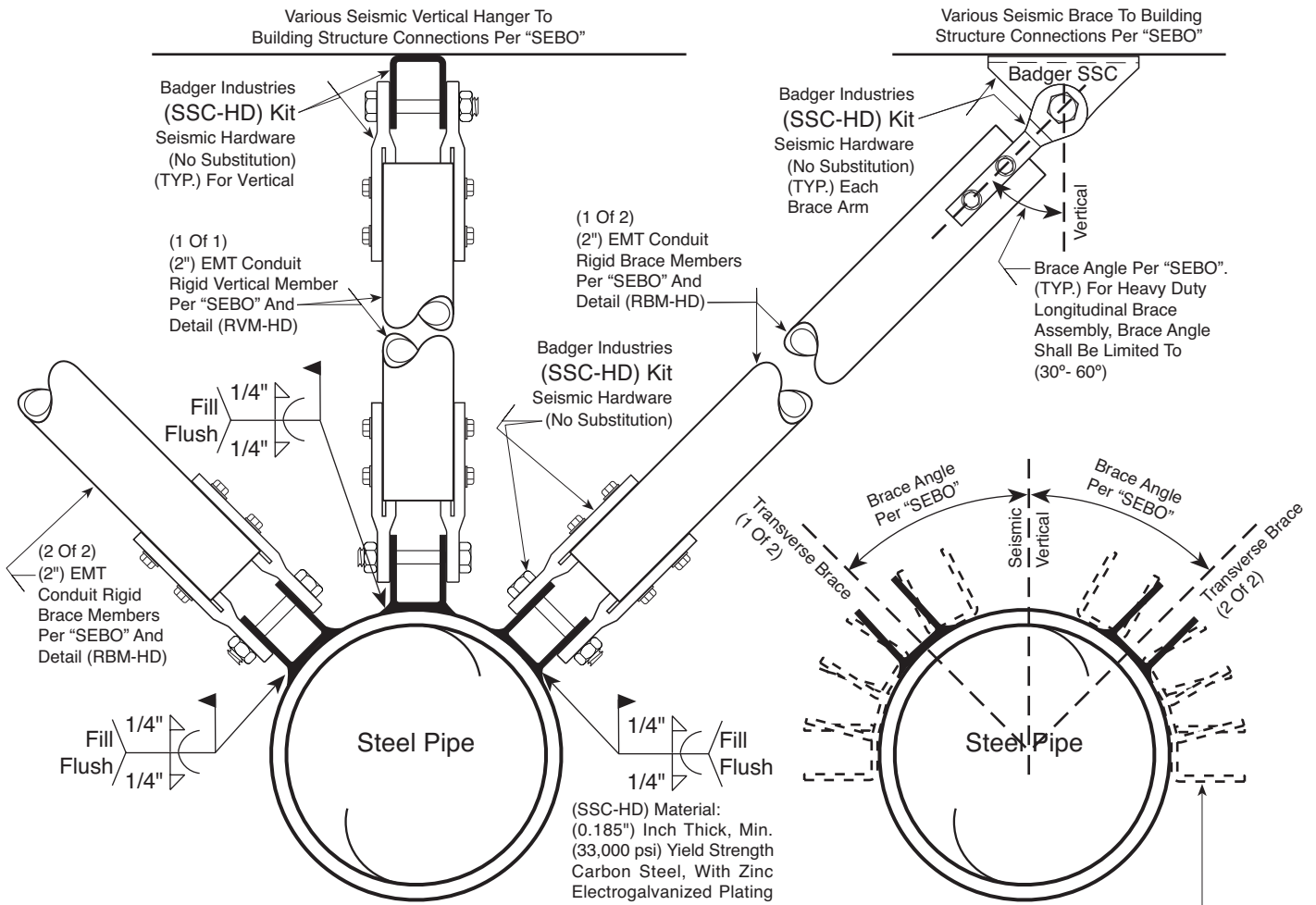


Notice: "SEBO"™ Seismic Engineering By Others  
Specified Weld Is TYP., For All Badger Seismic Hardware Connections To Piping. Welding Shall Be In Compliance With Project Specifications And Latest AWS Standards.

SHT-HD

~ BADGER INDUSTRIES ~  
Single Hanger Transverse Bracing - Heavy Duty

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



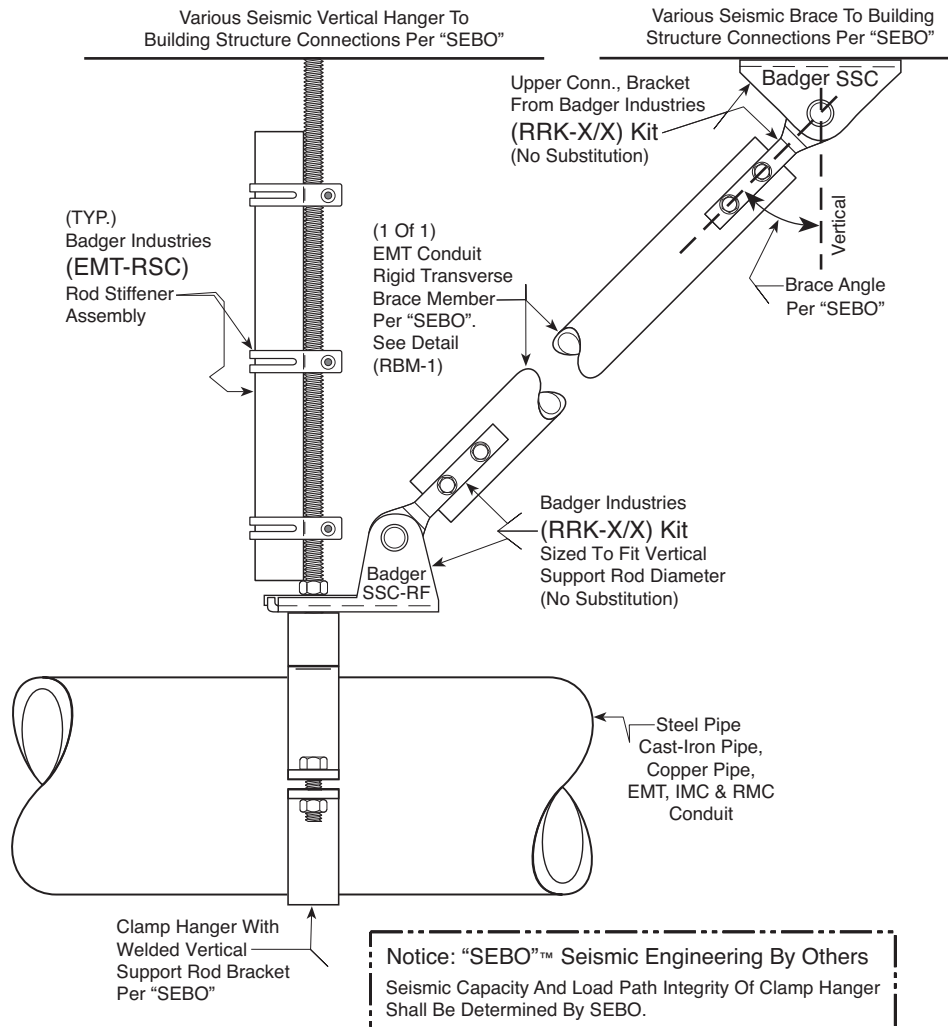
**Notice: "SEBO"™ Seismic Engineering By Others**  
Specified Weld Is TYP., For All Badger Seismic Hardware Connections To Piping. Welding Shall Be In Compliance With Project Specifications And Latest AWS Standards.

Welded To Steel Pipe At Various Applicable Brace Angles Per "SEBO" (TYP.)

**SHT-HD2**

~ **BADGER INDUSTRIES** ~  
**Single Hanger Transverse Bracing - Heavy Duty**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

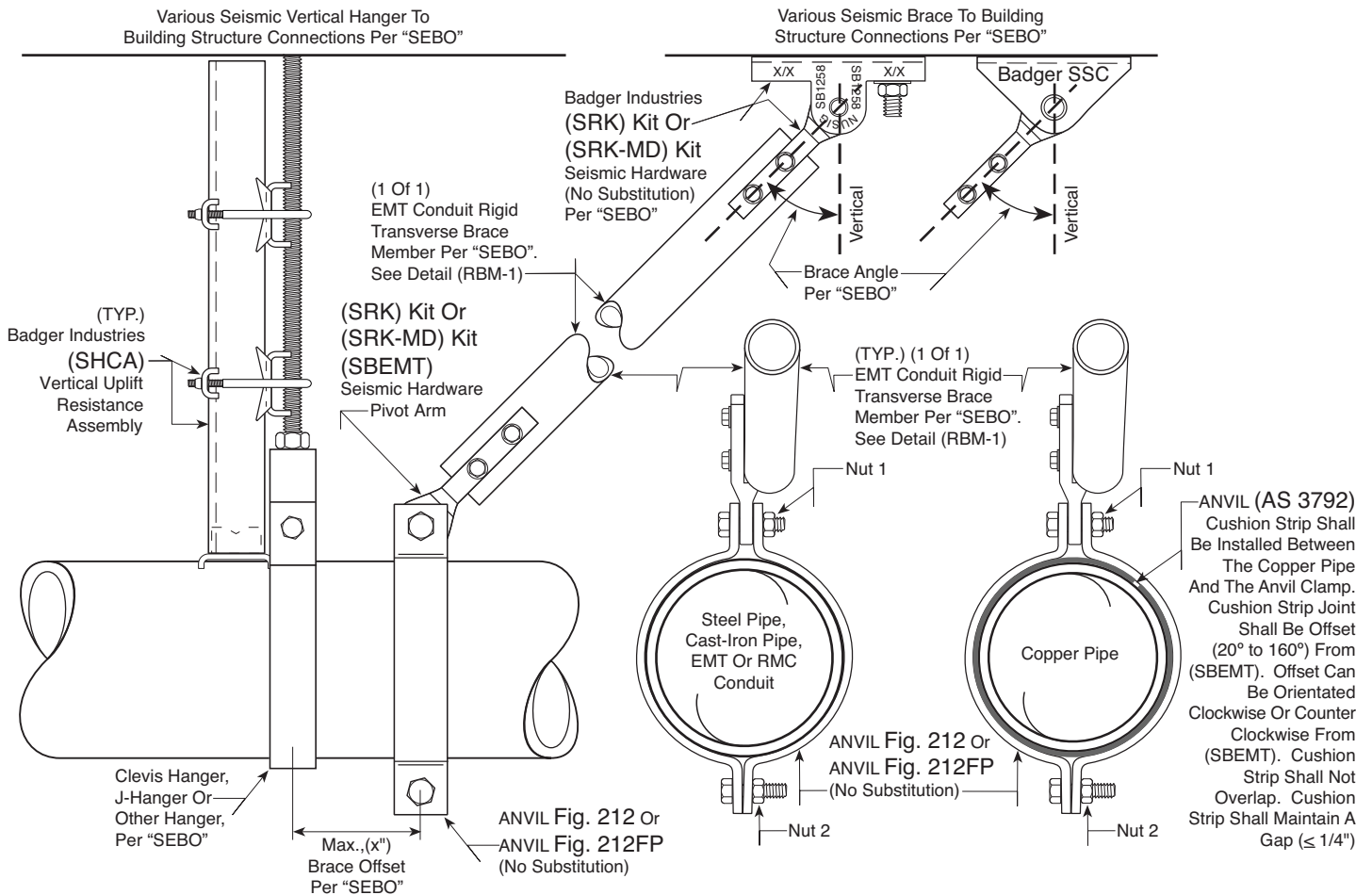


~ BADGER INDUSTRIES ~

## Single Hanger Longitudinal Bracing

SHL-CH

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



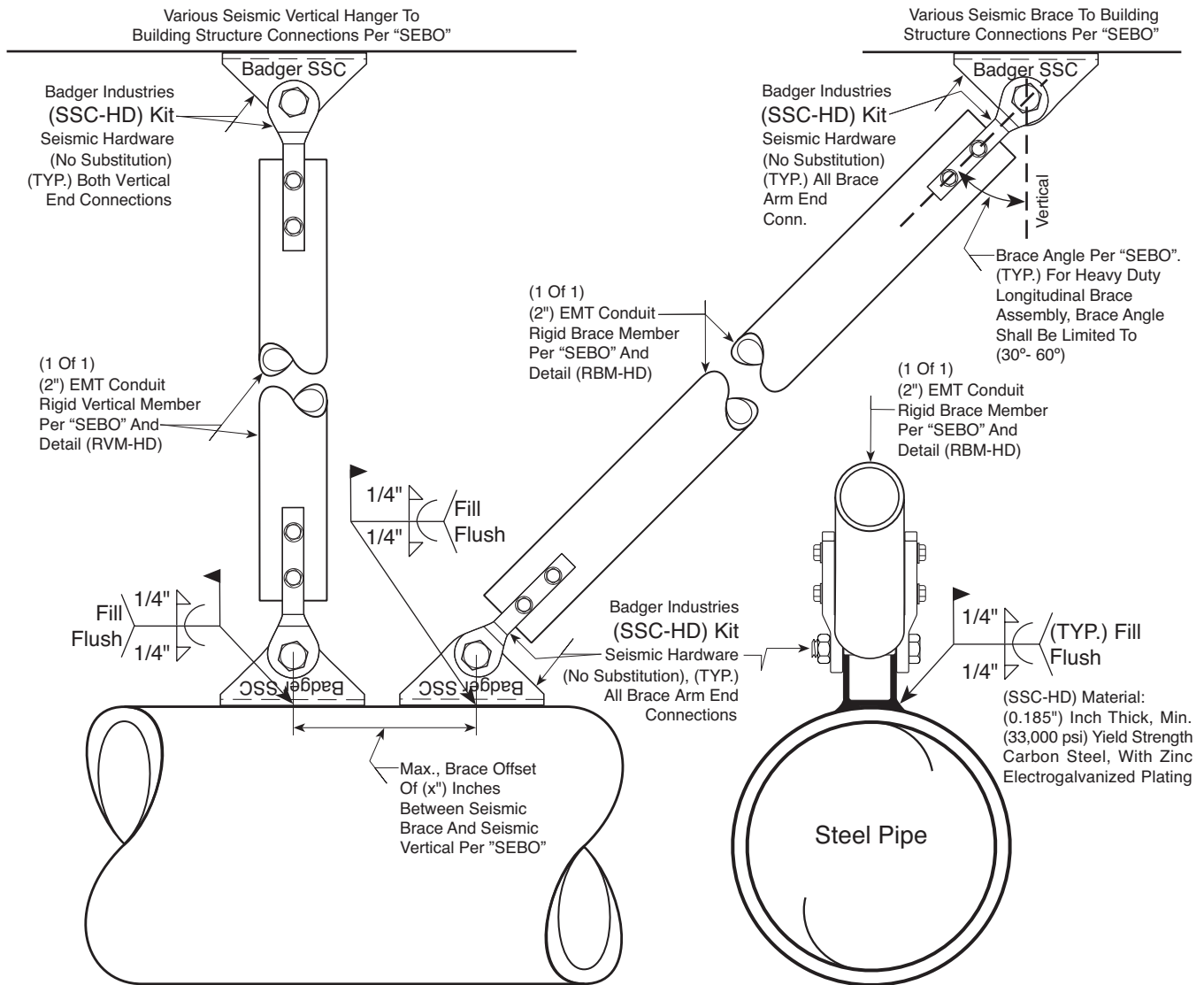
**Notice: "SEBO"™ Seismic Engineering By Others**  
Seismic Capacity And Load Path Integrity Of Depicted Clevis, Or Other Type Of Vertical Hanger Shall Be Determined By SEBO.  
For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details.  
For Sch 7 And Thicker Steel Pipe And RMC Conduit See Detail (SHL-SPCA).  
For Cast-Iron Pipe See Detail (SHL-CIPA).  
For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA).  
For Sch 5 Steel Pipe And EMT Conduit See Detail (SHL-EMT5A).

For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.  
Use ANVIL Fig. 212 Clamps For Pipe And Conduit Sizes (2-1/2" thru 4").  
Use ANVIL Fig. 212FP Clamps For Pipe And Conduit Sizes (5" thru 12").  
**ANVIL Fig. 212 And FIG. 212FP Assembly:**  
Anvil International LLC referred to as ANVIL  
**For Pipe Sizes (2" thru 12"):**  
1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).  
2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft.· lbs.), Using (10 - 15 ft.· lb.) Torque Increases.

**SHL-RA**

~ **BADGER INDUSTRIES** ~  
**Single Hanger Longitudinal Bracing**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



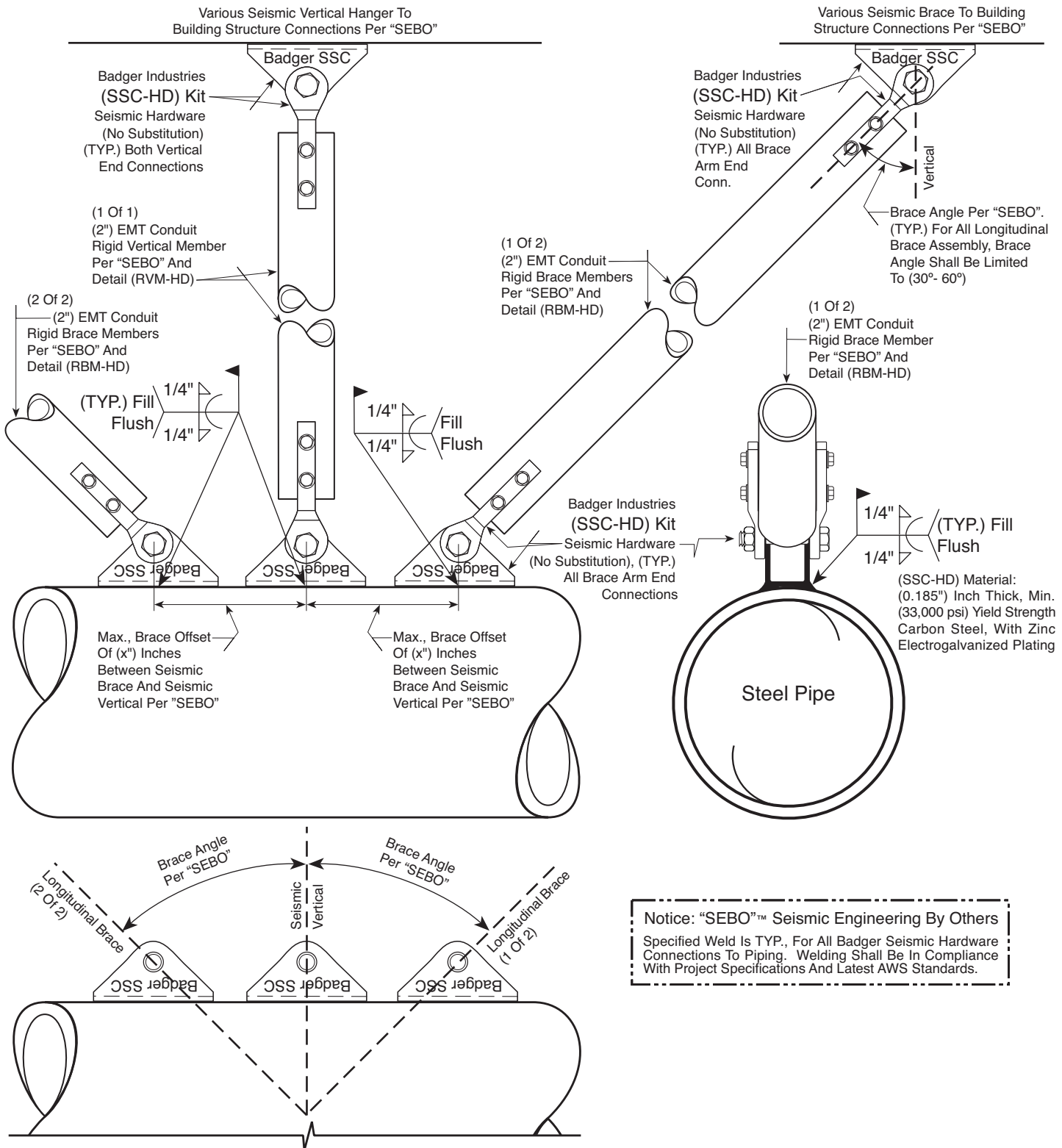
Notice: "SEBO"™ Seismic Engineering By Others  
Specified Weld Is TYP., For All Badger Seismic Hardware Connections To Piping. Welding Shall Be In Compliance With Project Specifications And Latest AWS Standards.

~ BADGER INDUSTRIES ~

**Single Hanger Longitudinal Bracing - Heavy Duty**

**SHL-HD**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



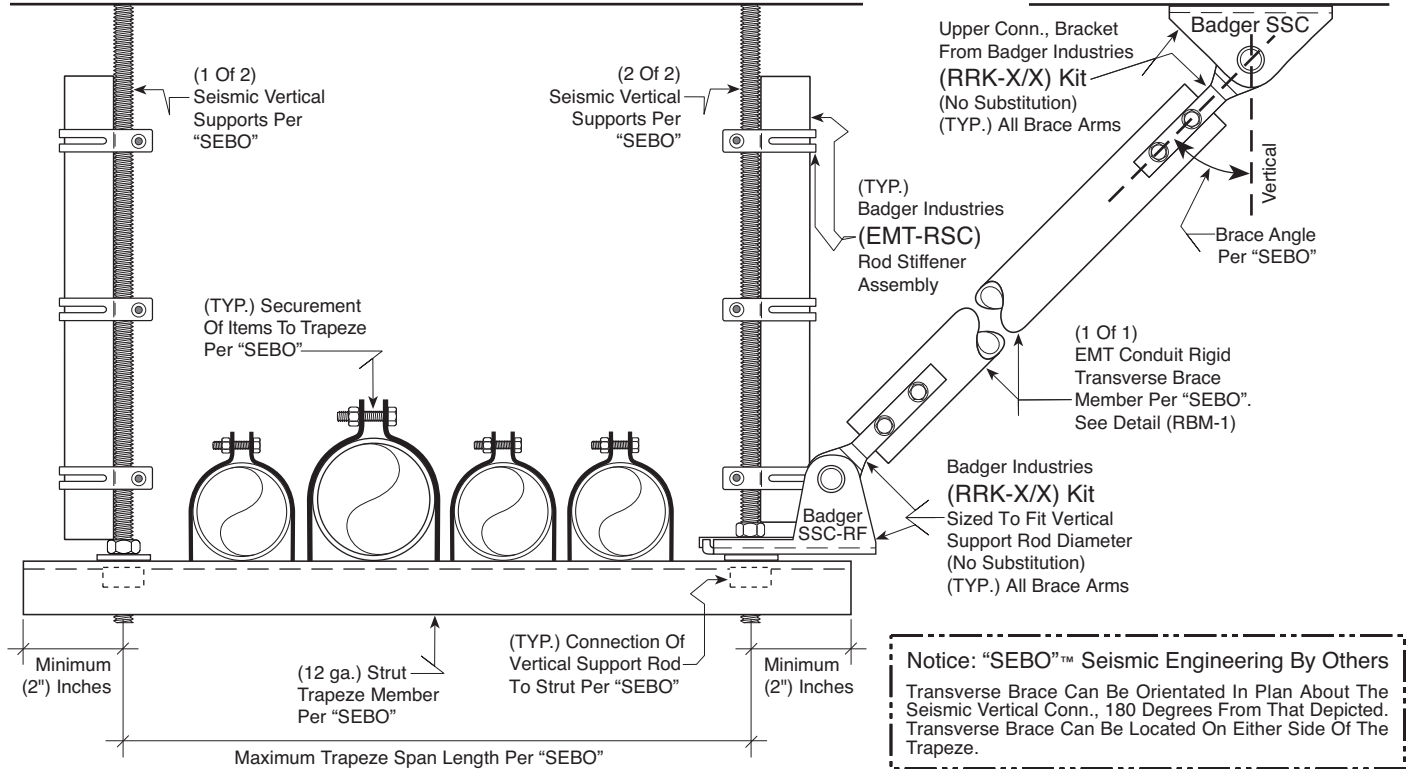
Notice: "SEBO"™ Seismic Engineering By Others Specified Weld Is TYP., For All Badger Seismic Hardware Connections To Piping. Welding Shall Be In Compliance With Project Specifications And Latest AWS Standards.





Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"



~ BADGER INDUSTRIES ~  
**Trapeze - Transverse Brace**

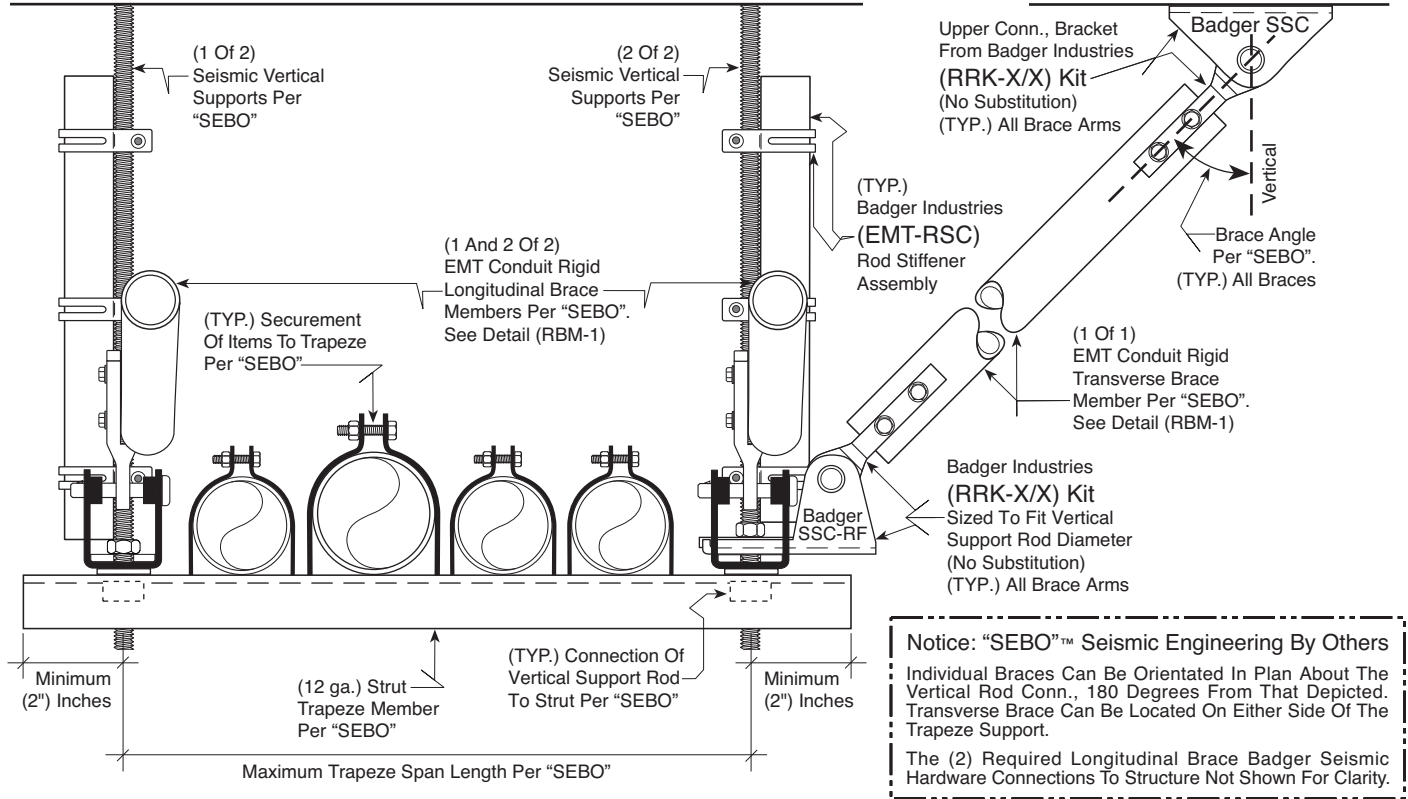
T-T1

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"



~ BADGER INDUSTRIES ~

Trapeze - Combination Transverse / Longitudinal Brace

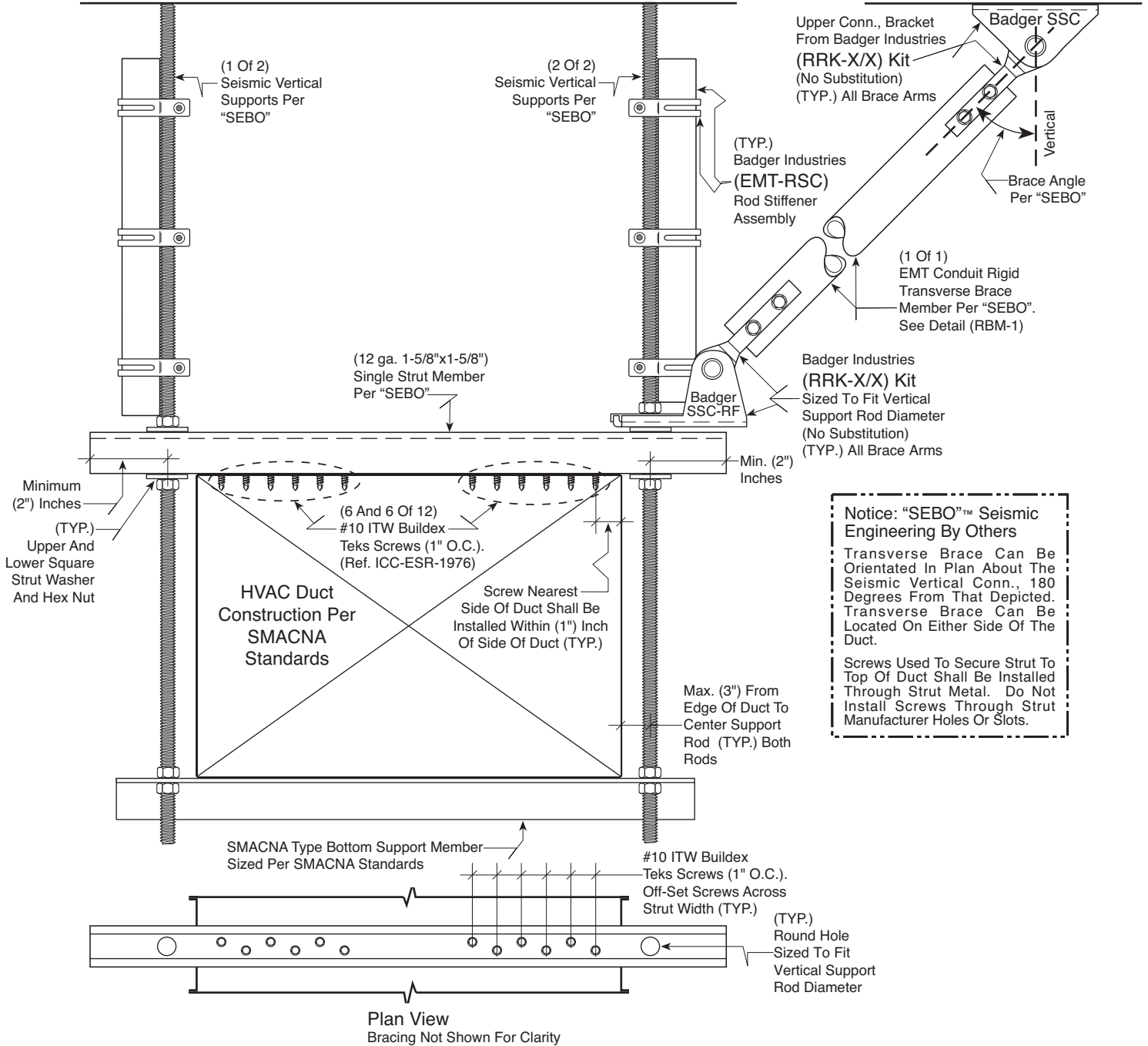
T-TL3

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"



D-T1

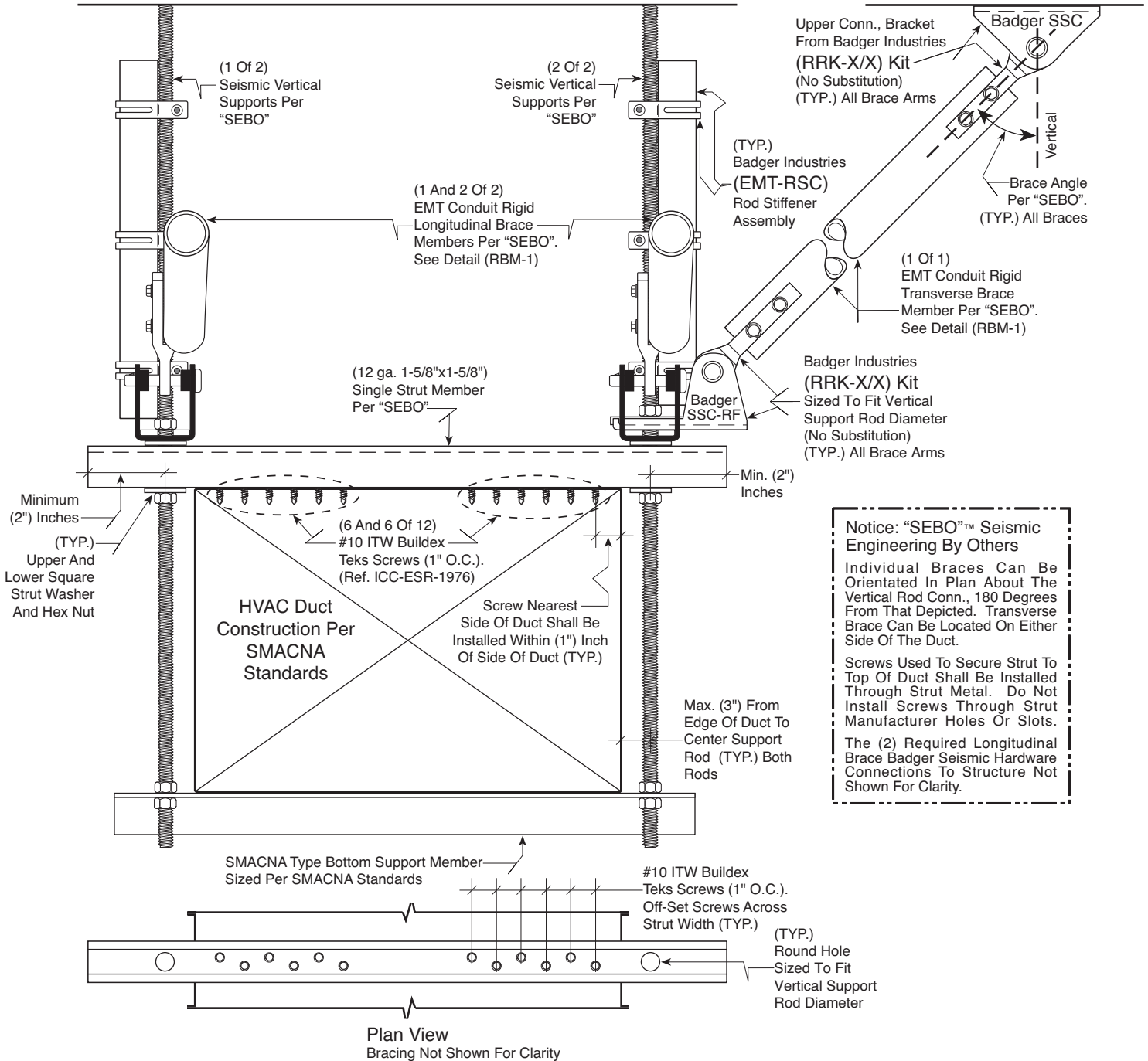
~ BADGER INDUSTRIES ~  
**HVAC Duct - Transverse Brace**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"



**Notice: "SEBO"™ Seismic Engineering By Others**

Individual Braces Can Be Orientated In Plan About The Vertical Rod Conn., 180 Degrees From That Depicted. Transverse Brace Can Be Located On Either Side Of The Duct.

Screws Used To Secure Strut To Top Of Duct Shall Be Installed Through Strut Metal. Do Not Install Screws Through Strut Manufacturer Holes Or Slots.

The (2) Required Longitudinal Brace Badger Seismic Hardware Connections To Structure Not Shown For Clarity.

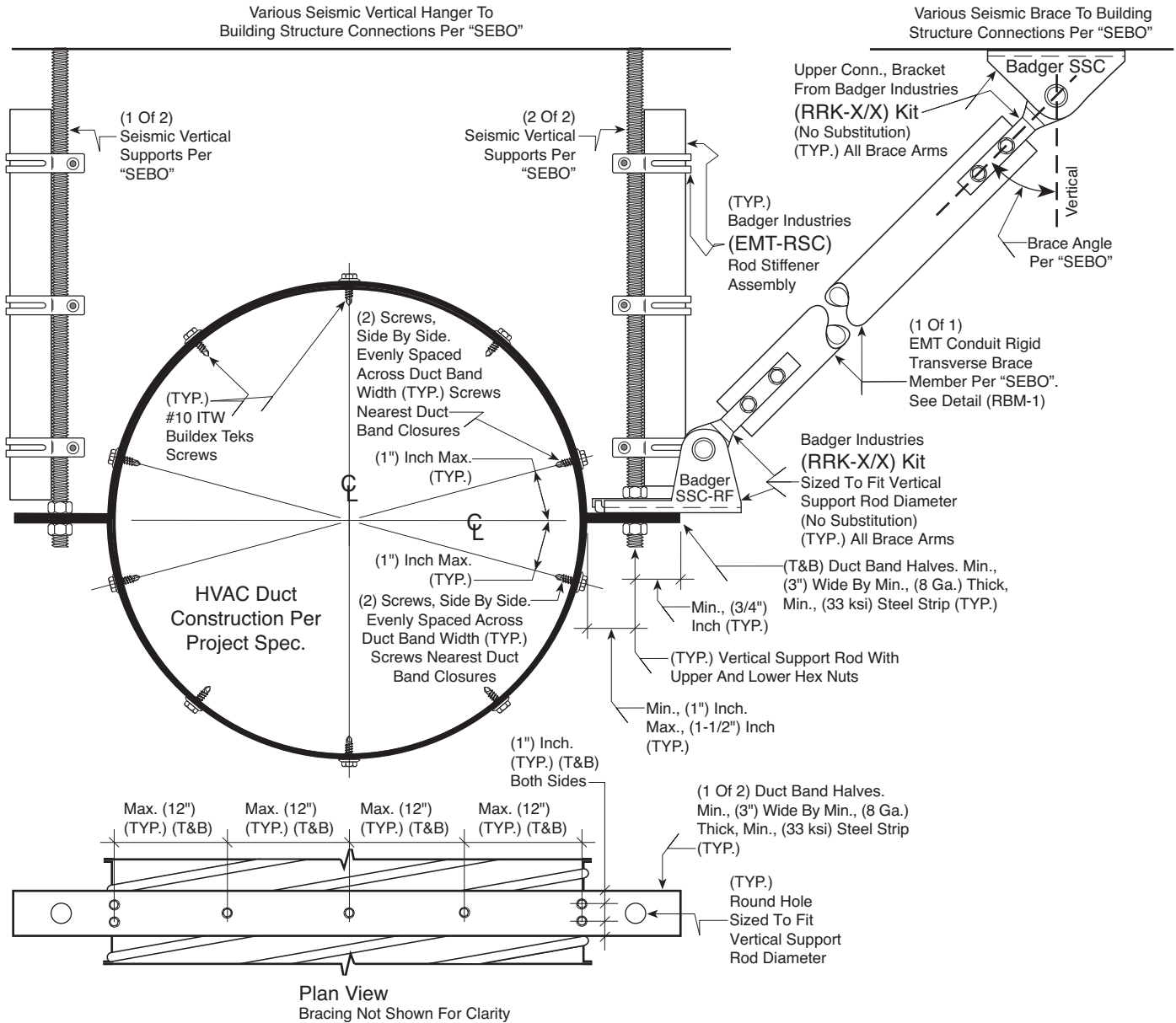
**D-TL3**

~ **BADGER INDUSTRIES** ~  
**HVAC Duct - Combination Transverse / Longitudinal Brace**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL



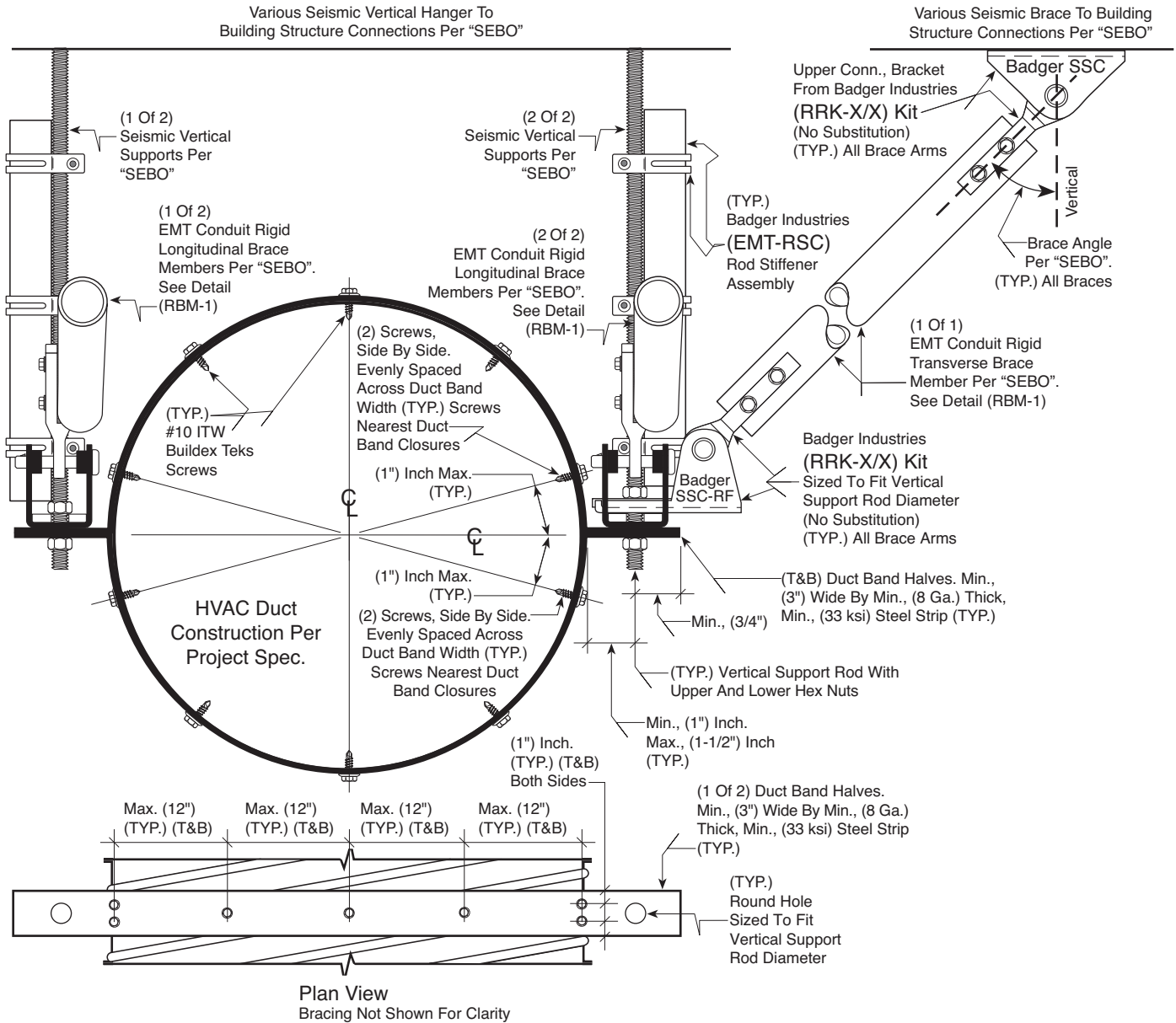
Plan View  
Bracing Not Shown For Clarity

Notice: "SEBO"™ Seismic Engineering By Others  
Transverse Brace Can Be Located On Either Side Of The Duct.

**RD-T1**

~ BADGER INDUSTRIES ~  
**Round HVAC Duct - Transverse Brace**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Notice: "SEBO"™ Seismic Engineering By Others  
Transverse Brace Can Be Located On Either Side Of The Round Duct. Individual Longitudinal Braces Can Be Rotated In Plan About Their Vertical Rod Conn., 180 Degrees From That Depicted.  
The (2) Required Longitudinal Brace Badger Seismic Hardware Connections To Structure Not Shown For Clarity.

**RD-TL3**

~ **BADGER INDUSTRIES** ~  
**Round HVAC Duct - Combination Transverse / Longitudinal Brace**

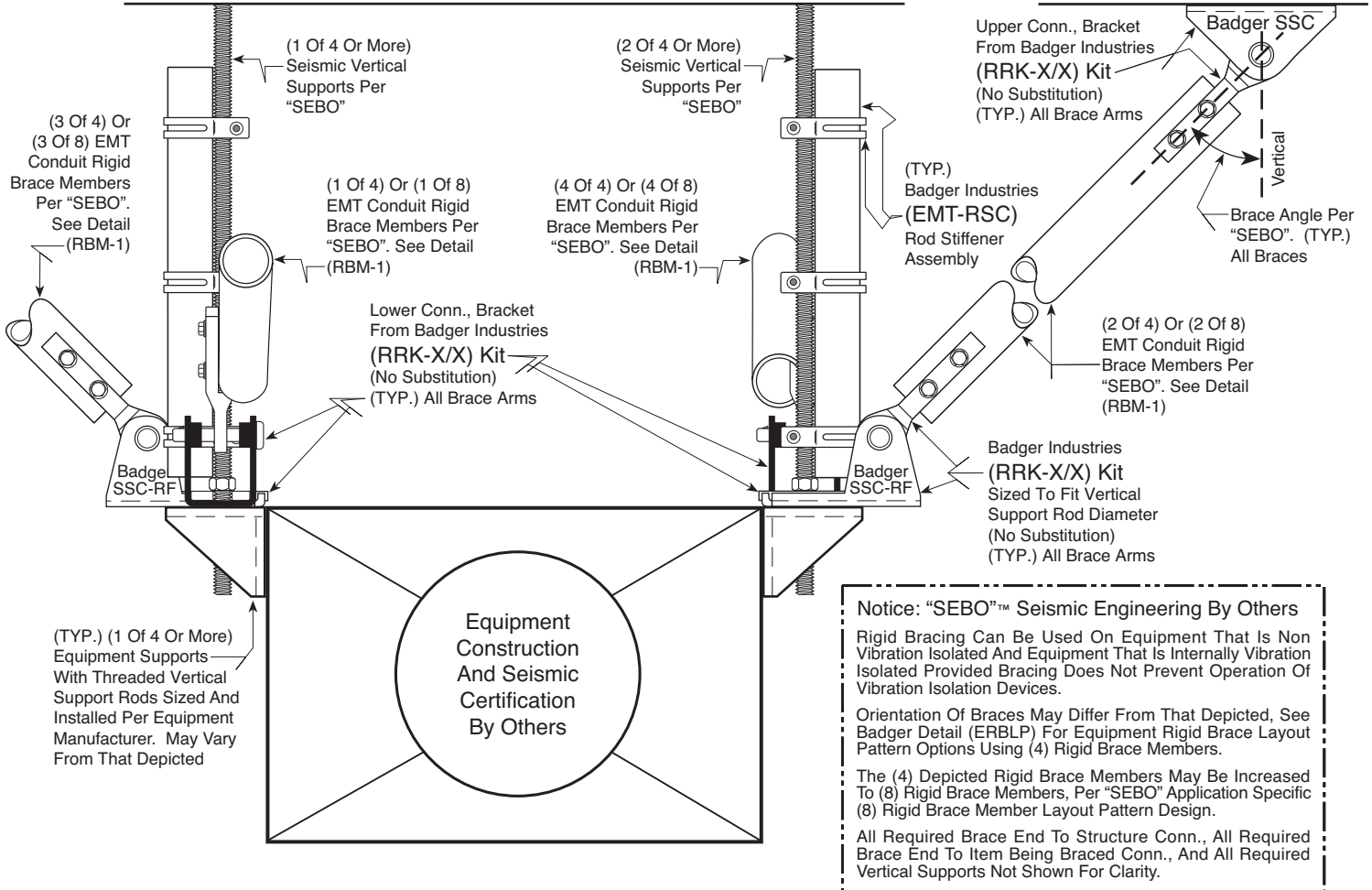
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL

Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"

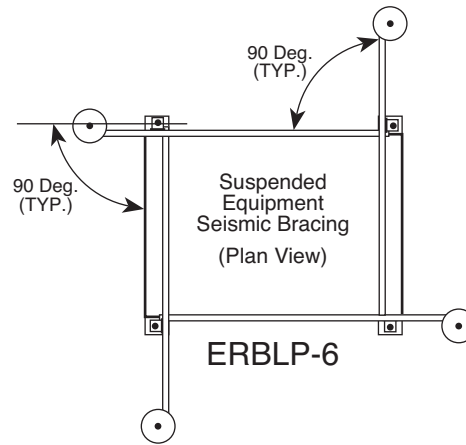
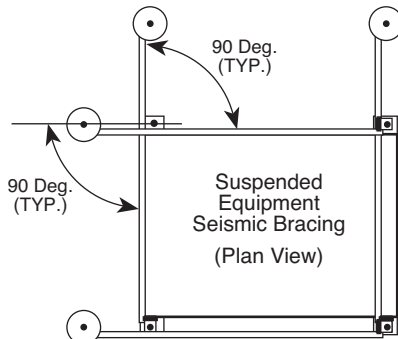
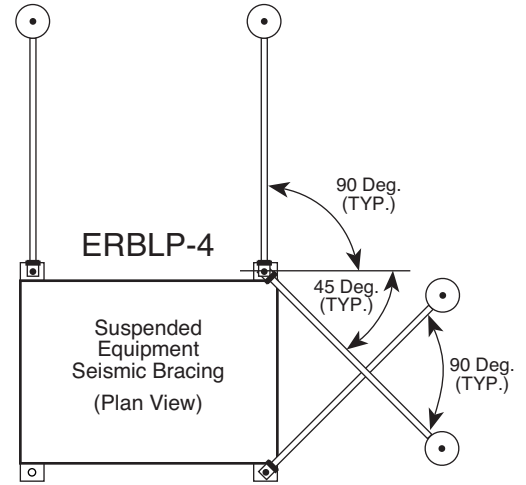
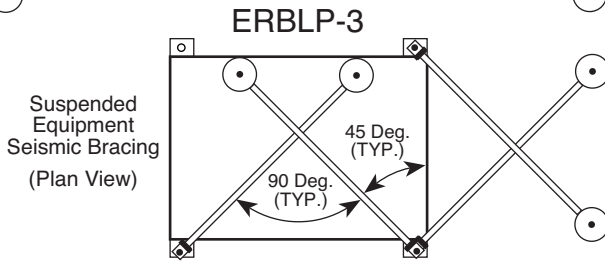
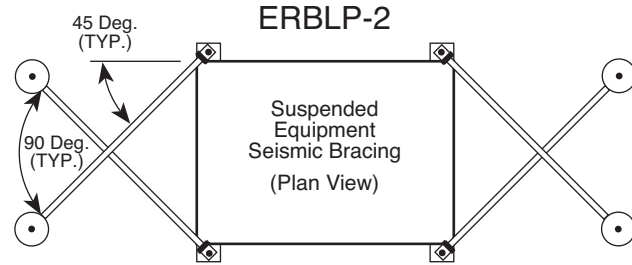
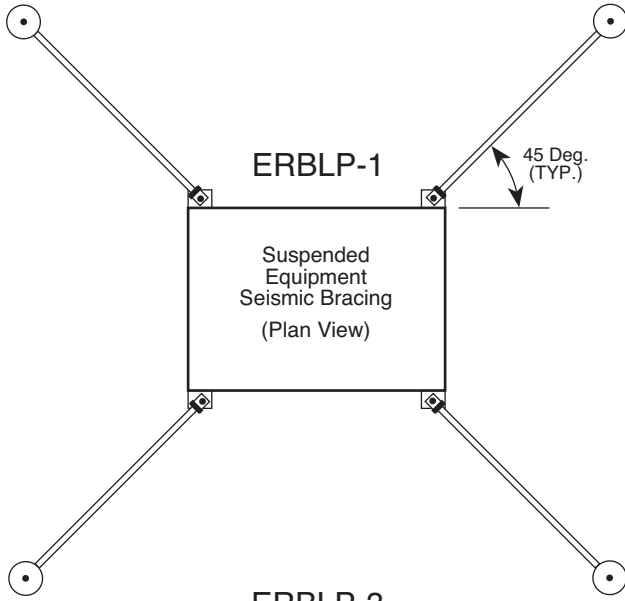


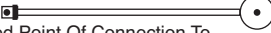
~ BADGER INDUSTRIES ~

Non Vibration Isolated Or Internally Vibration Isolated  
Equipment Combination Transverse / Longitudinal Brace



(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



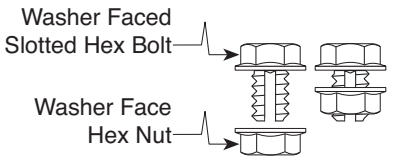
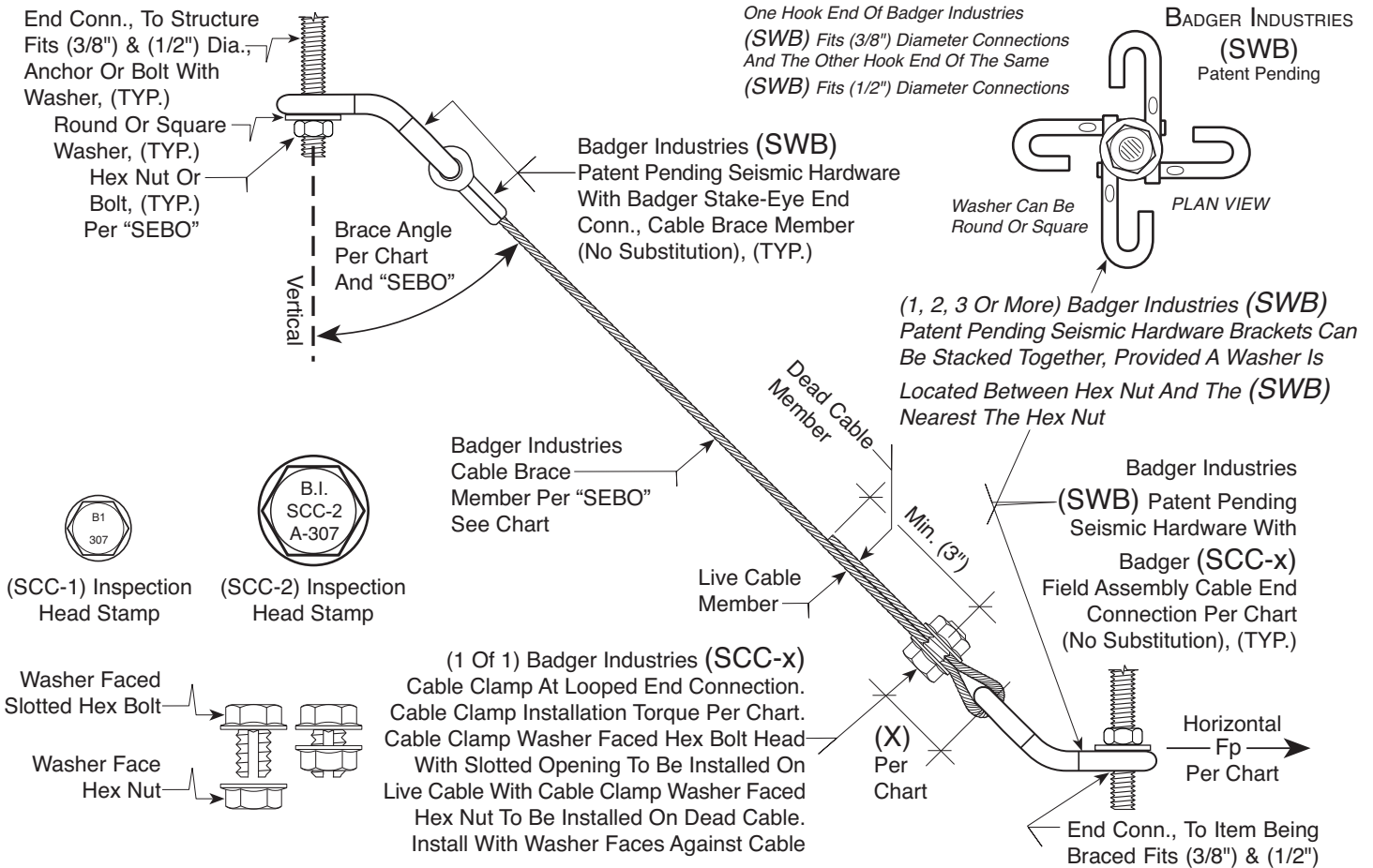
Notice: "SEBO"™ Seismic Engineering By Others  
One Or More Individual Rigid Brace Arms Depicted As  Can Be Rotated In Plan 180 Degrees About Its Depicted Point Of Connection To Equipment.  
At Least (3) Of The (4) Outer Most Vertical Support Rods Shall Be Used As Seismic Brace Connections To Equipment Unit.



# **C**CABLE **B**BRACING **I**INSTALLATION **D**DETAILS



# INSTALLATION DETAIL



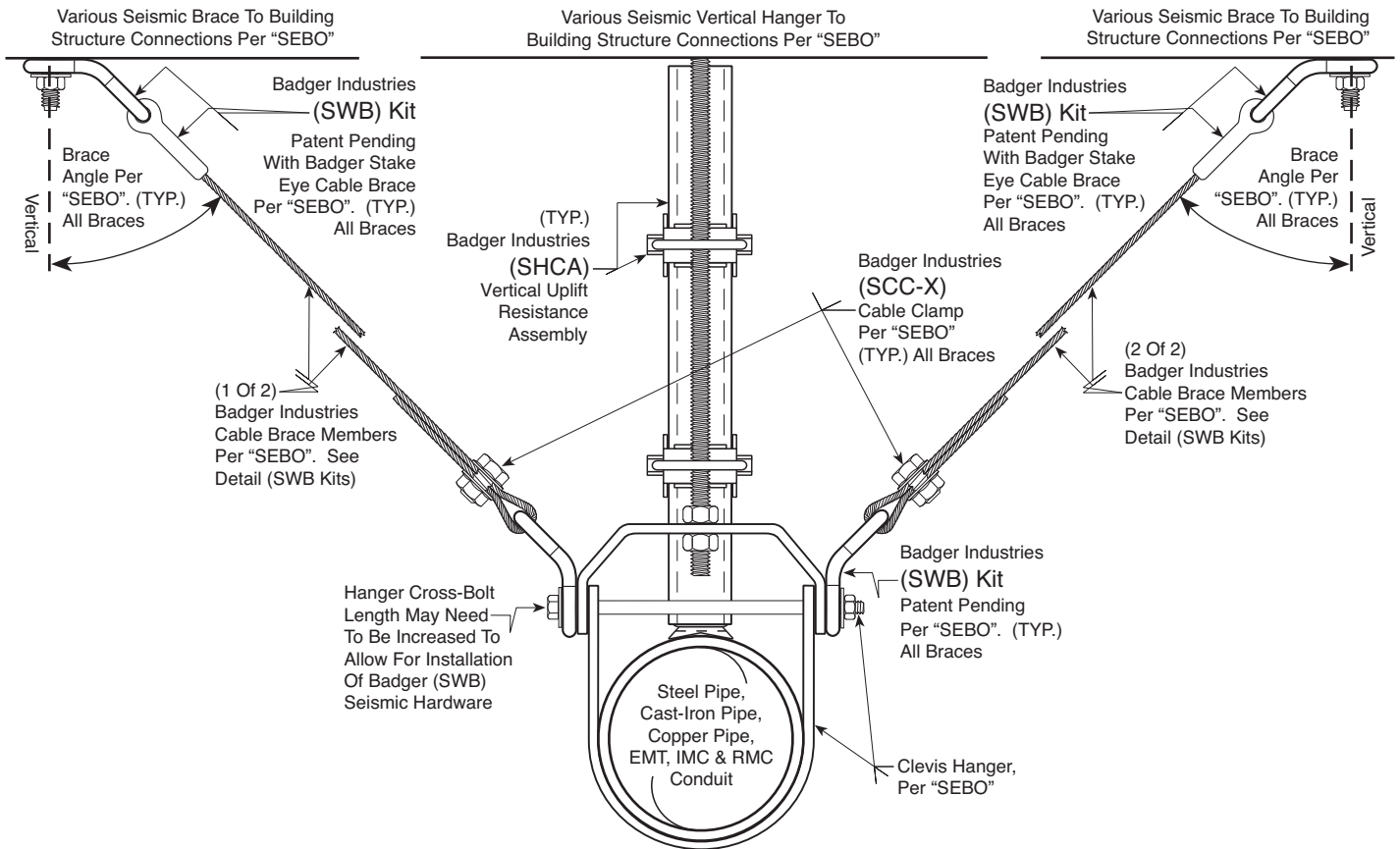
(1 Of 1) Badger Industries (SCC-x) Cable Clamp At Looped End Connection. Cable Clamp Installation Torque Per Chart. Cable Clamp Washer Faced Hex Bolt Head With Slotted Opening To Be Installed On Live Cable With Cable Clamp Washer Faced Hex Nut To Be Installed On Dead Cable. Install With Washer Faces Against Cable

~ BADGER INDUSTRIES ~ Detail (SWB Kits)							
BADGER INDUSTRIES Seismic Hardware Part Number	Cable Brace Member Size, Construction Strands / Arrangement, And Material	(SCC-x) Cable Clamp Size	(SCC-x) Installation Torque	(X) Maximum	Cable Brace Member Maximum Live Length	Brace Angle From Vertical	
						30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)
<b>SWBx116 - 10</b>	Min. (1/16") Inch Dia. (7x7) Galvanized Steel	SCC-1	10 ft. • lbs.	1-1/2" Inch	10 Feet	<b>112 lbs.</b>	<b>159 lbs.</b>
<b>SWBx118 - 10</b> <b>SWBx118 - 20</b>	Min. (1/8") Inch Dia. (7x7) Galvanized Steel	SCC-2	20 ft. • lbs.	1-1/2" Inch	10 Feet 20 Feet	<b>219 lbs.</b>	<b>310 lbs.</b>
<b>SWBx316 - 10</b>	Min. (3/16") Inch Dia. (7x19) Galvanized Steel	SCC-2	30 ft. • lbs.	1-1/2" Inch	10 Feet	<b>528 lbs.</b>	<b>771 lbs.</b>

Notice: "SEBO"™ Seismic Engineering By Others  
Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension Only Cyclic Loads Per ANSI / FM 1950 - 2016. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Torque Setting Of Badger (SCC-x) Cable Clamp Assembly With Both Live And Dead Cable Brace Members Will Cause Nesting Of The Cable Brace Members Within The (SCC-x) Cable Clamp, That May Result In An (SCC-x) Orientation Different Than That Depicted. Field Installed Cable Loop Shall Fit Tight To The Badger Seismic Hardware, Not Bulging Or Oversized. Cable Brace Member Shall Be Installed As A (1) Piece Continuous Taut Straight Member, EXCEPTION: For Item Suspended By Vibration Isolation Devices, Cable Brace Member Slack Shall Be As Determined By The Vibration Isolation Engineer.



# INSTALLATION DETAIL

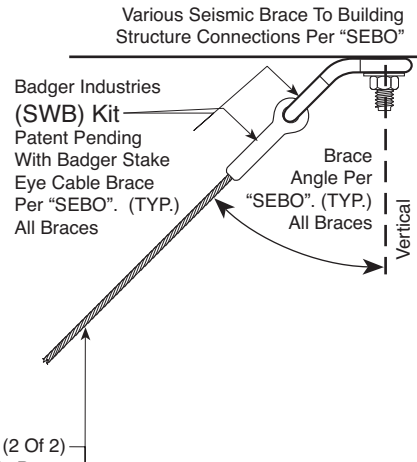
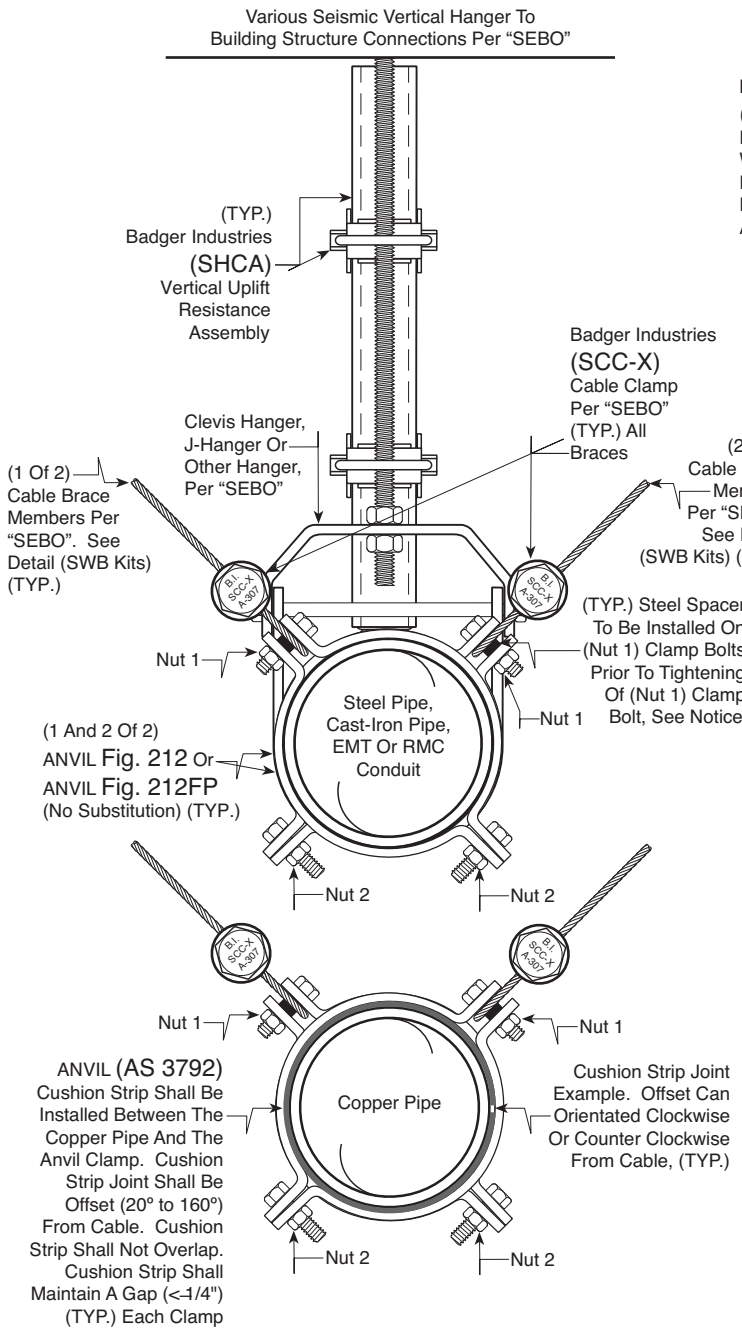


**Notice: "SEBO"™ Seismic Engineering By Others**  
Seismic Capacity And Load Path Integrity Of Clevis Hanger Shall Be Determined By SEBO.  
Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware.  
Cross-Bolt Type, Diameter And Length Vary Among Hanger Manufacturer's. Length May Need To Be Increased To Allow For Installation Of Seismic Hardware. Tighten Hex Nut On Cross-Bolt Per SEBO Requirements.  
Cross-Bolt Stiffener Not Depicted For Clarity. Need And Type Of Cross-Bolt Stiffener Shall Be As Determined By SEBO.  
This Detail Is For Use With Cable Bracing Installed Taught To Remove Slack.

SHT-C

~ BADGER INDUSTRIES ~  
**Single Hanger Transverse Bracing**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Notice: "SEBO"™ Seismic Engineering By Others**

Seismic Capacity And Load Path Integrity Of Depicted Clevis, Or Other Type Of Vertical Hanger Shall Be Determined By SEBO.

Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware.

For Applicable Anvil Clamp Sizes (2-1/2" thru 12") Use A McMASTER CARR Spacer Part #92415A144 Or Equal.

For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details.

For Sch 7 And Thicker Steel Pipe And RMC Conduit See Detail (SHL-SPCA).

For Cast-Iron Pipe See Detail (SHL-CIPA).

For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA).

For Sch 5 Steel Pipe And EMT Conduit See Detail (SHL-EMT5A).

This Detail Is For Use With Cable Bracing Installed Taught To Remove Slack.

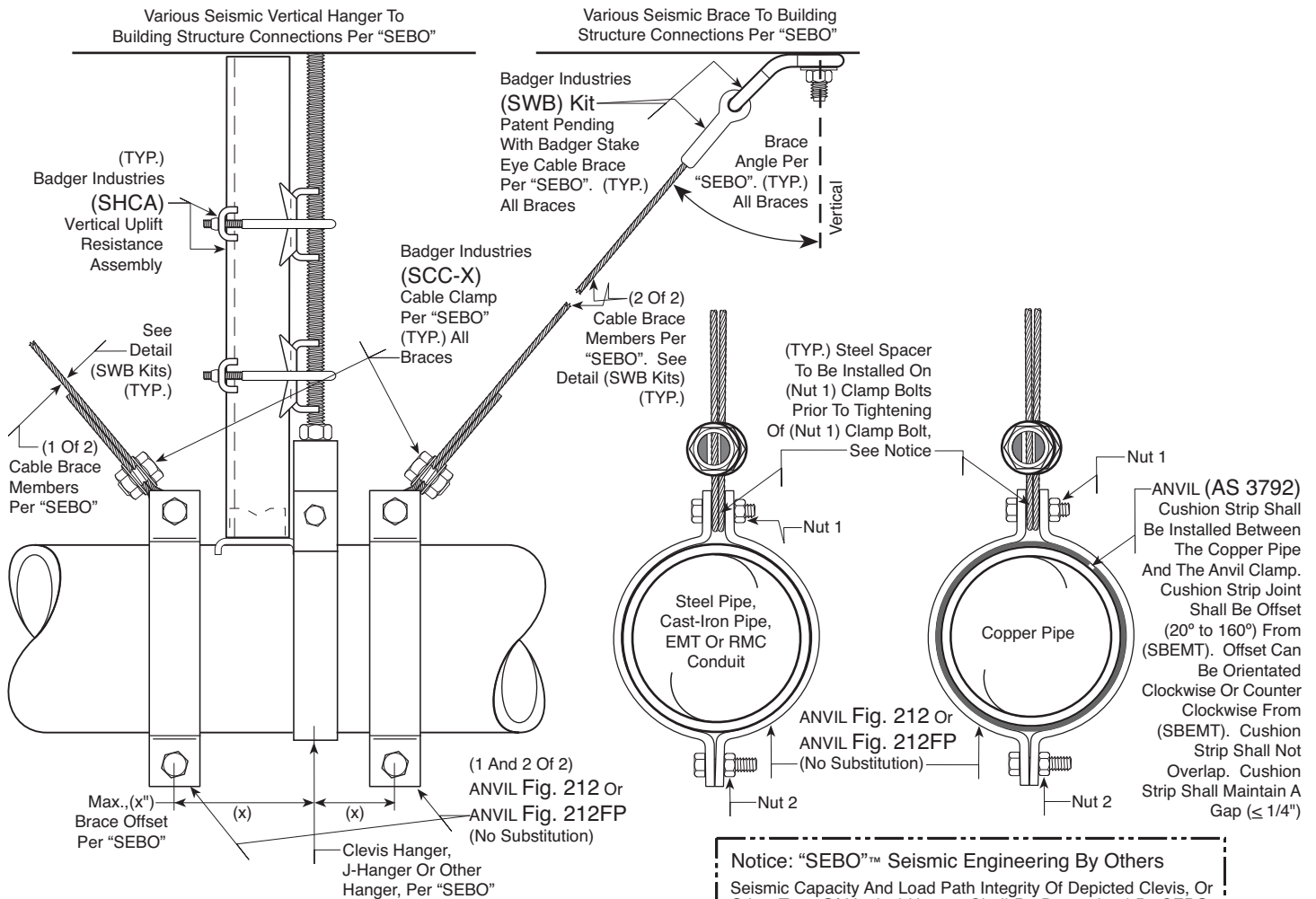
For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.

Use ANVIL Fig. 212 Clamps For Pipe And Conduit Sizes (2-1/2" thru 4").  
Use ANVIL Fig. 212FP Clamps For Pipe And Conduit Sizes (5" thru 12").

**ANVIL Fig. 212 And FIG. 212FP Assembly:**  
Anvil International LLC referred to as ANVIL

**For Pipe Sizes (2-1/2" thru 12"):**

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft. • lbs.), Using (10 - 15 ft. • lb.) Torque Increases.



For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.

Use ANVIL Fig. 212 Clamps For Pipe And Conduit Sizes (2-1/2" thru 4").  
Use ANVIL Fig. 212FP Clamps For Pipe And Conduit Sizes (5" thru 12").

**ANVIL Fig. 212 And FIG. 212FP Assembly:**  
Anvil International LLC referred to as ANVIL

**For Pipe Sizes (2-1/2" thru 12"):**

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft. • lbs.), Using (10 - 15 ft. • lb.) Torque Increases.

**Notice: "SEBO"™ Seismic Engineering By Others**

Seismic Capacity And Load Path Integrity Of Depicted Clevis, Or Other Type Of Vertical Hanger Shall Be Determined By SEBO.

Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware.

For Applicable Anvil Clamp Sizes (2-1/2" thru 12") Use A McMASTER CARR Spacer Part #92415A144 Or Equal.

For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details.

For Sch 7 And Thicker Steel Pipe And RMC Conduit See Detail (SHL-SPCA).

For Cast-Iron Pipe See Detail (SHL-CIPA).

For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA).

For Sch 5 Steel Pipe And EMT Conduit See Detail (SHL-EMT5A).

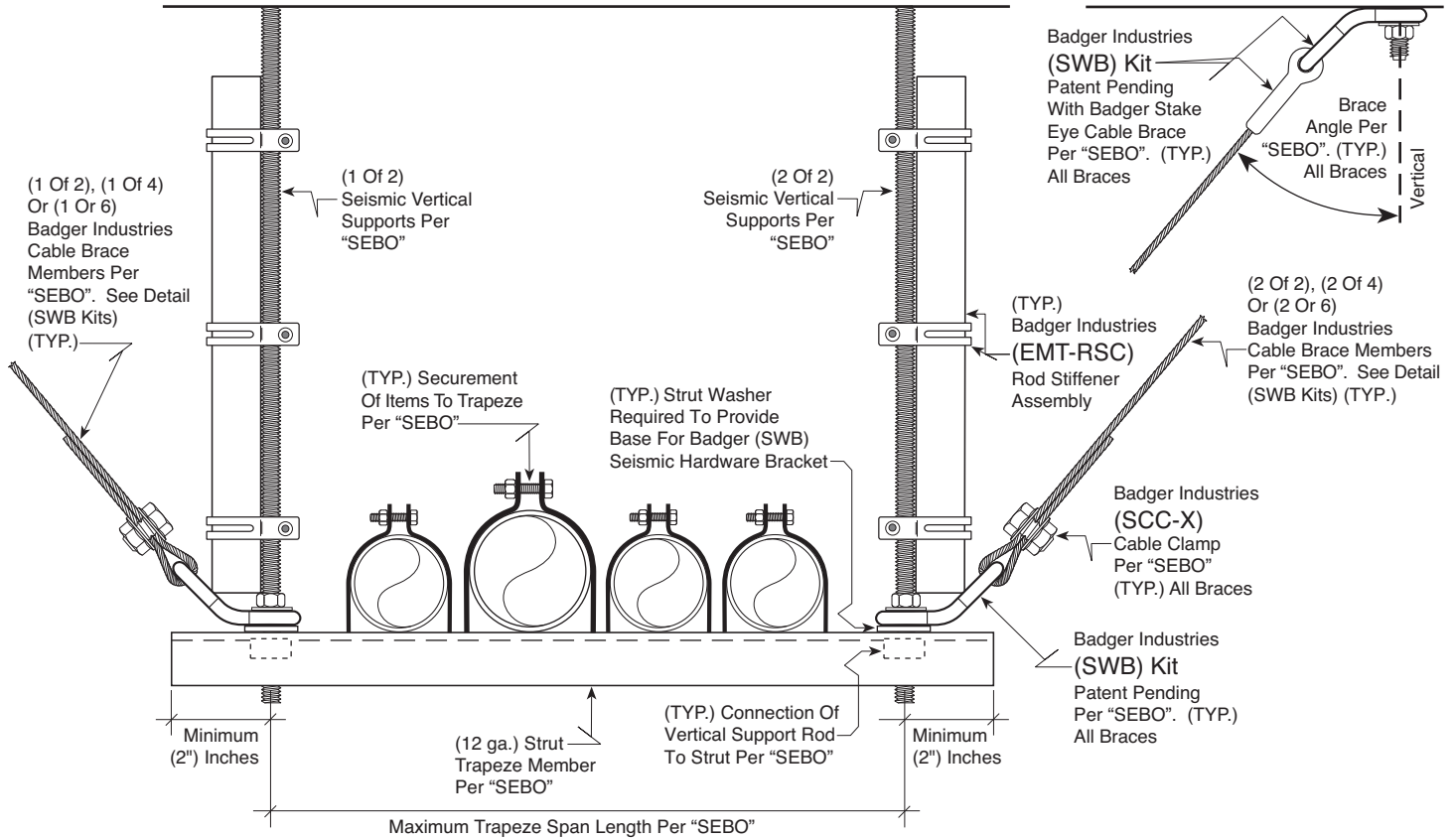
This Detail Is For Use With Cable Bracing Installed Taught To Remove Slack.



# INSTALLATION DETAIL

Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"



**Notice: "SEBO"™ Seismic Engineering By Others**  
All Cables Shall Be Installed Taught To Remove Slack. Application Specific Orientation Of Braces Shall Be Per "SEBO", See Badger Detail (TCBLP) For Trapeze Type Cable Brace Layout Pattern Options.  
Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware. All Required Brace End To Structure Conn., And All Required Brace End To Item Being Braced Conn., Not Shown For Clarity.

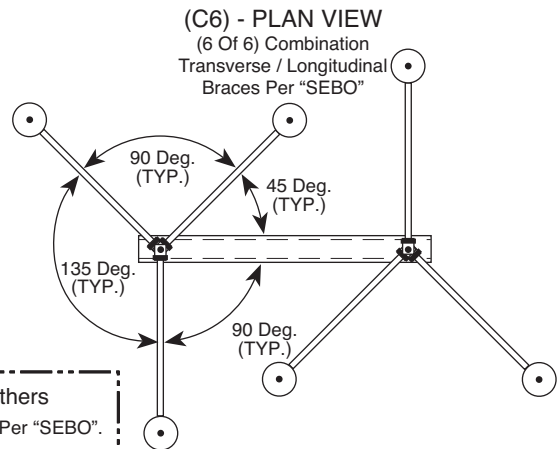
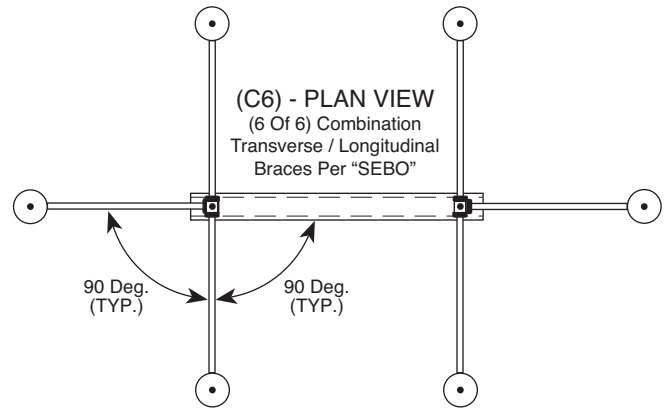
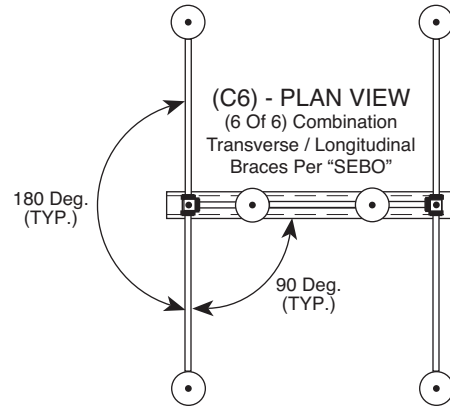
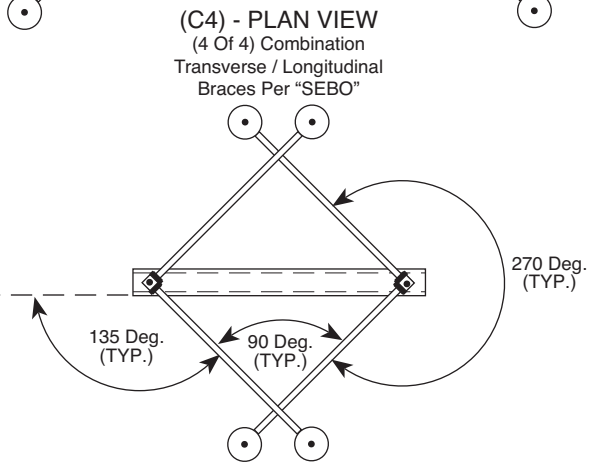
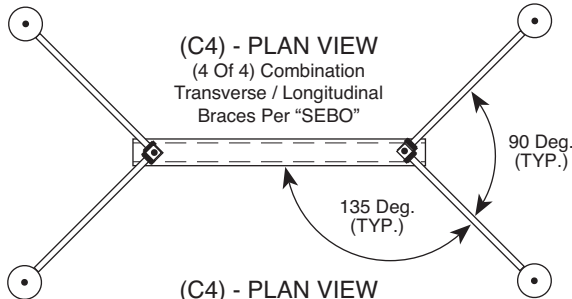
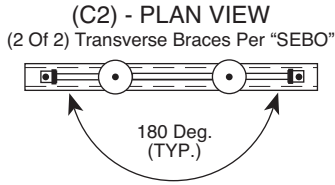
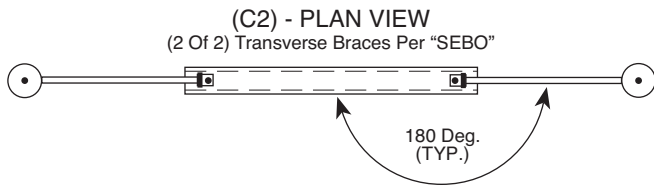


~ **BADGER INDUSTRIES** ~  
**Trapeze - Cable Bracing**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL



Notice: "SEBO"™ Seismic Engineering By Others  
Application Specific Orientation Of Braces Shall Be Per "SEBO".

TCBLP

~ BADGER INDUSTRIES ~  
Trapeze Cable Bracing Layout Pattern

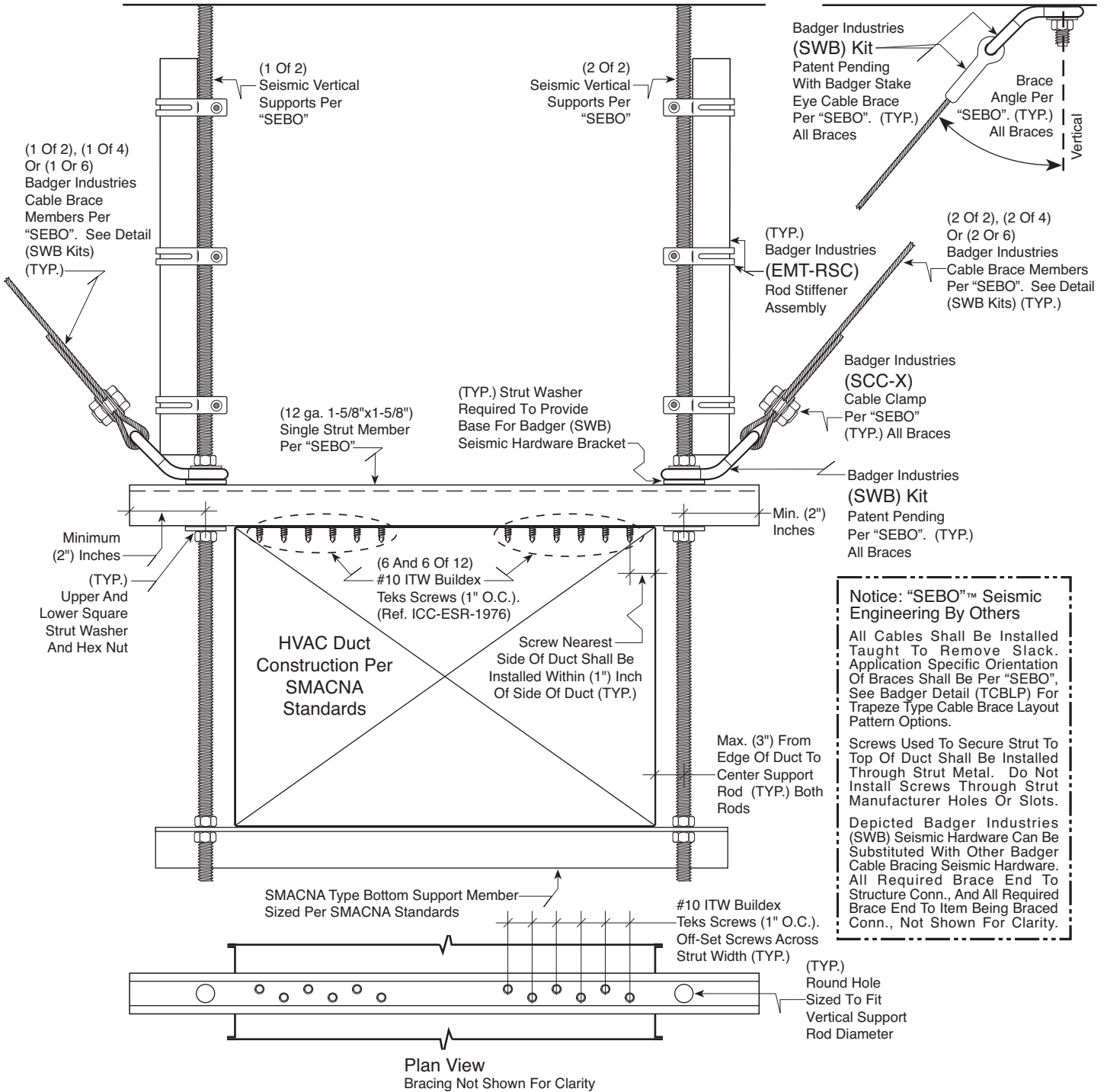
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL

Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"



~ BADGER INDUSTRIES ~  
**HVAC Duct - Cable Bracing**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

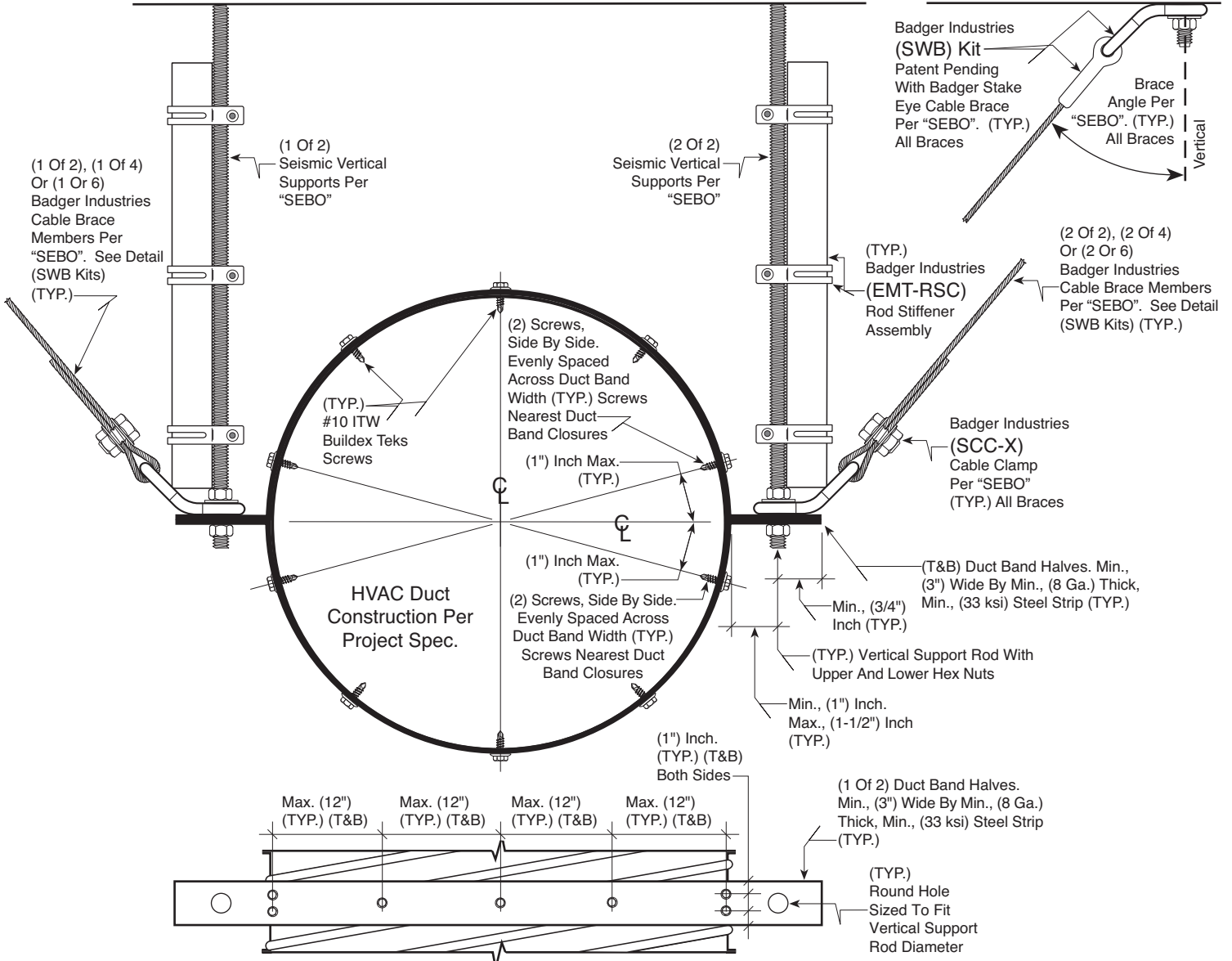




# INSTALLATION DETAIL

Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"

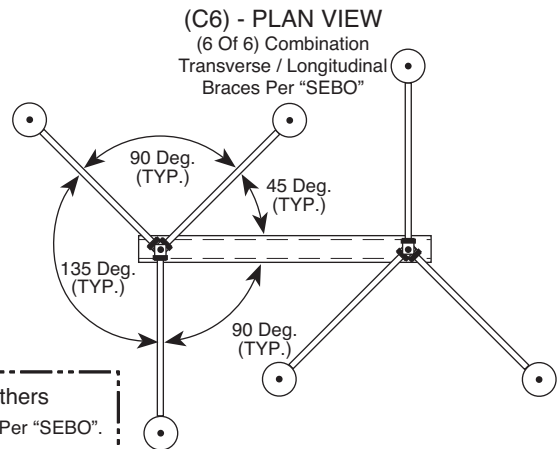
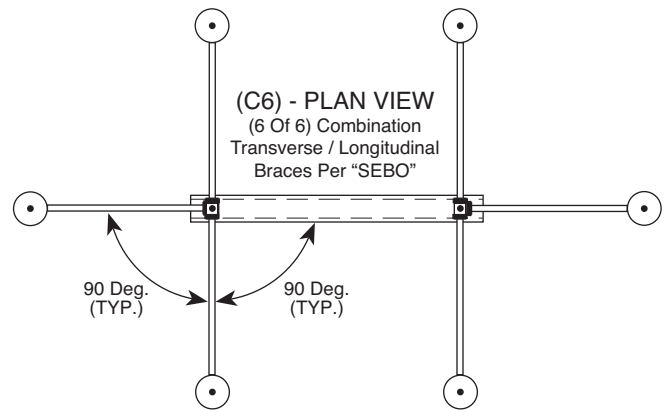
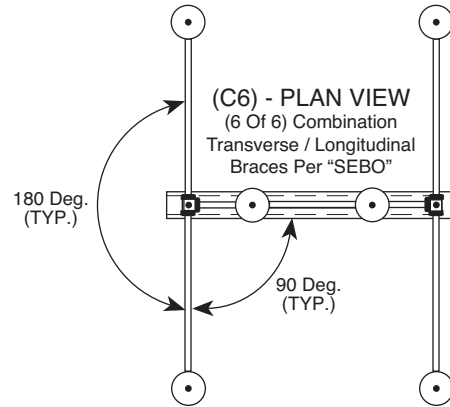
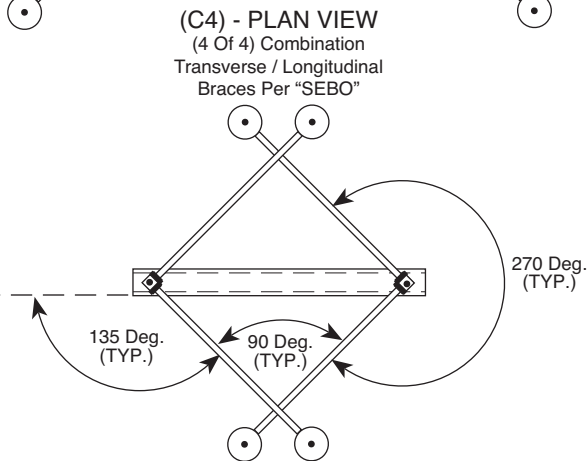
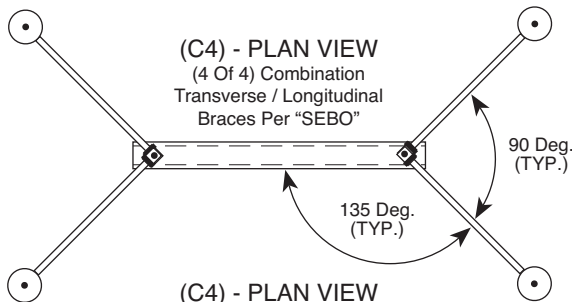
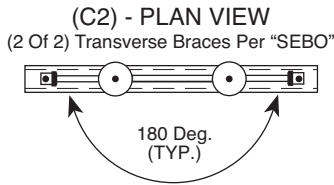
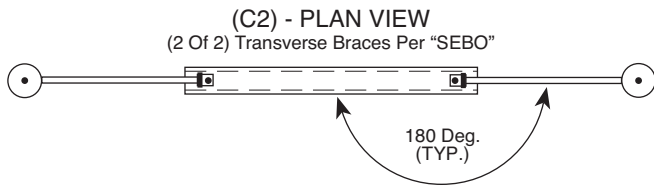


Plan View  
Bracing Not Shown For Clarity

Notice: "SEBO"™ Seismic Engineering By Others  
All Cables Shall Be Installed Taught To Remove Slack. Application Specific Orientation Of Braces Shall Be Per "SEBO". See Badger Detail (TCBLP) For Trapeze Type Cable Brace Layout Pattern Options.  
Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware. All Required Brace End To Structure Conn., And All Required Brace End To Item Being Braced Conn., Not Shown For Clarity.



# INSTALLATION DETAIL



Notice: "SEBO"™ Seismic Engineering By Others  
Application Specific Orientation Of Braces Shall Be Per "SEBO".

DCBLP

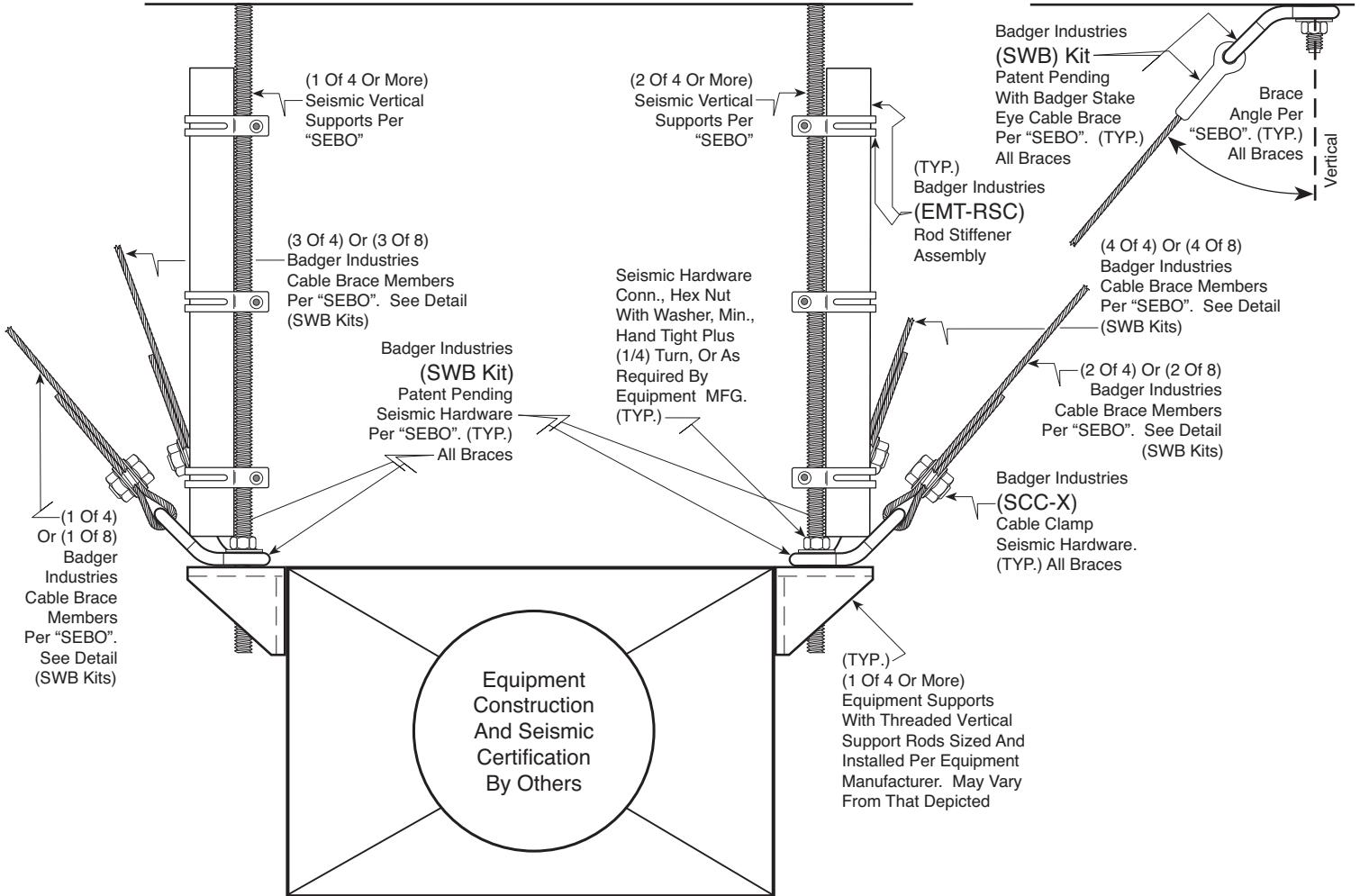
~ BADGER INDUSTRIES ~  
Duct Cable Bracing Layout Pattern

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Various Seismic Vertical Hanger To Building Structure Connections Per "SEBO"

Various Seismic Brace To Building Structure Connections Per "SEBO"



**Notice: "SEBO"™ Seismic Engineering By Others**

All Cables Shall Be Installed Taught To Remove Slack. This Cable Bracing Can Be Used On Equipment That Is Non Vibration Isolated And Internally Vibration Isolated Provided Bracing Does Not Prevent Operation Of Vibration Isolation Devices.

Orientation Of Braces May Differ From That Depicted. The (4) Depicted Cable Brace Members May Be Increased To (8) Cable Brace Members, Per "SEBO", See Badger Detail (ECBLP) For Equipment Cable Brace Layout Pattern Options.

Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware. All Required Brace End To Structure Conn., All Required Brace End To Item Being Braced Conn., And All Required Vertical Supports Not Shown For Clarity.

~ BADGER INDUSTRIES ~

Non Vibration Isolated Or Internally Vibration Isolated  
Equipment - Combination Transverse / Longitudinal Bracing

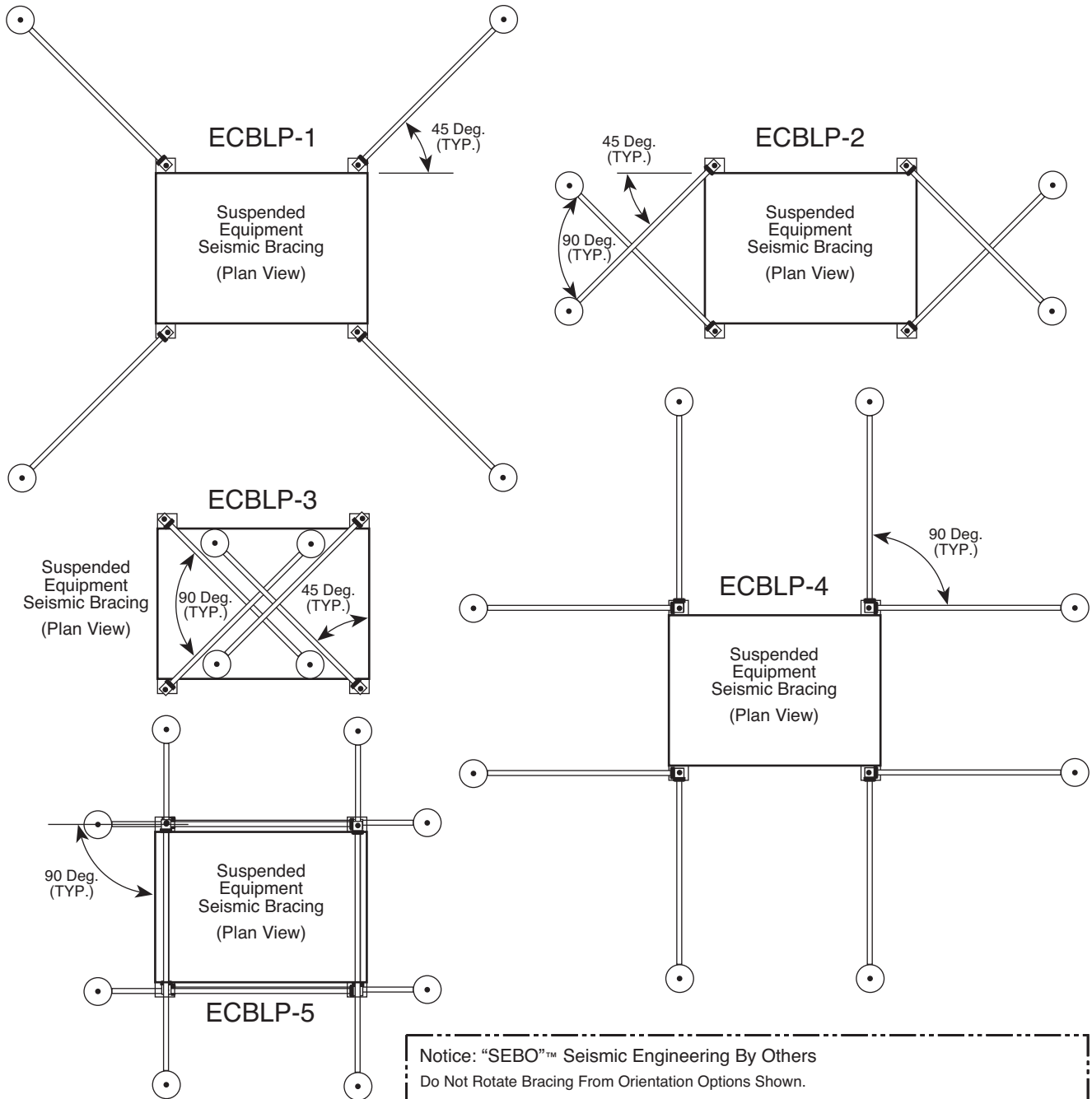
EC-4

EC-8

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL

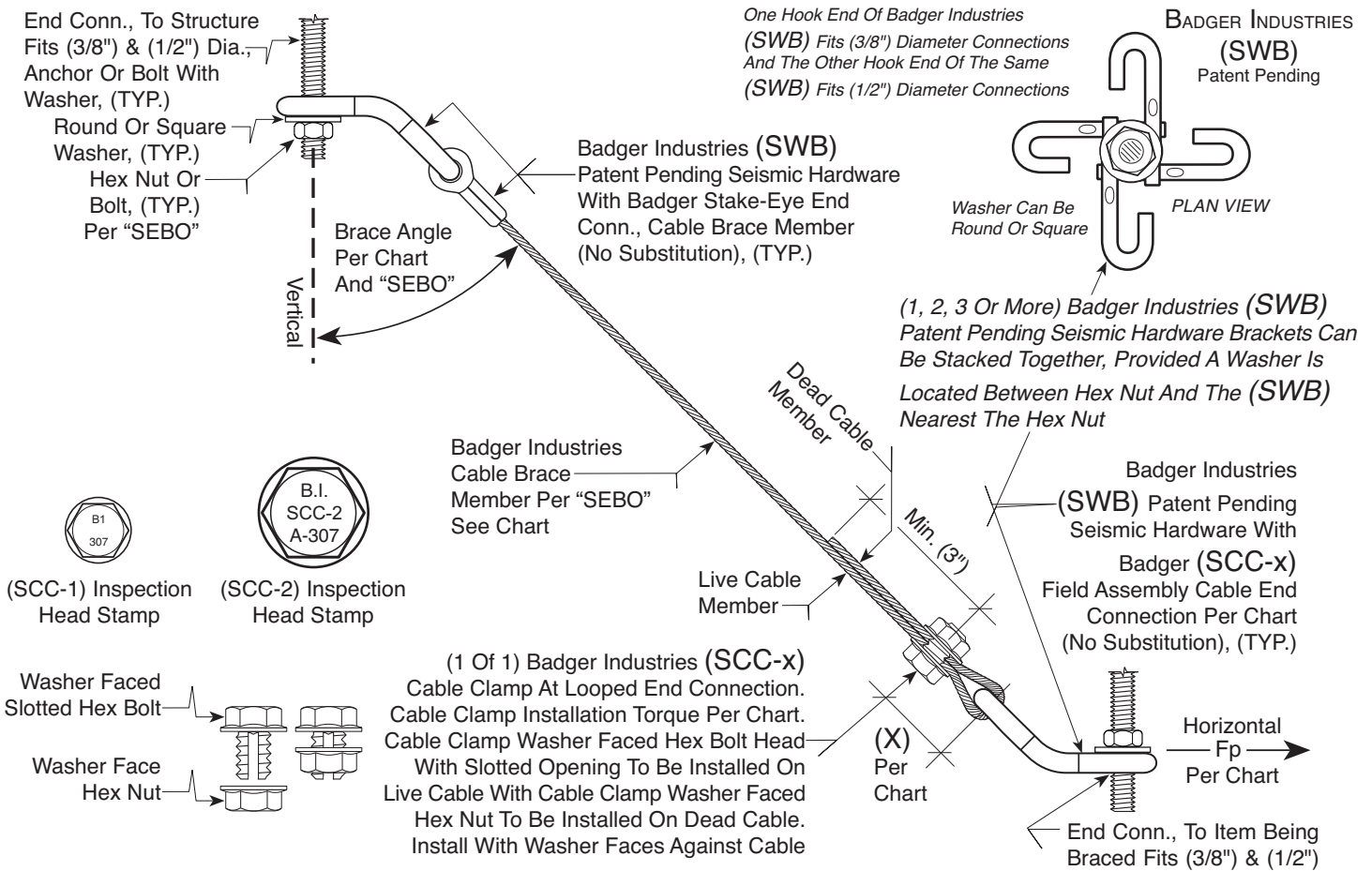


Notice: "SEBO"™ Seismic Engineering By Others  
Do Not Rotate Bracing From Orientation Options Shown.  
Designs Approved For (4) Cable Braces Can Use Any Of The Depicted (4) Or (8) Cable Brace Patterns For Field Condition Coordination.  
Designs Approved For (4) Cable Braces Can Only Use (1) Of The (2) Depicted (8) Cable Brace Patterns For Field Condition Coordination. See Details (ECBLP-4) And (ECBLP-5).  
All (4) Vertical Supports Shall Be Used As Brace Connection To Equipment Locations.  
Image Below Represents (1 Of 4) Or (1 Of 8) Individual Cable Brace Members Per Equipment Unit.

# **VIBRATION ISOLATION BRACING INSTALLATION DETAILS**



# INSTALLATION DETAIL



~ BADGER INDUSTRIES ~  
Detail (SWB Kits)

BADGER INDUSTRIES Seismic Hardware Part Number	Cable Brace Member Size, Construction Strands / Arrangement, And Material	(SCC-x) Cable Clamp Size	(SCC-x) Installation Torque	(X) Maximum	Cable Brace Member Maximum Live Length	Brace Angle From Vertical	
						30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)
<b>SWBx116 - 10</b>	Min. (1/16") Inch Dia. (7x7) Galvanized Steel	SCC-1	10 ft. • lbs.	1-1/2" Inch	10 Feet	<b>112 lbs.</b>	<b>159 lbs.</b>
<b>SWBx118 - 10</b> <b>SWBx118 - 20</b>	Min. (1/8") Inch Dia. (7x7) Galvanized Steel	SCC-2	20 ft. • lbs.	1-1/2" Inch	10 Feet 20 Feet	<b>219 lbs.</b>	<b>310 lbs.</b>
<b>SWBx316 - 10</b>	Min. (3/16") Inch Dia. (7x19) Galvanized Steel	SCC-2	30 ft. • lbs.	1-1/2" Inch	10 Feet	<b>528 lbs.</b>	<b>771 lbs.</b>

**Notice: "SEBO"™ Seismic Engineering By Others**

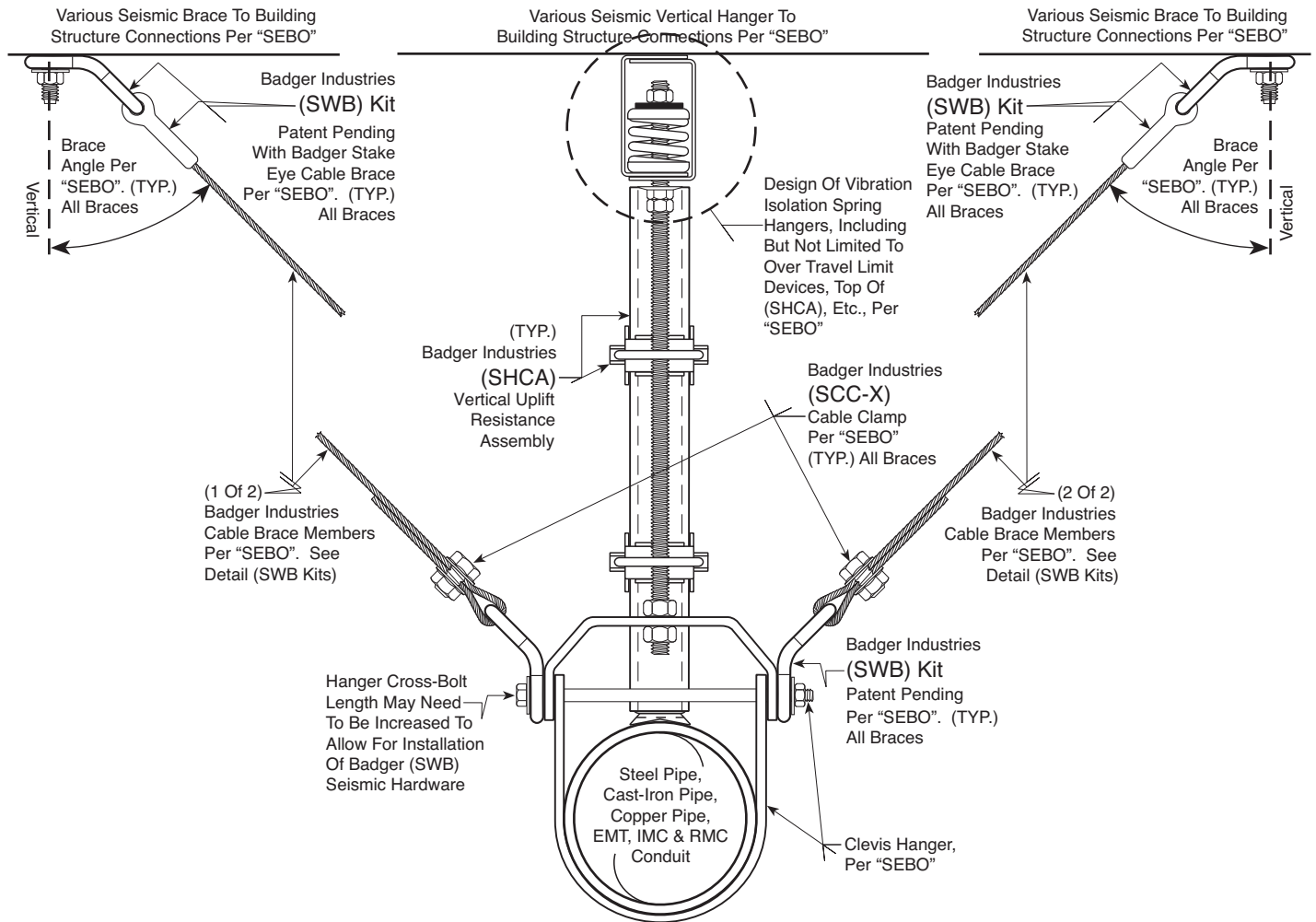
Listed (LRFD) Capacities Based On Seismic Independent Lab Testing Performed Using Tension Only Cyclic Loads Per ANSI / FM 1950 - 2016. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Torque Setting Of Badger (SCC-x) Cable Clamp Assembly With Both Live And Dead Cable Brace Members Will Cause Nesting Of The Cable Brace Members Within The (SCC-x) Cable Clamp, That May Result In An (SCC-x) Orientation Different Than That Depicted. Field Installed Cable Loop Shall Fit Tight To The Badger Seismic Hardware, Not Bulging Or Oversized. Cable Brace Member Shall Be Installed As A (1) Piece Continuous Taut Straight Member, EXCEPTION: For Item Suspended By Vibration Isolation Devices, Cable Brace Member Slack Shall Be As Determined By The Vibration Isolation Engineer.



~ BADGER INDUSTRIES ~  
**SWB Cable Kits Seismic Hardware - Design Demand Capacity Limits**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Notice: "SEBO"™ Seismic Engineering By Others**

Seismic Capacity And Load Path Integrity Of Clevis Hanger Shall Be Determined By SEBO.

Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware.

Cross-Bolt Type, Diameter And Length Vary Among Hanger Manufacturer's. Length May Need To Be Increased To Allow For Installation Of Seismic Hardware. Tighten Hex Nut On Cross-Bolt Per SEBO Requirements.

Cross-Bolt Stiffener Not Depicted For Clarity. Need And Type Of Cross-Bolt Stiffener Shall Be As Determined By SEBO.

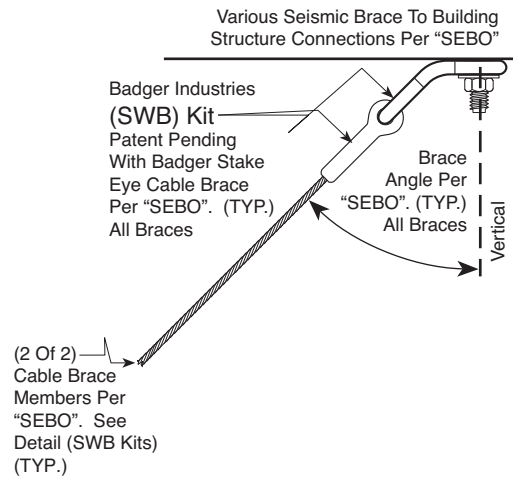
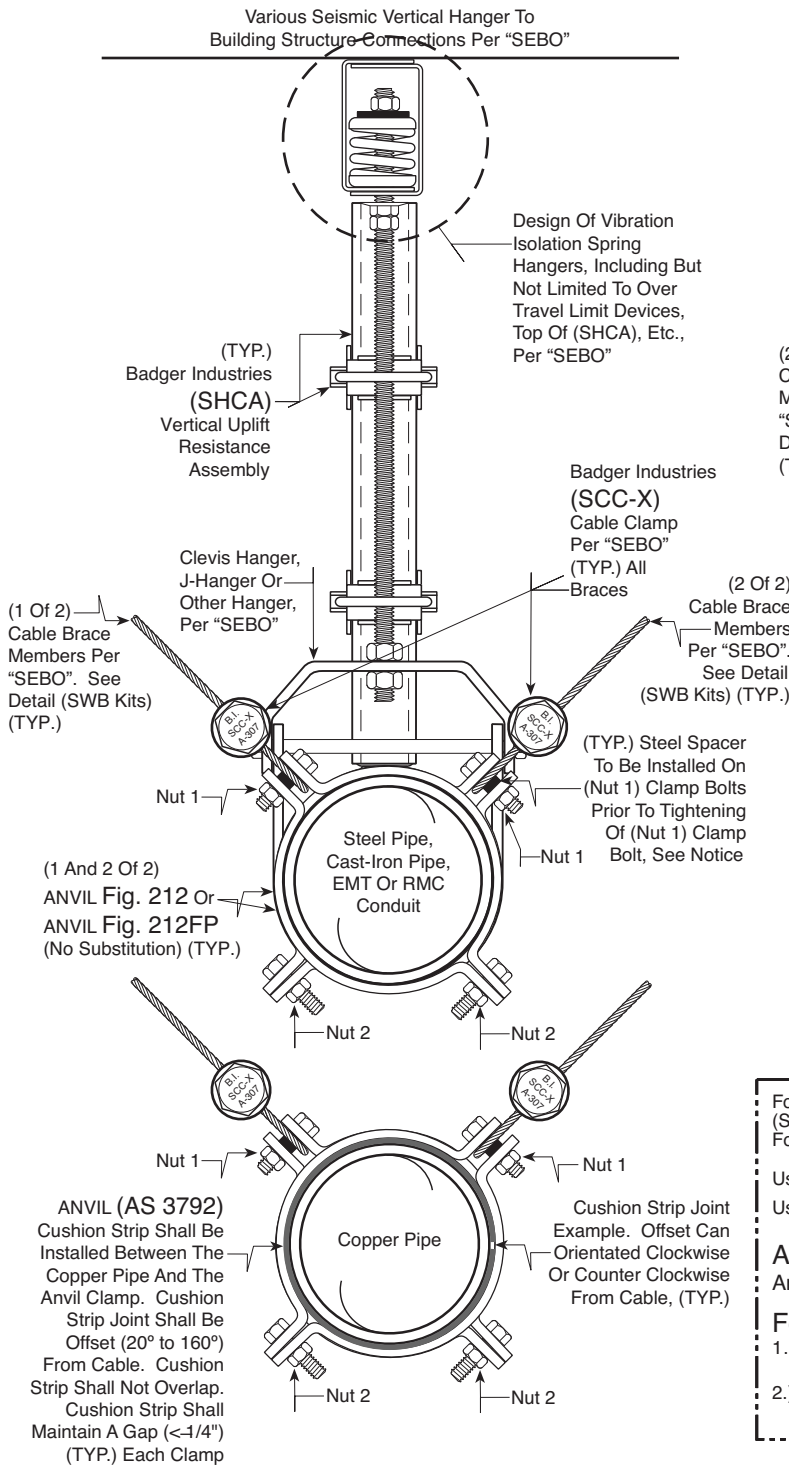
This Detail Is For Use With Slack Cable Bracing To Allow For Operational Movement Of Spring Hanger Type Vertical Support. Proper Amount Of Cable Slack Shall Be Determined By Vibration Isolation Design Engineering By Others.

~ BADGER INDUSTRIES ~

SHT-V

Vibration Isolated Spring Hanger Supported Single Hanger Transverse Bracing

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Notice: "SEBO"™ Seismic Engineering By Others**

Seismic Capacity And Load Path Integrity Of Depicted Clevis, Or Other Type Of Vertical Hanger Shall Be Determined By SEBO.

Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware.

For Applicable Anvil Clamp Sizes (2-1/2" thru 12") Use A McMASTER CARR Spacer Part #92415A144 Or Equal.

For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details.

For Sch 7 And Thicker Steel Pipe And RMC Conduit See Detail (SHL-SPCA).

For Cast-Iron Pipe See Detail (SHL-CIPA).

For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA).

For Sch 5 Steel Pipe And EMT Conduit See Detail (SHL-EMT5A).

This Detail Is For Use With Slack Cable Bracing To Allow For Operational Movement Of Spring Hanger Type Vertical Support. Proper Amount Of Cable Slack Shall Be Determined By Vibration Isolation Design Engineering By Others.

For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.

Use ANVIL Fig. 212 Clamps For Pipe And Conduit Sizes (2-1/2" thru 4").

Use ANVIL Fig. 212FP Clamps For Pipe And Conduit Sizes (5" thru 12").

**ANVIL Fig. 212 And FIG. 212FP Assembly:**  
Anvil International LLC referred to as ANVIL

**For Pipe Sizes (2-1/2" thru 12"):**

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft.· lbs.), Using (10 - 15 ft.· lb.) Torque Increases.

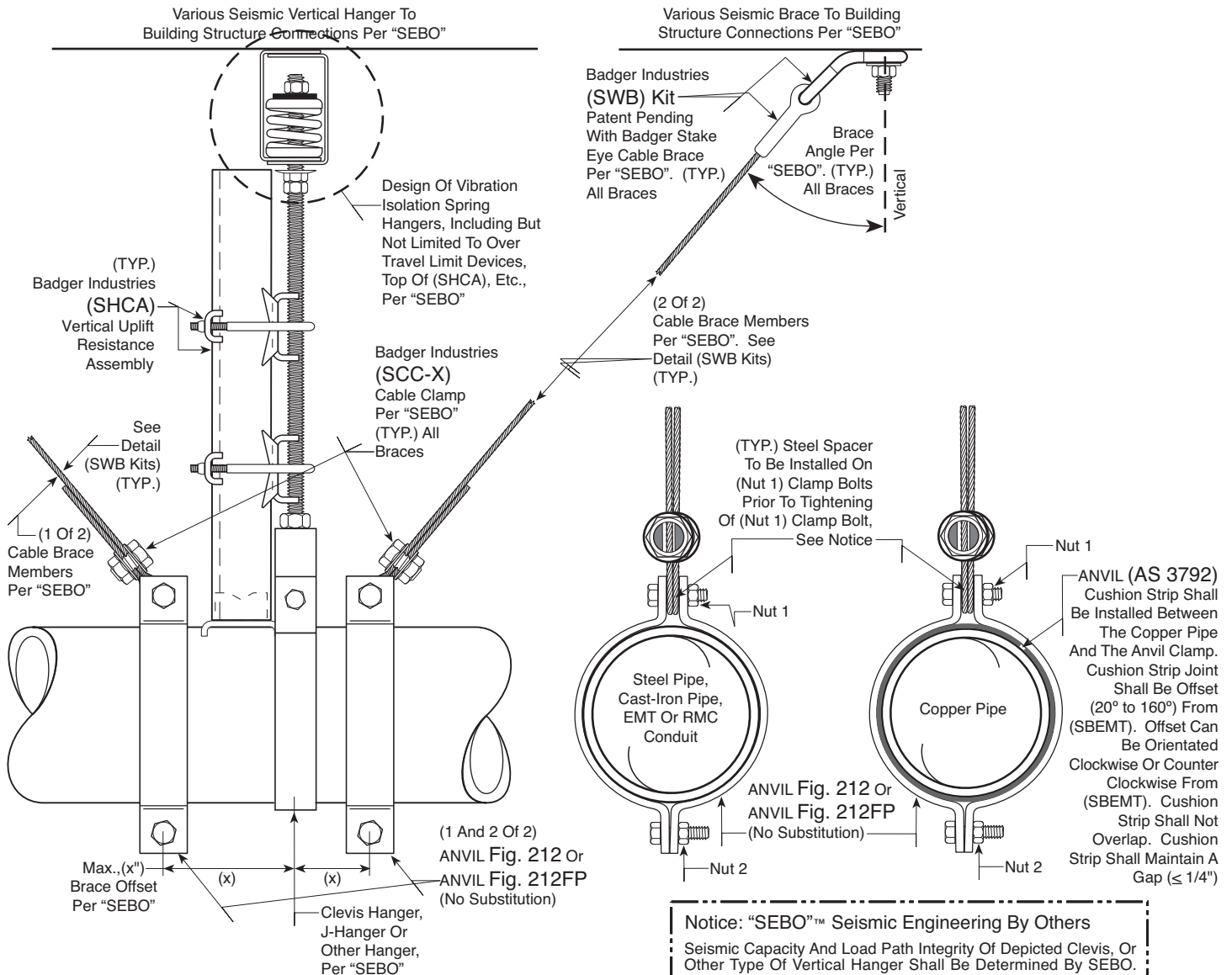
~ BADGER INDUSTRIES ~

## Vibration Isolated Spring Hanger Supported Single Hanger Transverse Bracing

SHT-VA

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.

Use ANVIL Fig. 212 Clamps For Pipe And Conduit Sizes (2-1/2" thru 4").  
Use ANVIL Fig. 212FP Clamps For Pipe And Conduit Sizes (5" thru 12").

**ANVIL Fig. 212 And FIG. 212FP Assembly:**  
Anvil International LLC referred to as ANVIL

**For Pipe Sizes (2-1/2" thru 12"):**

- 1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
- 2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft. • lbs.), Using (10 - 15 ft. • lb.) Torque Increases.

**Notice: "SEBO"™ Seismic Engineering By Others**

Seismic Capacity And Load Path Integrity Of Depicted Clevis, Or Other Type Of Vertical Hanger Shall Be Determined By SEBO.

Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware.

For Applicable Anvil Clamp Sizes (2-1/2" thru 12") Use A McMASTER CARR Spacer Part #92415A144 Or Equal.

For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details.

For Sch 7 And Thicker Steel Pipe And RMC Conduit See Detail (SHL-SPCA).

For Cast-Iron Pipe See Detail (SHL-CIPA).

For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA).

For Sch 5 Steel Pipe And EMT Conduit See Detail (SHL-EMT5A).

This Detail Is For Use With Slack Cable Bracing To Allow For Operational Movement Of Spring Hanger Type Vertical Support. Proper Amount Of Cable Slack Shall Be Determined By Vibration Isolation Design Engineering By Others.

~ BADGER INDUSTRIES ~

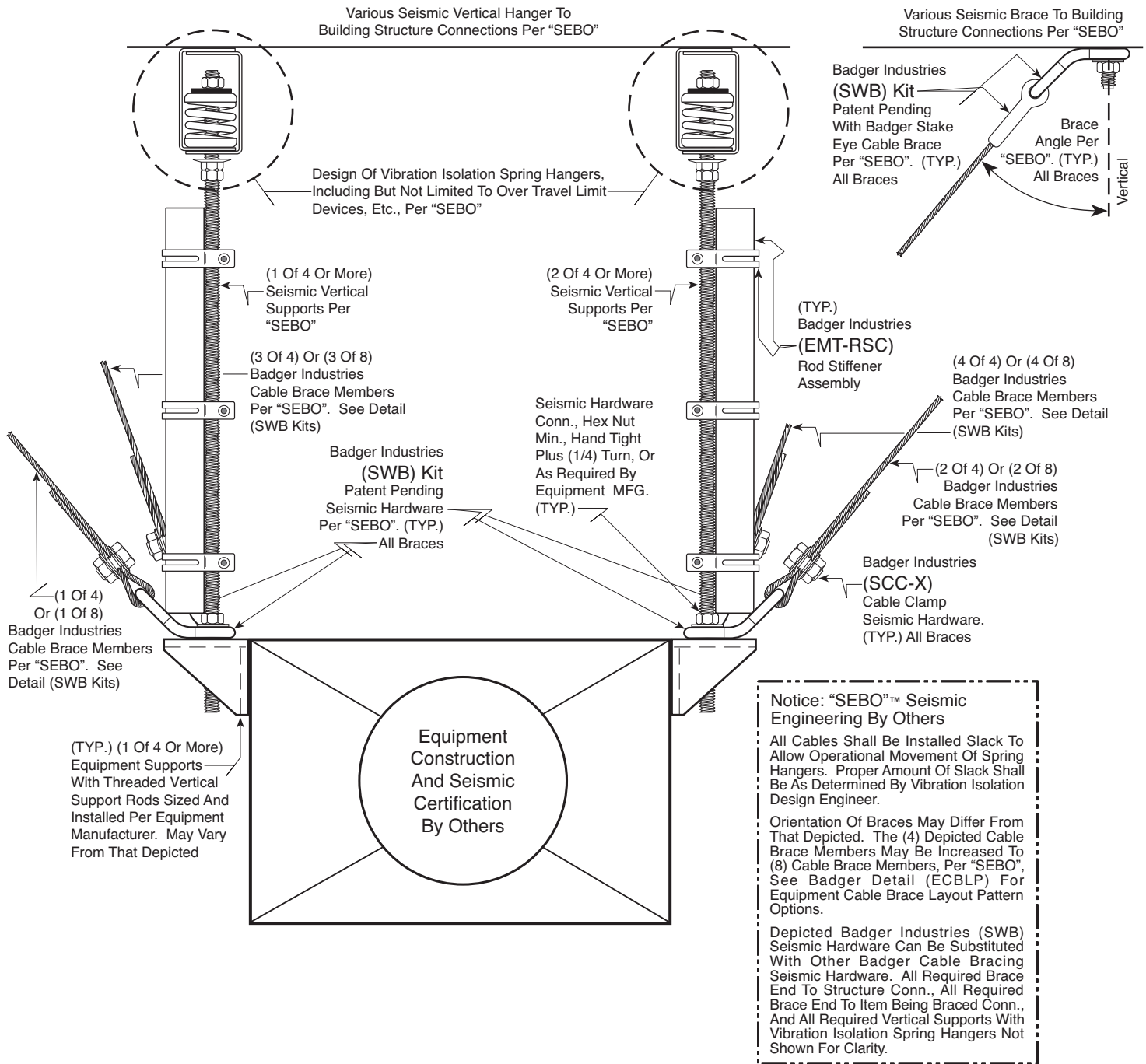
SHL-VA

Vibration Isolated Spring Hanger Supported Single Hanger Longitudinal Bracing

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL



~ BADGER INDUSTRIES ~

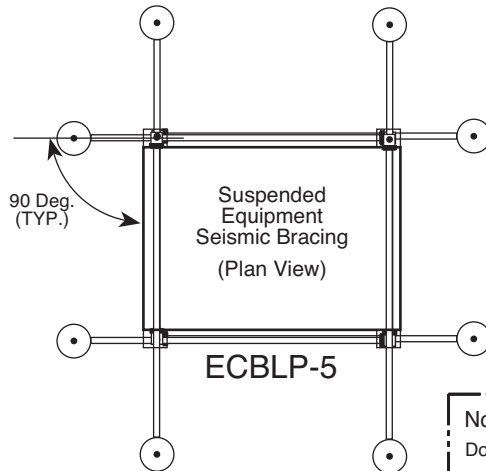
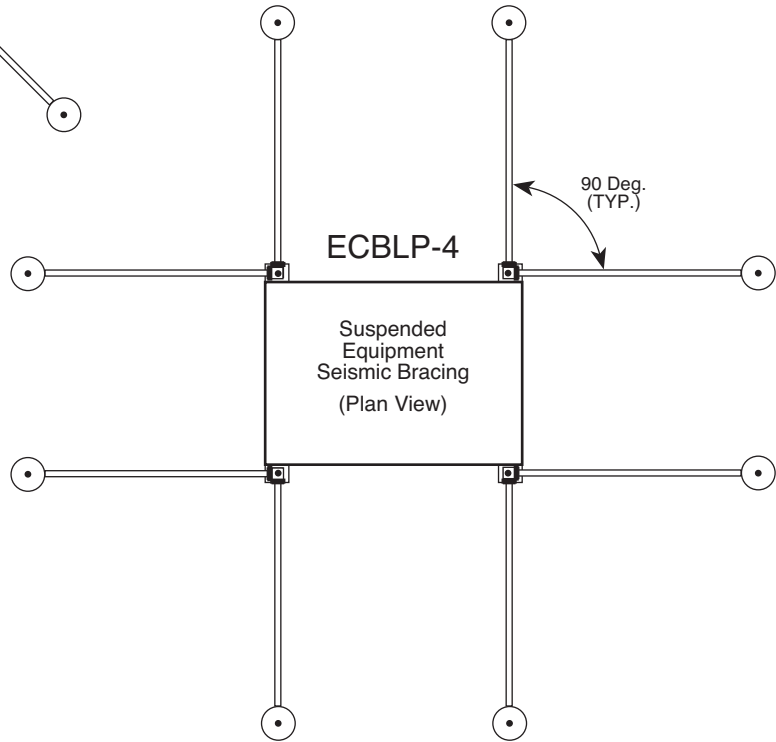
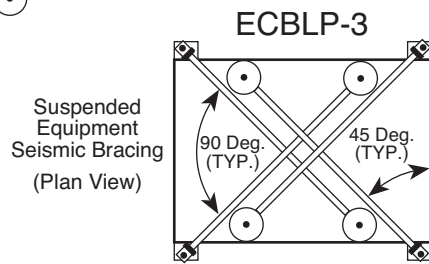
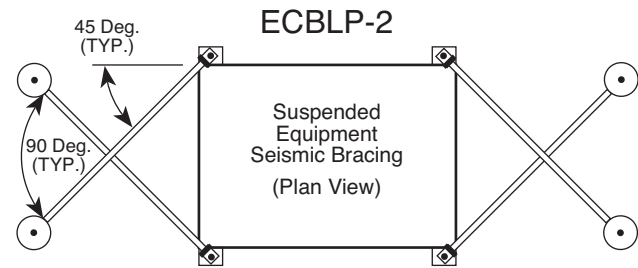
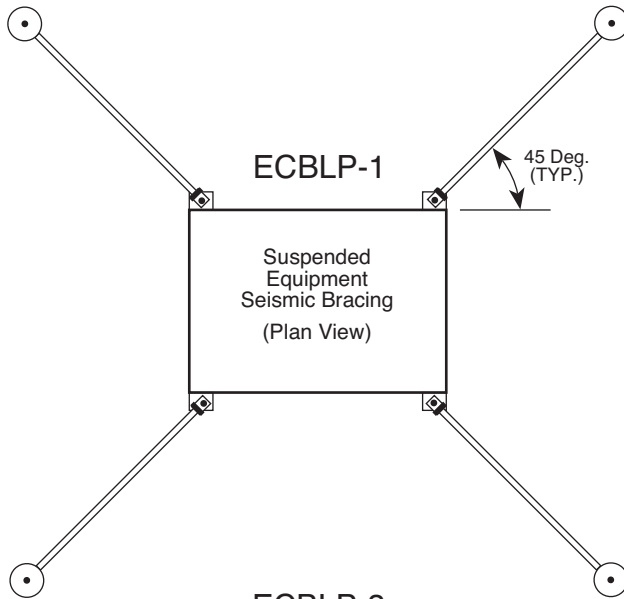
## Vibration Isolated Spring Hanger Supported Equipment Combination Transverse / Longitudinal Bracing



(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



# INSTALLATION DETAIL



Notice: "SEBO"™ Seismic Engineering By Others  
Do Not Rotate Bracing From Orientation Options Shown.  
Designs Approved For (4) Cable Braces Can Use Any Of The Depicted (4) Or (8) Cable Brace Patterns For Field Condition Coordination.  
Designs Approved For (4) Cable Braces Can Only Use (1) Of The (2) Depicted (8) Cable Brace Patterns For Field Condition Coordination. See Details (ECBLP-4) And (ECBLP-5).  
All (4) Vertical Supports Shall Be Used As Brace Connection To Equipment Locations.  
Image Below Represents (1 Of 4) Or (1 Of 8) Individual Cable Brace Members Per Equipment Unit.

**ECBLP**

~ BADGER INDUSTRIES ~  
**Equipment Cable Bracing Layout Pattern**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

**SEISMIC VERTICAL CONN.,  
To STRUCTURE  
INSTALLATION DETAILS**



**Anchor Length Notice:**

After Proper Installation And Tightening Of Anchor, A Minimum (3/4") Of And Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger (SVC38) Seismic Hardware. Recommend Use Of (3/8x3-3/4) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~  
**Detail (SVC13H)**

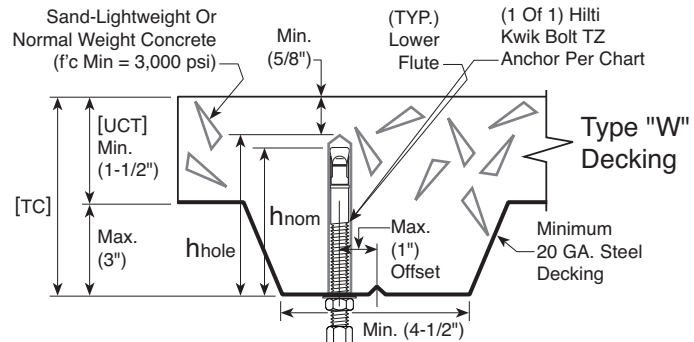
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da	3/8 in.	3/8 in.
Min. h <sub>nom</sub> Embed.	2-5/16 in.	2-5/16 in.
Min. h <sub>hole</sub> Depth	2-5/8 in.	2-5/8 in.
Min. [TC] Thickness	3-1/4 in.	3-1/4 in.
Min. Edge Distance	5 in.	5 in.
Min. Between Anchor Spacing	6-3/4 in.	6 in.
Min. Between Anchor Spacing Across Lower Flutes	10 in.	4-1/2 in.
Installation Torque	25 ft. • lbs.	25 ft. • lbs.
Seismic Vertical Maximum F <sub>pT</sub> (LRFD)	<b>355 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>403 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, F <sub>p</sub> (LRFD) Values, Multiply Listed Values By (0.80).		

**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. F<sub>pT</sub> Values Account For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

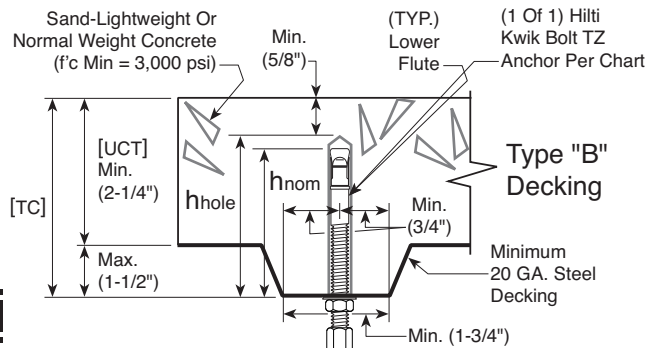
Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.

Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].



ASTM A563 Coupler Nut, One End Sized To Fit Anchor, One End Sized To Fit ASTM A36 Vertical Support Rod. Coupler Nut Thread Engagement Shall Be Minimum (1 Times) Diameter Of The Applicable Threaded Member

F<sub>pT</sub> / F<sub>pC</sub> Per Chart



ASTM A563 Coupler Nut, One End Sized To Fit Anchor, One End Sized To Fit ASTM A36 Vertical Support Rod. Coupler Nut Thread Engagement Shall Be Minimum (1 Times) Diameter Of The Applicable Threaded Member

F<sub>pT</sub> / F<sub>pC</sub> Per Chart

**SVC13H**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - 1 Anchor**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Anchor Length Notice:**

After Proper Installation And Tightening Of Anchor, A Minimum (3/4") Of And Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger (SVC12) Seismic Hardware. Recommend Use Of (1/2x5-1/2) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~  
**Detail (SVC14H)**

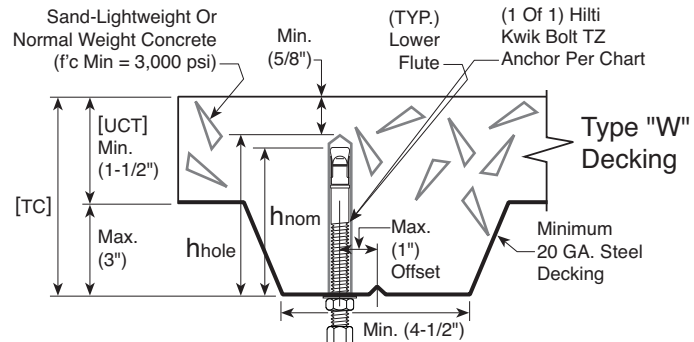
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da	1/2 in.	1/2 in.
Min. $h_{nom}$ Embed.	3-5/8 in.	3-5/8 in.
Min. $h_{hole}$ Depth	4 in.	4 in.
Min. [TC] Thickness	4-5/8 in.	4-5/8 in.
Min. Edge Distance	7-1/2 in.	7-1/2 in.
Min. Between Anchor Spacing	9-3/4 in.	9-3/4 in.
Min. Between Anchor Spacing Across Lower Flutes	10 in.	4-1/2 in.
Installation Torque	40 ft. • lbs.	40 ft. • lbs.
Seismic Vertical Maximum $F_{pT}$ (LRFD)	<b>637 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>732 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, $F_p$ (LRFD) Values, Multiply Listed Values By (0.80).		

**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements.  $F_{pT}$  Values Account For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

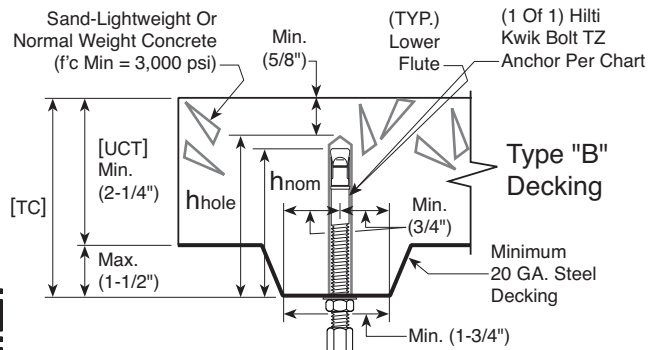
Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.

Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].



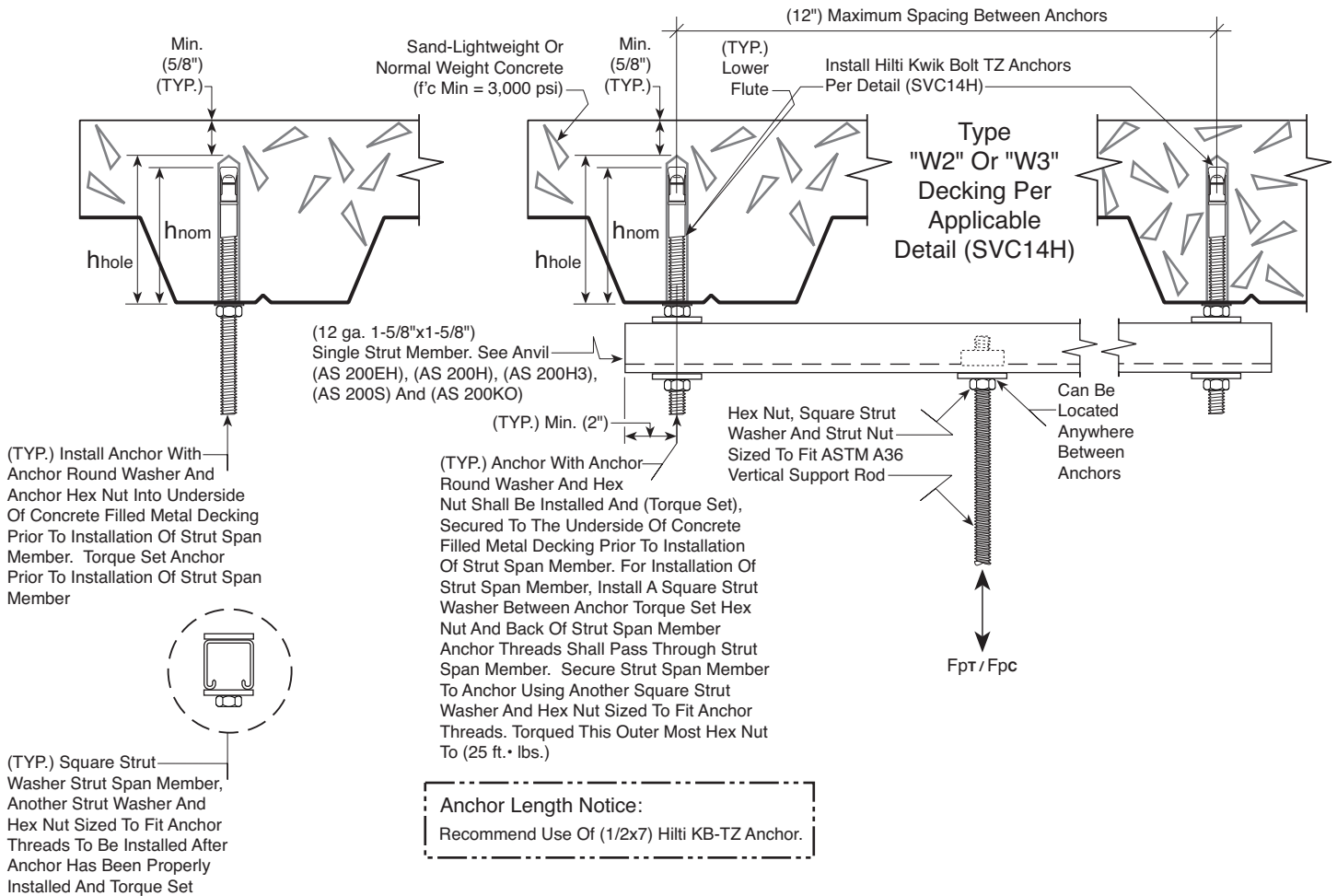
ASTM A563 Coupler Nut, One End Sized To Fit Anchor, One End Sized To Fit ASTM A36 Vertical Support Rod. Coupler Nut Thread Engagement Shall Be Minimum (1 Times) Diameter Of The Applicable Threaded Member

$F_{pT} / F_{pC}$  Per Chart



ASTM A563 Coupler Nut, One End Sized To Fit Anchor, One End Sized To Fit ASTM A36 Vertical Support Rod. Coupler Nut Thread Engagement Shall Be Minimum (1 Times) Diameter Of The Applicable Threaded Member

$F_{pT} / F_{pC}$  Per Chart



Notice: "SEBO"™ Seismic Engineering By Others

This Detail Is To Be Used As A Flute Span Double Anchor Assembly Option To Compliment Badger Single Anchor Detail (SVC14H).

The Installation, Testing And Inspection Requirements Of The Drill-In Anchors Shall Be That Identified Within Badger Detail (SVC14H).

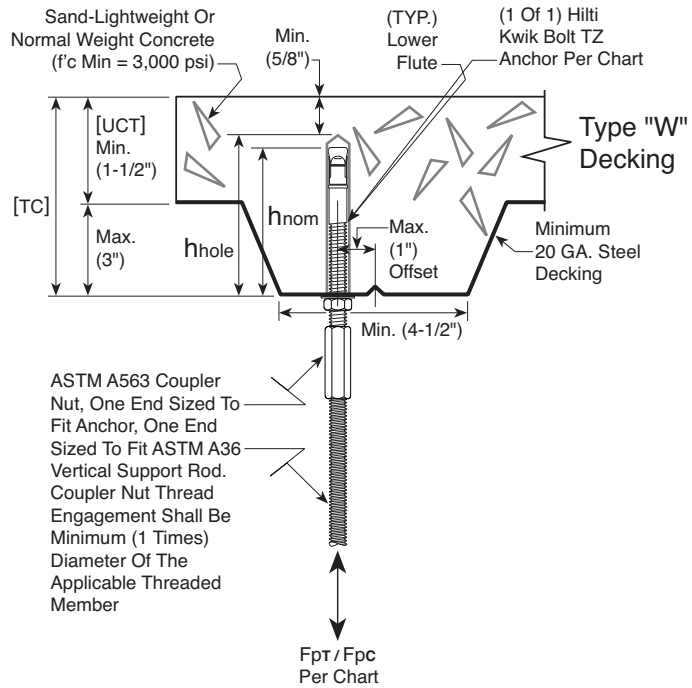
The Design Capacity Of This Detail Shall Be That Identified Within Badger Single Anchor Detail (SVC14H), Thus The Vertical Support Connection To Strut Span Member Can Be Located Anywhere Between The Double Anchors. The Design Capacity Of Badger Detail (SVC14H) Is Greater Than The Design Capacity Of Badger Detail (SVC13H), Thus This Detail Can Be Used As A Flute Span Assembly For Badger Detail (SVC13H). Do Not Use This Detail For Badger Detail SVC15H) Design Demand Applications.

Both Anchors With Strut Span Member Can Be installed Into The Same Flute. Anchors With Strut Span Member Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Concrete Thickness Is Equal Or Greater Than That Required.



**Anchor Length Notice:**  
After Proper Installation And Tightening Of Anchor, A Minimum (3/4") Of And Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger (SVC58) Seismic Hardware. Recommend Use Of (5/8x6) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~ Detail (SVC15H)		
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da	5/8 in.	Not Applicable
Min. h <sub>nom</sub> Embed.	4-7/16 in.	
Min. h <sub>hole</sub> Depth	4-3/4 in.	
Min. [TC] Thickness	5-3/8 in.	
Min. Edge Distance	8-3/4 in.	
Min. Between Anchor Spacing	12 in.	
Min. Between Anchor Spacing Across Lower Flutes	10 in.	
Installation Torque	60 ft. • lbs.	
Seismic Vertical Maximum F <sub>pT</sub> (LRFD)	<b>1,131 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	
For ASCE 7-10, F <sub>p</sub> (LRFD) Value, Multiply Listed Value By (0.80).		



**Notice: "SEBO"™ Seismic Engineering By Others**  
Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. F<sub>pT</sub> Values Account For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.  
Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].

~ BADGER INDUSTRIES ~  
**SVC15H** Seismic Vertical Connection - 1 Anchor  
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

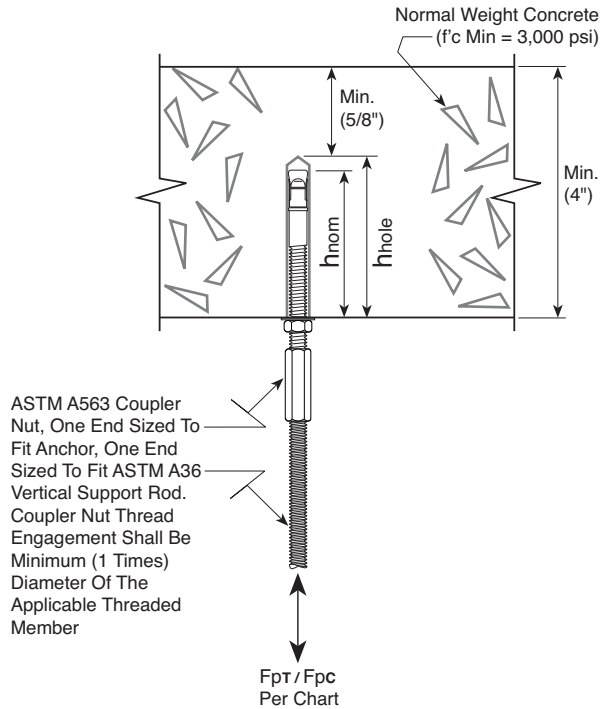




# INSTALLATION DETAIL

**Anchor Length Notice:**  
After Proper Installation And Tightening Of Anchor, A Minimum (3/4") Of And Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger (SVC38) Seismic Hardware. Recommend Use Of (3/8x5) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~ Detail (SVC13HCS)	
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	3/8 in.
Min. $h_{nom}$ Embed.	2-5/16 in.
Min. $h_{hole}$ Depth	2-5/8 in.
Min. [TC] Thickness	4 in.
Min. Edge Distance	4-3/8 in.
Min. Between Anchor Spacing	5 in.
Installation Torque	25 ft. • lbs.
Seismic Vertical Maximum FpT (LRFD)	<b>600 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, FpT (LRFD) Values, Multiply Listed Value By (0.80).	



**Notice: "SEBO"™ Seismic Engineering By Others**  
Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. FpT Values Account For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.

**SVC13HCS**

## ~ BADGER INDUSTRIES ~ Seismic Vertical Connection - 1 Anchor

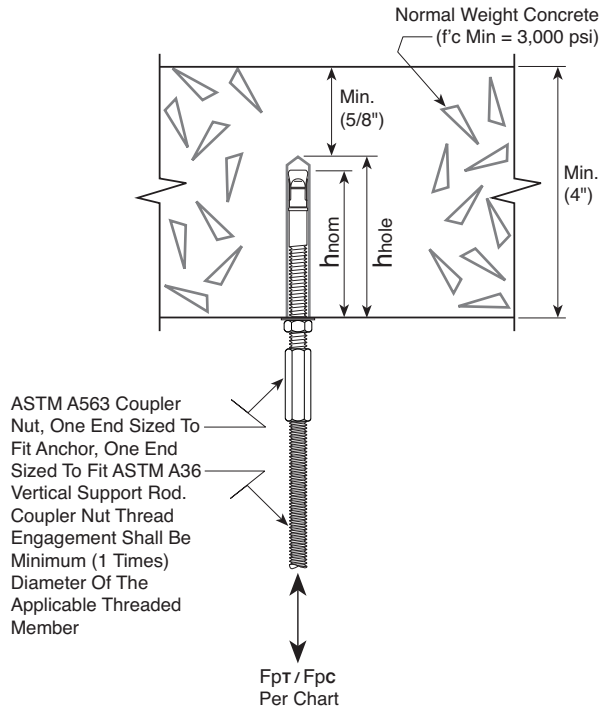
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Anchor Length Notice:**

After Proper Installation And Tightening Of Anchor, A Minimum (3/4") Of And Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger (SVC12) Seismic Hardware. Recommend Use Of (1/2x5-1/2) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~ Detail (SVC14HCS)	
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	1/2 in.
Min. $h_{nom}$ Embed.	3-5/8 in.
Min. $h_{hole}$ Depth	4 in.
Min. [TC] Thickness	6 in.
Min. Edge Distance	7-1/2 in.
Min. Between Anchor Spacing	9-3/4 in.
Installation Torque	40 ft. • lbs.
Seismic Vertical Maximum $F_{pT}$ (LRFD)	<b>1,295 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, $F_{pT}$ (LRFD) Values, Multiply Listed Value By (0.80).	



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements.  $F_{pT}$  Values Account For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.

**SVC14HCS**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - 1 Anchor**

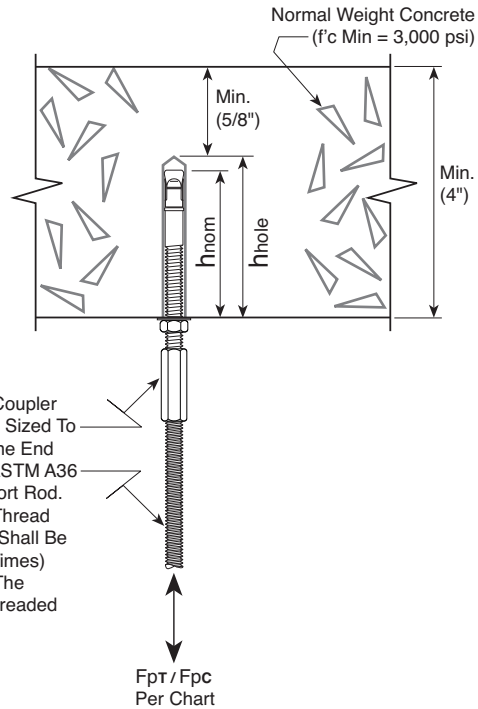
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Anchor Length Notice:**

After Proper Installation And Tightening Of Anchor, A Minimum (3/4") Of And Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger (SVC58) Seismic Hardware. Recommend Use Of (5/8x6) Hilti KB-TZ Anchor.

~ NUSIG ~ Detail (SVC15HCS)	
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	5/8 in.
Min. $h_{nom}$ Embed.	4-7/16 in.
Min. $h_{hole}$ Depth	4-3/4 in.
Min. [TC] Thickness	6 in.
Min. Edge Distance	8-3/4 in.
Min. Between Anchor Spacing	12 in.
Installation Torque	60 ft. • lbs.
Seismic Vertical Maximum FpT (LRFD)	<b>1,795 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, FpT (LRFD) Values, Multiply Listed Value By (0.80).	



ASTM A563 Coupler Nut, One End Sized To Fit Anchor, One End Sized To Fit ASTM A36 Vertical Support Rod. Coupler Nut Thread Engagement Shall Be Minimum (1 Times) Diameter Of The Applicable Threaded Member

FpT / Fpc Per Chart

**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. FpT Values Account For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.

**SVC15HCS**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - 1 Anchor**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC51-EF)		ANSI / MSS SP-58 Maximum Allowable Tension GRAVITY	ANSI / FM 1950-2016 Maximum SEISMIC F <sub>PT</sub> / F <sub>PC</sub> (LRFD)
BADGER INDUSTRIES Seismic Hardware Part Number	Vertical Support Rod Size		
<b>SBC158</b>	3/8"	<b>730 lbs.</b>	<b>2,040 lbs.</b>
<b>SBC158</b>	1/2"	<b>1,350 lbs.</b>	
<b>SBC158</b>	5/8"	<b>2,160 lbs.</b>	

Compliant Per 2016 NFPA-13, Paragraph 9.1.1.2 For Single Hanger Piping 10" And Smaller

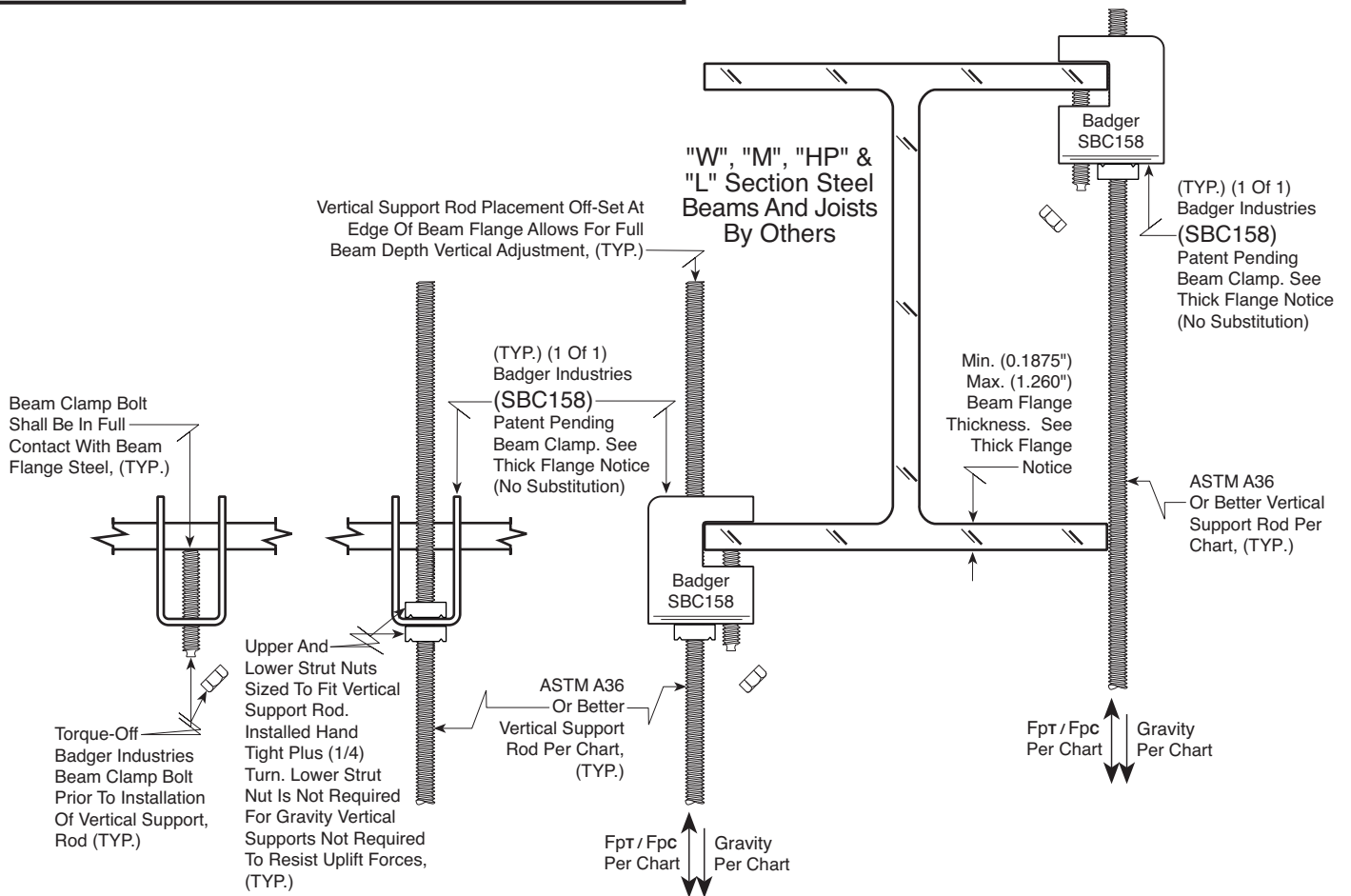
**Notice:**

Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Beam Clamp Bolt Until Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away.

**Thick Flange Notice:**

Use Badger Industries (SBC158L-C) Beam Clamp For Flange Thickness (1.300") Inch, To A Maximum Thickness Of (3.00") Inch.



**SVC51-EF**

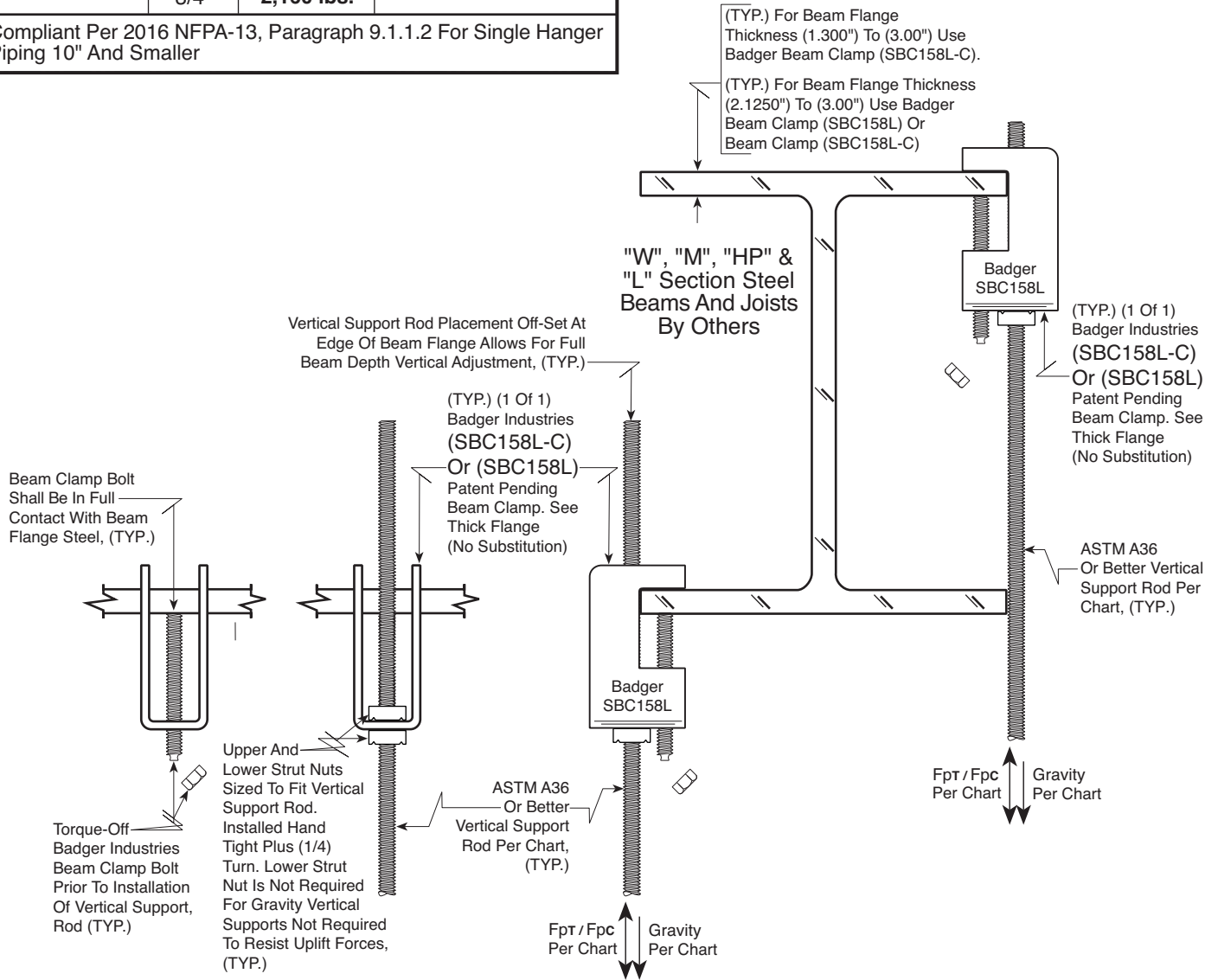
~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Single Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC51L-EF)			
BADGER INDUSTRIES Seismic Hardware Part Number	Vertical Support Rod Size	ANSI / MSS SP-58 Maximum Allowable Tension GRAVITY	ANSI / FM 1950-2016 Maximum SEISMIC FpT / Fpc (LRFD)
<b>SBC158L</b> Or <b>SBC158L-C</b> See Flange Thickness Notes	3/8"	<b>730 lbs.</b>	<b>2,040 lbs.</b>
	1/2"	<b>1,350 lbs.</b>	
	5/8"	<b>2,160 lbs.</b>	
	3/4"	<b>2,160 lbs.</b>	
Compliant Per 2016 NFPA-13, Paragraph 9.1.1.2 For Single Hanger Piping 10" And Smaller			

**Notice:**  
Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Install Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Beam Clamp Bolt Until Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away.



**SVC51L-EF**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Single Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC52)		ANSI / MSS SP-58 Maximum Allowable Tension GRAVITY	ANSI / FM 1950-2016 Maximum SEISMIC FpT / FpC (LRFD)
BADGER INDUSTRIES Seismic Hardware Part Number	Maximum Beam Flange Width		
<b>SBC158</b>	6"	<b>1,900 lbs.</b>	<b>1,934 lbs.</b>
<b>SBC158</b>	12"	<b>1,780 lbs.</b>	
<b>SBC158</b>	18"	<b>1,135 lbs.</b>	

Compliant Per 2016 NFPA-13, Paragraph 9.1.1.2 For Single Hanger Piping 6" And Smaller

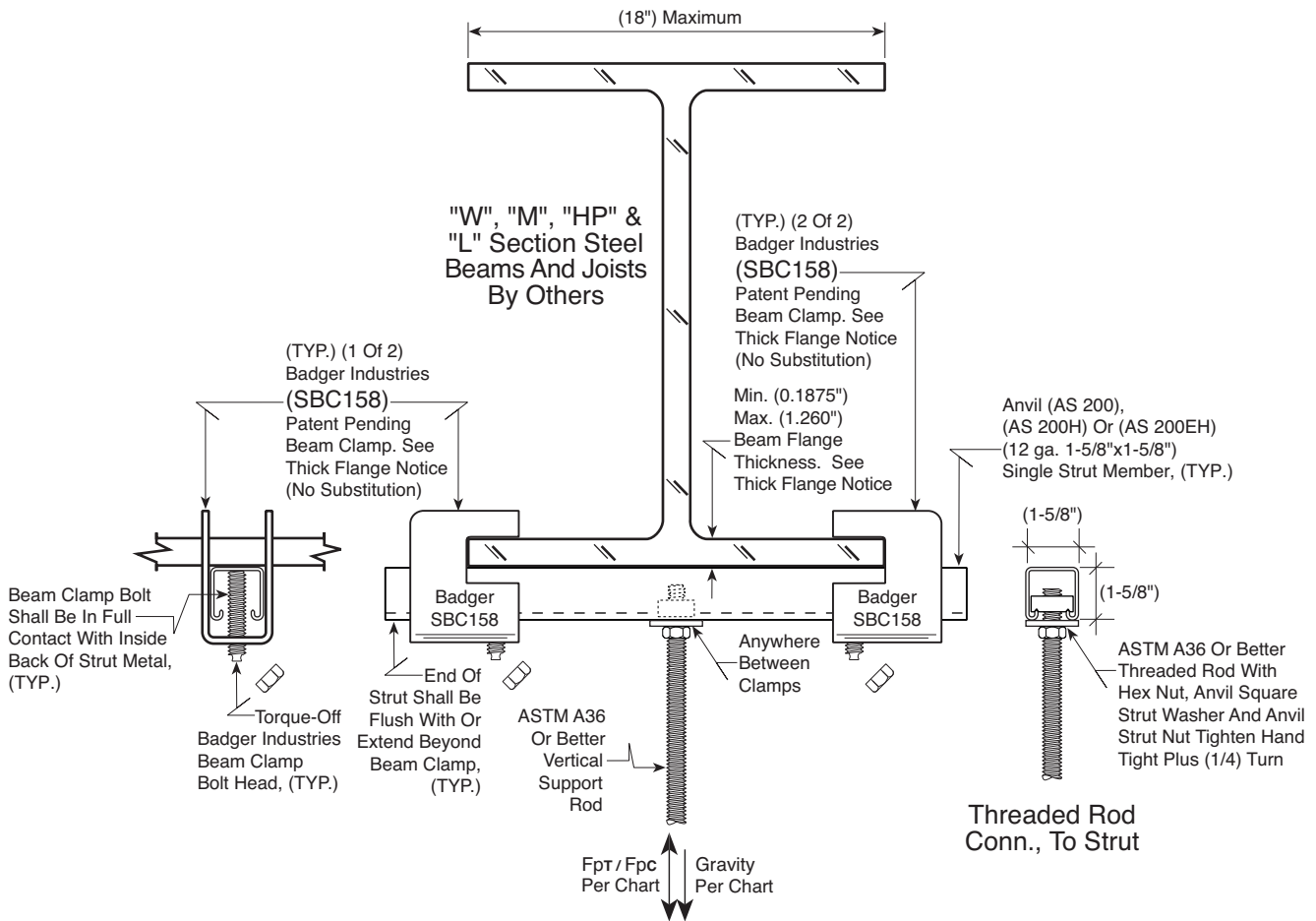
**Notice:**

Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Each Beam Clamp Bolt Until Strut Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

**Thick Flange Notice:**

Use Badger Industries (SBC158L-C) Beam Clamp For Flange Thickness (1.300") Inch, To A Maximum Thickness Of (3.00") Inch.



**SVC52**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

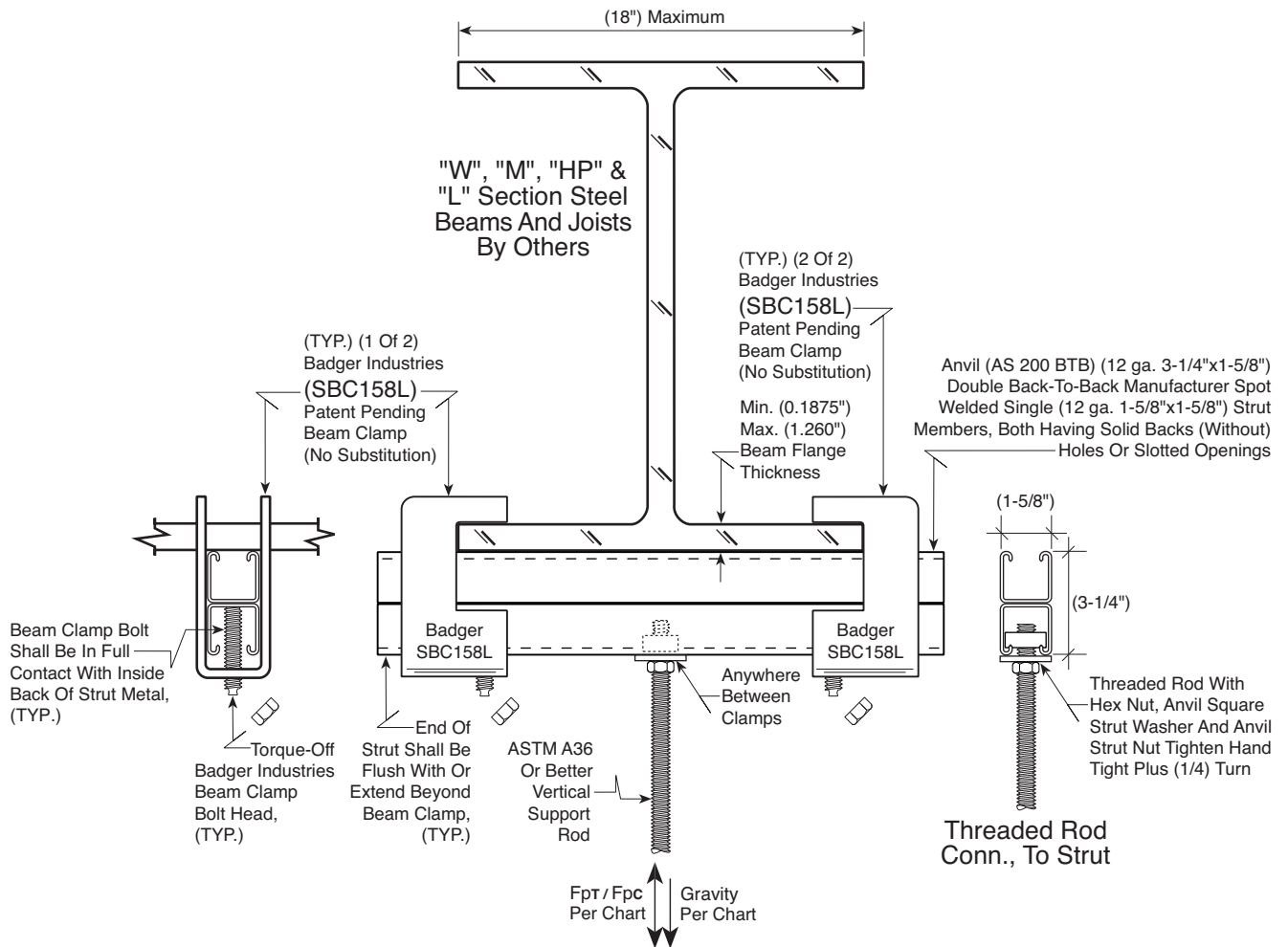


~ BADGER INDUSTRIES ~ Detail (SVC52L)		ANSI/MSS SP-58	ANSI / FM 1950-2016
BADGER INDUSTRIES Seismic Hardware Part Number	Maximum Beam Flange Width	Maximum Allowable Tension GRAVITY	Maximum SEISMIC F <sub>pT</sub> / F <sub>pC</sub> (LRFD)
<b>SBC158L</b>	<b>18"</b>	<b>2,100 lbs.</b>	<b>2,152 lbs.</b>
Compliant Per 2016 NFPA-13, Paragraph 9.1.1.2 For Single Hanger Piping 10" And Smaller			

**Notice:**

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Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Each Beam Clamp Bolt Until Strut Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.



~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

SVC52L

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC52-C4)		Cantilever End Load	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	ANSI/MSS SP-58 Maximum Allowable Tension GRAVITY	ANSI / FM 1950-2016 Maximum SEISMIC FpT / FpC (LRFD)
SBC158	6"	337 lbs.	703 lbs.
SBC158	9"	254 lbs.	468 lbs.
SBC158	12"	195 lbs.	350 lbs.
SBC158	15"	155 lbs.	279 lbs.
SBC158	18"	128 lbs.	221 lbs.
SBC158	21"	109 lbs.	166 lbs.
SBC158	24"	94 lbs.	130 lbs.
SBC158	27"	83 lbs.	103 lbs.
SBC158	30"	74 lbs.	84 lbs.

**Notice:**

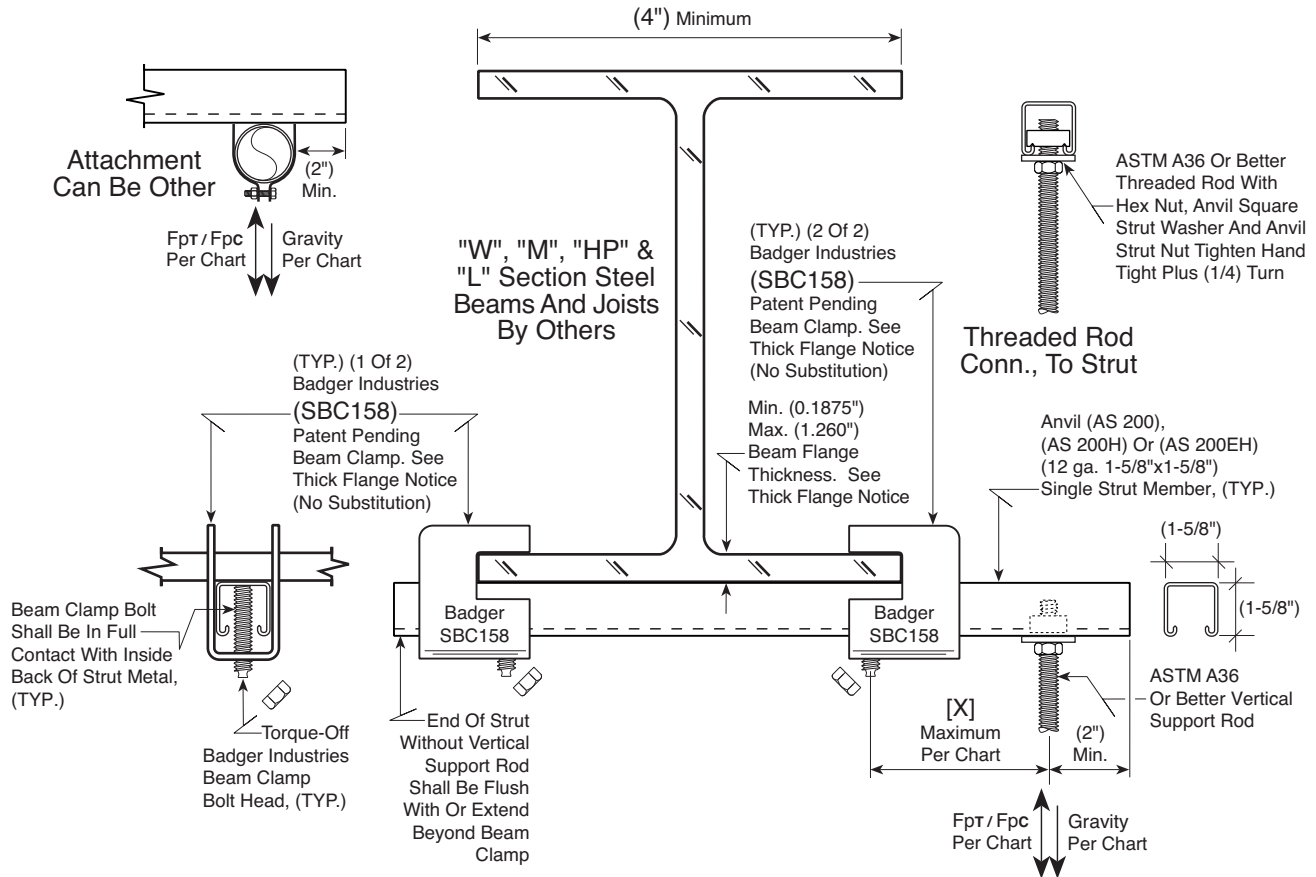
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Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Each Beam Clamp Bolt Until Strut Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

Multiple Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Listing Within Chart.

**Thick Flange Notice:**

Use Badger Industries (SBC158L-C) Beam Clamp For Flange Thickness (1.300") Inch, To A Maximum Thickness Of (3.00") Inch.



**SVC52-C4**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





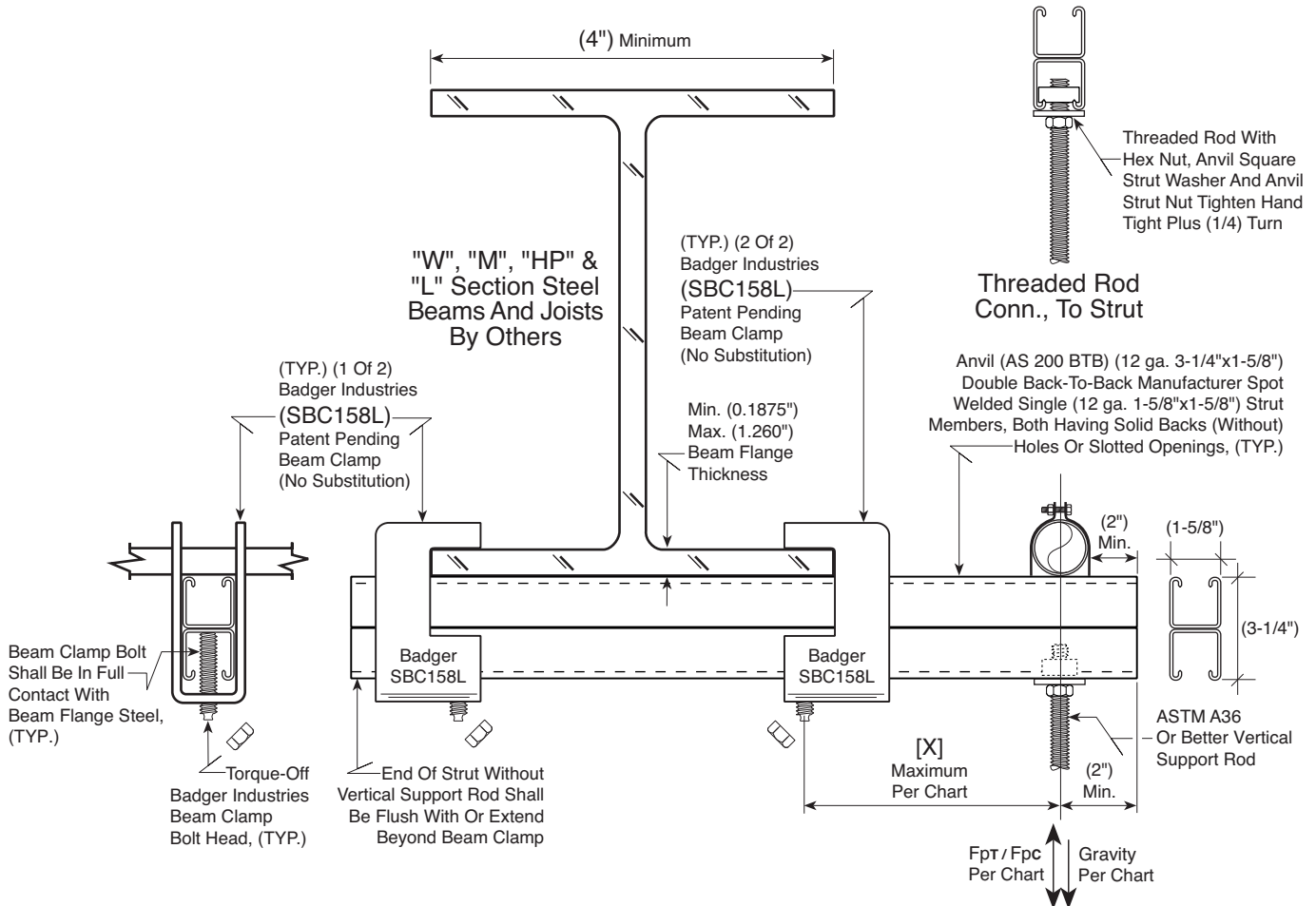
~ BADGER INDUSTRIES ~ Detail (SVC52L-C4)		Cantilever End Load	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	ANSI/MSS SP-58 Maximum Allowable Tension GRAVITY	ANSI / FM 1950-2016 Maximum SEISMIC FpT / Fpc (LRFD)
SBC158L	6"	372 lbs.	1,169 lbs.
SBC158L	9"	281 lbs.	884 lbs.
SBC158L	12"	226 lbs.	710 lbs.
SBC158L	15"	189 lbs.	594 lbs.
SBC158L	18"	162 lbs.	510 lbs.
SBC158L	21"	142 lbs.	447 lbs.
SBC158L	24"	126 lbs.	398 lbs.
SBC158L	27"	114 lbs.	358 lbs.
SBC158L	30"	104 lbs.	326 lbs.

**Notice:**

Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Each Beam Clamp Bolt Until Strut Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

Multiple Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Listing Within Chart.



**SVC52L-C4**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



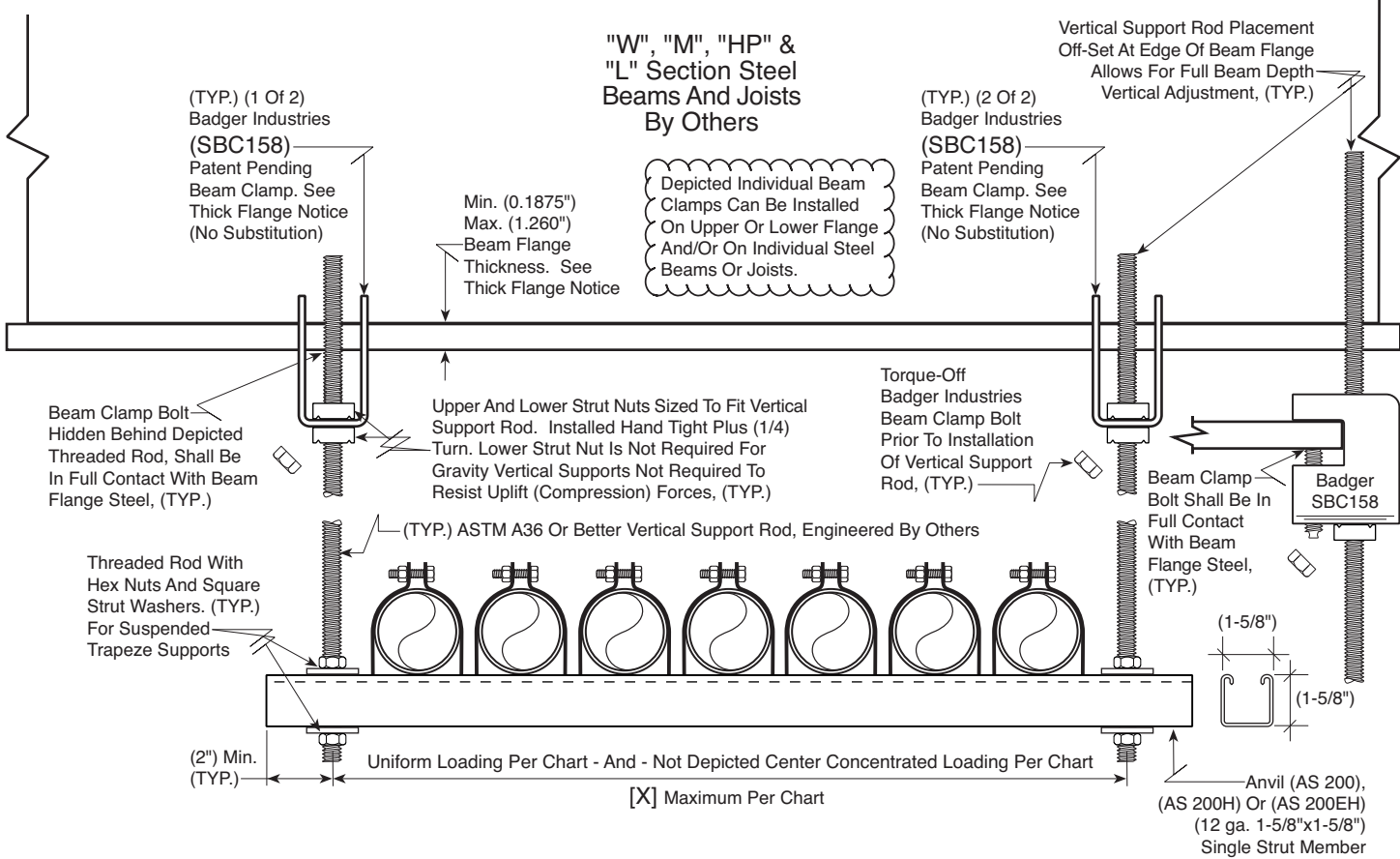
~ BADGER INDUSTRIES ~ Detail (SVC52-EF1T)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load	Concentrated Center Load	Uniform Load	Concentrated Center Load
		Maximum Allowable Tension GRAVITY	Maximum Allowable Tension GRAVITY	Maximum SEISMIC FpT / FpC (LRFD)	Maximum SEISMIC FpT / FpC (LRFD)
SBC158	1'- 0"	1,572 lbs.	785 lbs.	2,817 lbs.	1,407 lbs.
SBC158	2'- 0"	783 lbs.	390 lbs.	1,405 lbs.	701 lbs.
SBC158	3'- 0"	519 lbs.	257 lbs.	934 lbs.	464 lbs.
SBC158	4'- 0"	386 lbs.	189 lbs.	697 lbs.	345 lbs.
SBC158	5'- 0"	306 lbs.	148 lbs.	555 lbs.	273 lbs.
SBC158	6'- 0"	252 lbs.	120 lbs.	459 lbs.	224 lbs.
SBC158	7'- 0"	212 lbs.	100 lbs.	390 lbs.	189 lbs.
SBC158	8'- 0"	183 lbs.	84 lbs.	338 lbs.	162 lbs.
SBC158	9'- 0"	159 lbs.	72 lbs.	297 lbs.	141 lbs.
SBC158	10'- 0"	140 lbs.	61 lbs.	235 lbs.	123 lbs.
SBC158	11'- 0"	124 lbs.	52 lbs.	178 lbs.	109 lbs.
SBC158	12'- 0"	110 lbs.	45 lbs.	137 lbs.	86 lbs.

**Notice:**  
Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Beam Clamp Bolt Until Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

(Non-Uniform) Load Or Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.

**Thick Flange Notice:**  
Use Badger Industries (SBC158L-C) Beam Clamp For Flange Thickness (1.300") Inch, To A Maximum Thickness Of (3.00") Inch.



**SVC52-EF1T**

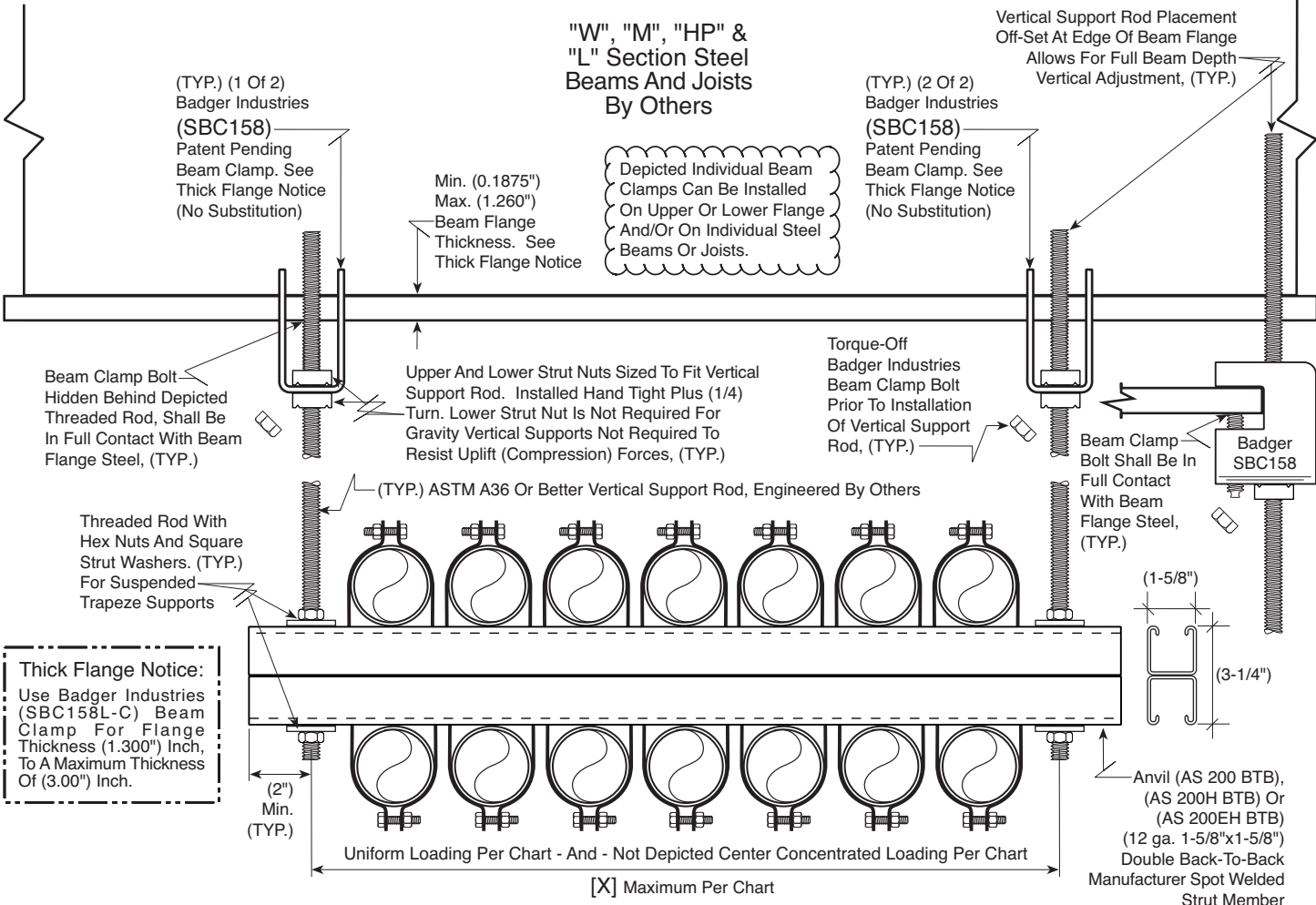
~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC52-EF4T)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load	Concentrated Center Load	Uniform Load	Concentrated Center Load
		Maximum Allowable Tension GRAVITY	Maximum Allowable Tension GRAVITY	Maximum SEISMIC FpT / FpC (LRFD)	Maximum SEISMIC FpT / FpC (LRFD)
SBC158	3'- 0"	1,460 lbs.	725 lbs.	2,623 lbs.	1,306 lbs.
SBC158	4'- 0"	1,089 lbs.	537 lbs.	1,961 lbs.	973 lbs.
SBC158	5'- 0"	865 lbs.	424 lbs.	1,563 lbs.	773 lbs.
SBC158	6'- 0"	714 lbs.	347 lbs.	1,296 lbs.	637 lbs.
SBC158	7'- 0"	606 lbs.	291 lbs.	1,104 lbs.	540 lbs.
SBC158	8'- 0"	524 lbs.	248 lbs.	960 lbs.	466 lbs.
SBC158	9'- 0"	459 lbs.	214 lbs.	847 lbs.	408 lbs.
SBC158	10'- 0"	407 lbs.	186 lbs.	755 lbs.	360 lbs.
SBC158	11'- 0"	363 lbs.	162 lbs.	680 lbs.	321 lbs.
SBC158	12'- 0"	326 lbs.	142 lbs.	617 lbs.	288 lbs.

**Notice:**  
Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
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(Non-Uniform) Load Or Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.



**SVC52-EF4T**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



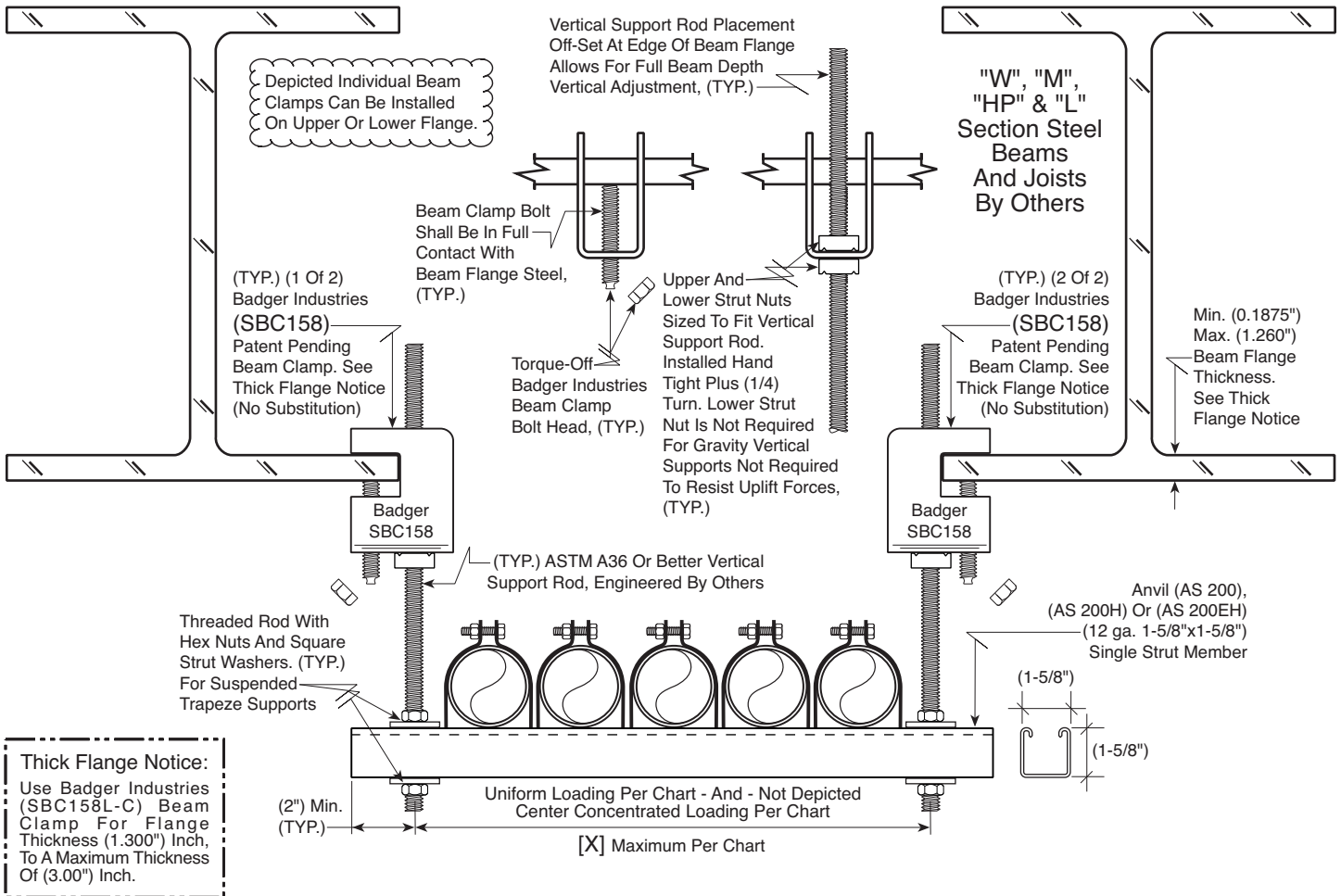
~ BADGER INDUSTRIES ~ Detail (SVC52-LF1T)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load Maximum Allowable Tension GRAVITY	Concentrated Center Load Maximum Allowable Tension GRAVITY	Uniform Load Maximum SEISMIC FpT / FpC (LRFD)	Concentrated Center Load Maximum SEISMIC FpT / FpC (LRFD)
SBC158	5'- 0"	306 lbs.	148 lbs.	555 lbs.	273 lbs.
SBC158	6'- 0"	252 lbs.	120 lbs.	459 lbs.	224 lbs.
SBC158	7'- 0"	212 lbs.	100 lbs.	390 lbs.	189 lbs.
SBC158	8'- 0"	183 lbs.	84 lbs.	338 lbs.	162 lbs.
SBC158	9'- 0"	159 lbs.	72 lbs.	297 lbs.	141 lbs.
SBC158	10'- 0"	140 lbs.	61 lbs.	235 lbs.	123 lbs.
SBC158	11'- 0"	124 lbs.	52 lbs.	178 lbs.	109 lbs.
SBC158	12'- 0"	110 lbs.	45 lbs.	137 lbs.	86 lbs.

**Notice:**

Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Beam Clamp Bolt Until Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

(Non-Uniform) Load Or Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.



SVC52-LF1T

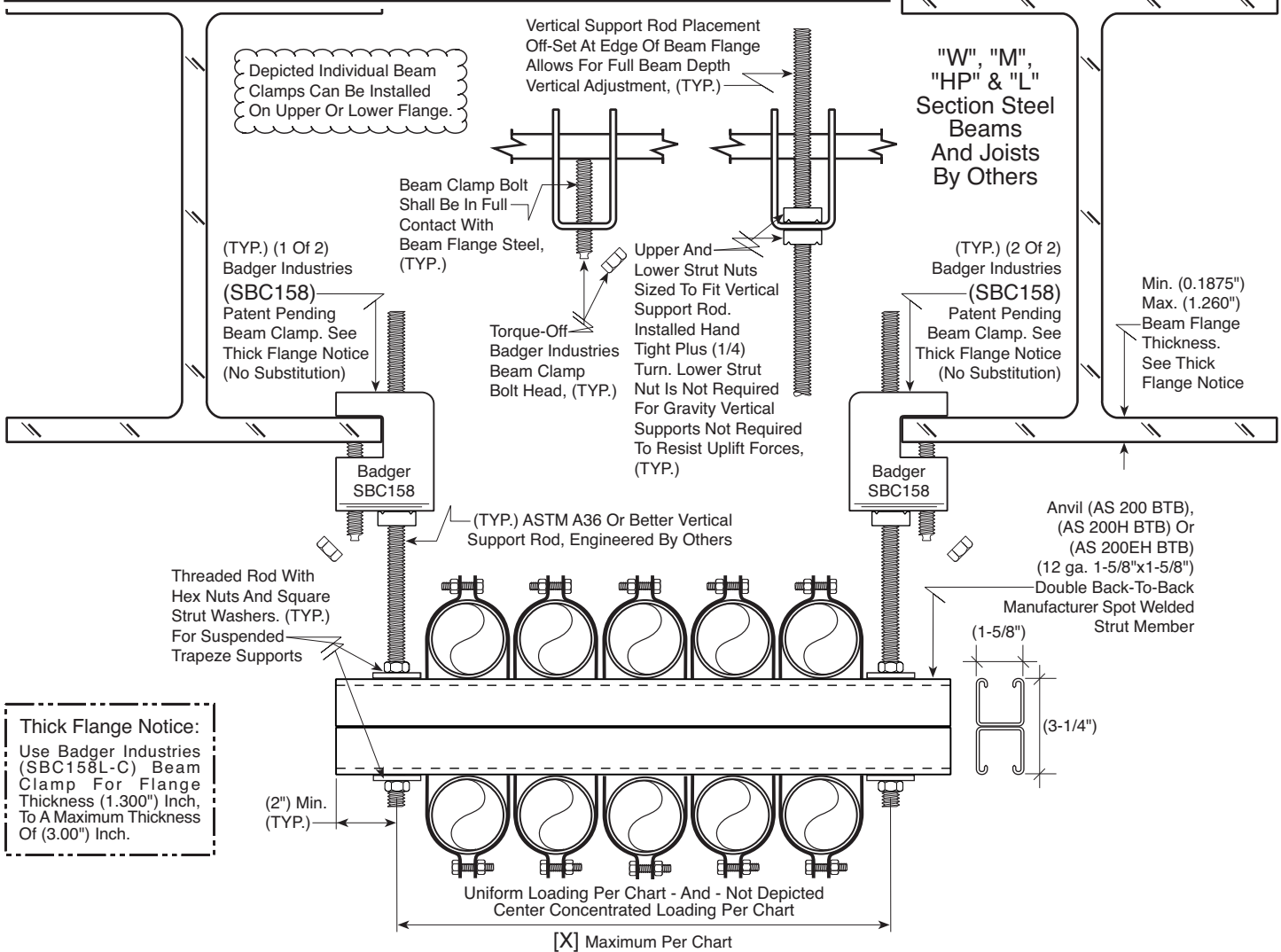
~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC52-LF4T)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load Maximum Allowable Tension GRAVITY	Concentrated Center Load Maximum Allowable Tension GRAVITY	Uniform Load Maximum SEISMIC F <sub>pT</sub> / F <sub>pC</sub> (LRFD)	Concentrated Center Load Maximum SEISMIC F <sub>pT</sub> / F <sub>pC</sub> (LRFD)
SBC158	5'- 0"	865 lbs.	424 lbs.	1,563 lbs.	773 lbs.
SBC158	6'- 0"	714 lbs.	347 lbs.	1,296 lbs.	637 lbs.
SBC158	7'- 0"	606 lbs.	291 lbs.	1,104 lbs.	540 lbs.
SBC158	8'- 0"	524 lbs.	248 lbs.	960 lbs.	466 lbs.
SBC158	9'- 0"	459 lbs.	214 lbs.	847 lbs.	408 lbs.
SBC158	10'- 0"	407 lbs.	186 lbs.	755 lbs.	360 lbs.
SBC158	11'- 0"	363 lbs.	162 lbs.	680 lbs.	321 lbs.
SBC158	12'- 0"	326 lbs.	142 lbs.	617 lbs.	288 lbs.

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Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Beam Clamp Bolt Until Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.  
(Non-Uniform) Load Or Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.



**Thick Flange Notice:**  
Use Badger Industries (SBC158L-C) Beam Clamp For Flange Thickness (1.300") Inch, To A Maximum Thickness Of (3.00") Inch.

**SVC52-LF4T**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC52-LF)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load	Concentrated Center Load	Uniform Load	Concentrated Center Load
		Maximum Allowable Tension GRAVITY	Maximum Allowable Tension GRAVITY	Maximum SEISMIC FpT / Fpc (LRFD)	Maximum SEISMIC FpT / Fpc (LRFD)
<b>SBC158</b>	5'- 0"	<b>463 lbs.</b>	<b>306 lbs.</b>	<b>837 lbs.</b>	<b>555 lbs.</b>
<b>SBC158</b>	6'- 0"	<b>383 lbs.</b>	<b>252 lbs.</b>	<b>694 lbs.</b>	<b>459 lbs.</b>
<b>SBC158</b>	7'- 0"	<b>325 lbs.</b>	<b>212 lbs.</b>	<b>592 lbs.</b>	<b>390 lbs.</b>
<b>SBC158</b>	8'- 0"	<b>281 lbs.</b>	<b>183 lbs.</b>	<b>514 lbs.</b>	<b>338 lbs.</b>
<b>SBC158</b>	9'- 0"	<b>246 lbs.</b>	<b>159 lbs.</b>	<b>454 lbs.</b>	<b>297 lbs.</b>
<b>SBC158</b>	10'- 0"	<b>219 lbs.</b>	<b>140 lbs.</b>	<b>405 lbs.</b>	<b>264 lbs.</b>
<b>SBC158</b>	11'- 0"	<b>195 lbs.</b>	<b>124 lbs.</b>	<b>365 lbs.</b>	<b>237 lbs.</b>
<b>SBC158</b>	12'- 0"	<b>176 lbs.</b>	<b>110 lbs.</b>	<b>331 lbs.</b>	<b>214 lbs.</b>

**Notice:**

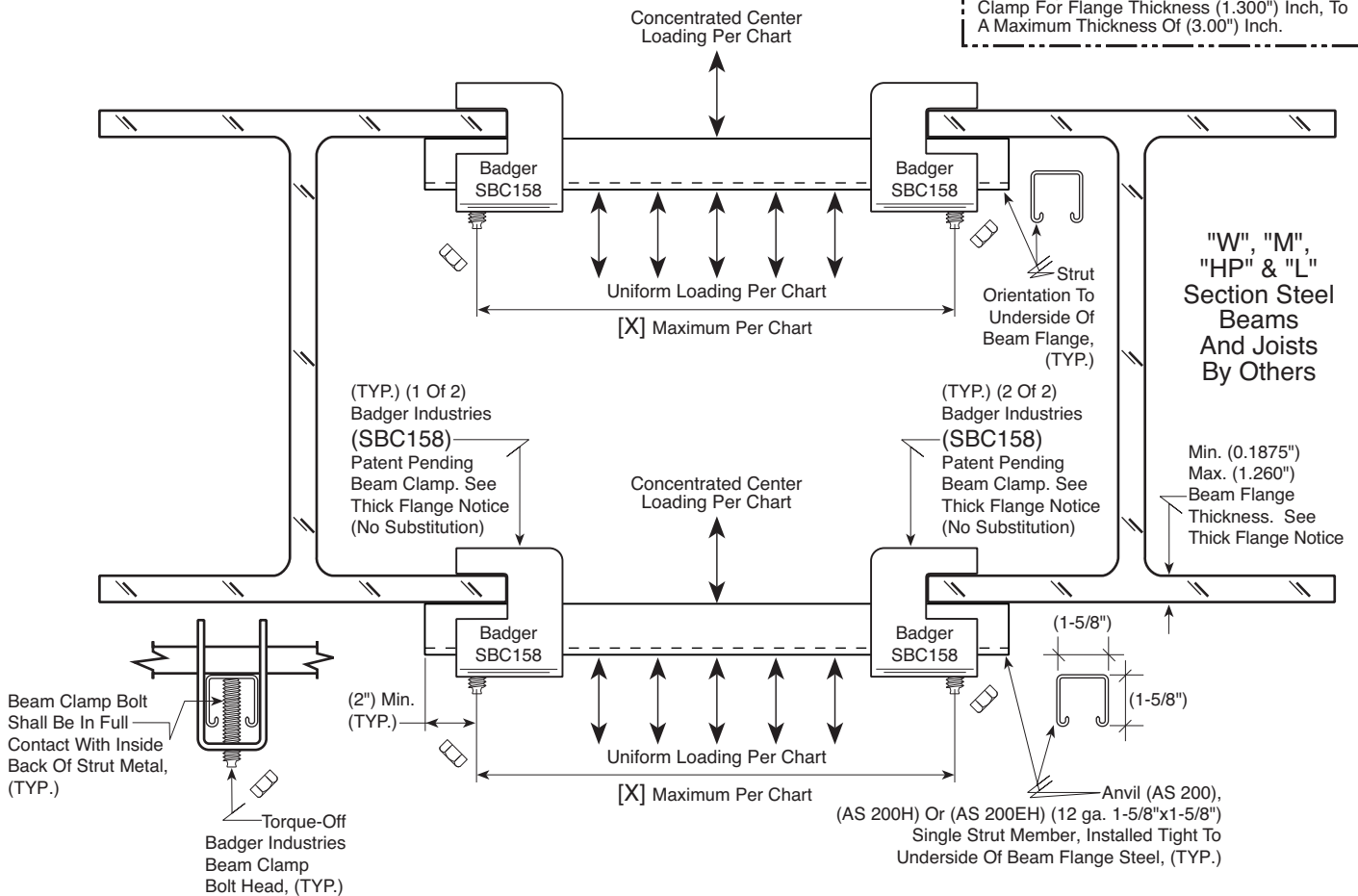
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Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Each Beam Clamp Bolt Until Strut Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

(Non-Uniform) Load Or Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.

**Thick Flange Notice:**

Use Badger Industries (SBC158L-C) Beam Clamp For Flange Thickness (1.300") Inch, To A Maximum Thickness Of (3.00") Inch.



**SVC52-LF**

~ **BADGER INDUSTRIES** ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



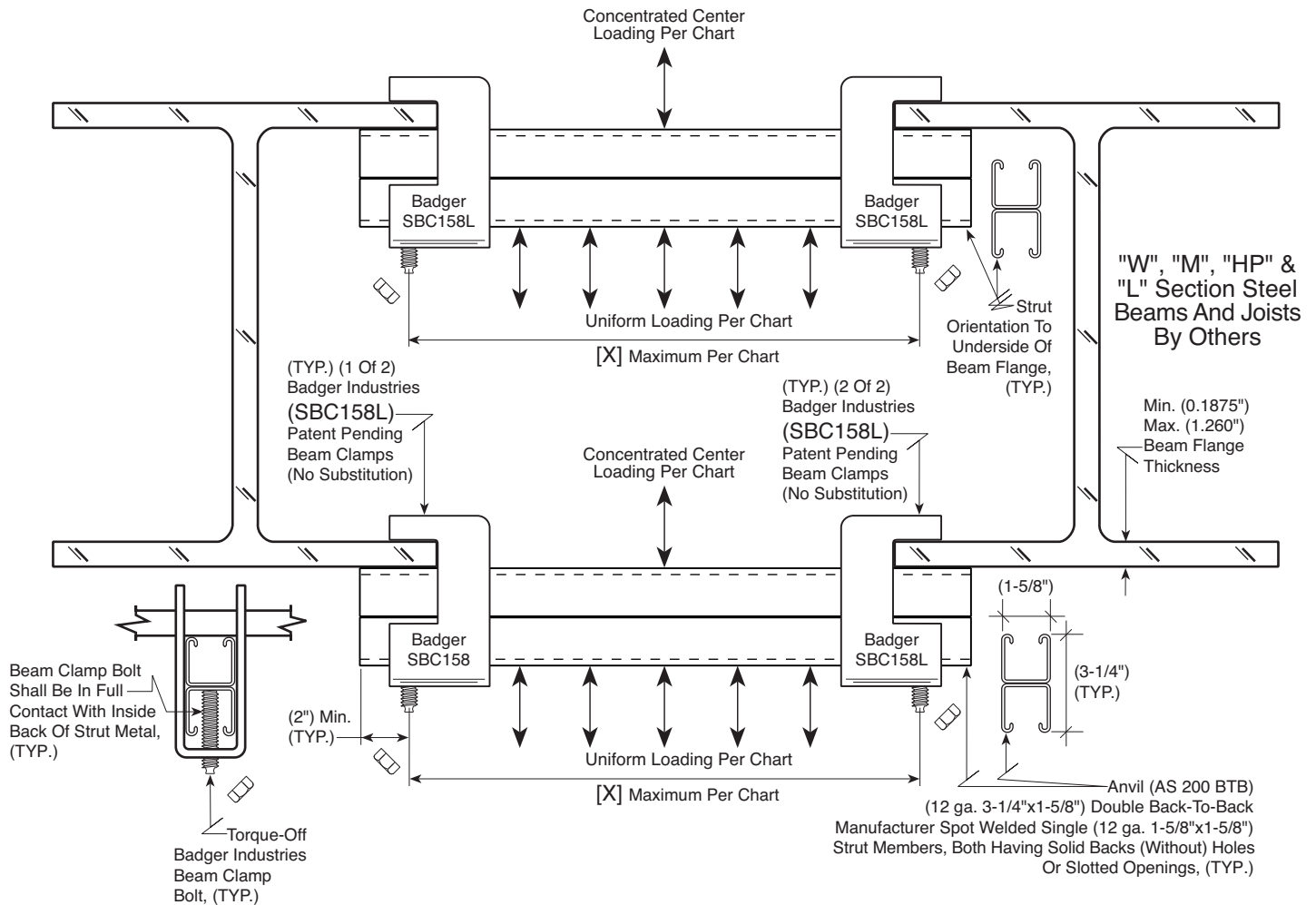
~ BADGER INDUSTRIES ~ Detail (SVC52L-LF)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load Maximum Allowable Tension GRAVITY	Concentrated Center Load Maximum Allowable Tension GRAVITY	Uniform Load Maximum SEISMIC F <sub>pT</sub> / F <sub>pC</sub> (LRFD)	Concentrated Center Load Maximum SEISMIC F <sub>pT</sub> / F <sub>pC</sub> (LRFD)
SBC158L	5'- 0"	1,306 lbs.	865 lbs.	2,152 lbs.	1,563 lbs.
SBC158L	6'- 0"	1,082 lbs.	714 lbs.	1,954 lbs.	1,296 lbs.
SBC158L	7'- 0"	921 lbs.	606 lbs.	1,669 lbs.	1,104 lbs.
SBC158L	8'- 0"	799 lbs.	524 lbs.	1,454 lbs.	960 lbs.
SBC158L	9'- 0"	704 lbs.	459 lbs.	1,286 lbs.	847 lbs.
SBC158L	10'- 0"	627 lbs.	407 lbs.	1,150 lbs.	755 lbs.
SBC158L	11'- 0"	564 lbs.	363 lbs.	1,039 lbs.	680 lbs.
SBC158L	12'- 0"	510 lbs.	326 lbs.	946 lbs.	617 lbs.

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**SVC52L-LF**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ Detail (SVC52-LFa)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load	Concentrated Center Load	Uniform Load	Concentrated Center Load
		Maximum Allowable Tension GRAVITY	Maximum Allowable Tension GRAVITY	Maximum SEISMIC FpT / Fpc (LRFD)	Maximum SEISMIC FpT / Fpc (LRFD)
SBC158	5'- 0"	463 lbs.	306 lbs.	837 lbs.	555 lbs.
SBC158	6'- 0"	383 lbs.	252 lbs.	694 lbs.	459 lbs.
SBC158	7'- 0"	325 lbs.	212 lbs.	592 lbs.	390 lbs.
SBC158	8'- 0"	281 lbs.	183 lbs.	514 lbs.	338 lbs.
SBC158	9'- 0"	246 lbs.	159 lbs.	454 lbs.	297 lbs.
SBC158	10'- 0"	219 lbs.	140 lbs.	405 lbs.	264 lbs.
SBC158	11'- 0"	195 lbs.	124 lbs.	365 lbs.	237 lbs.
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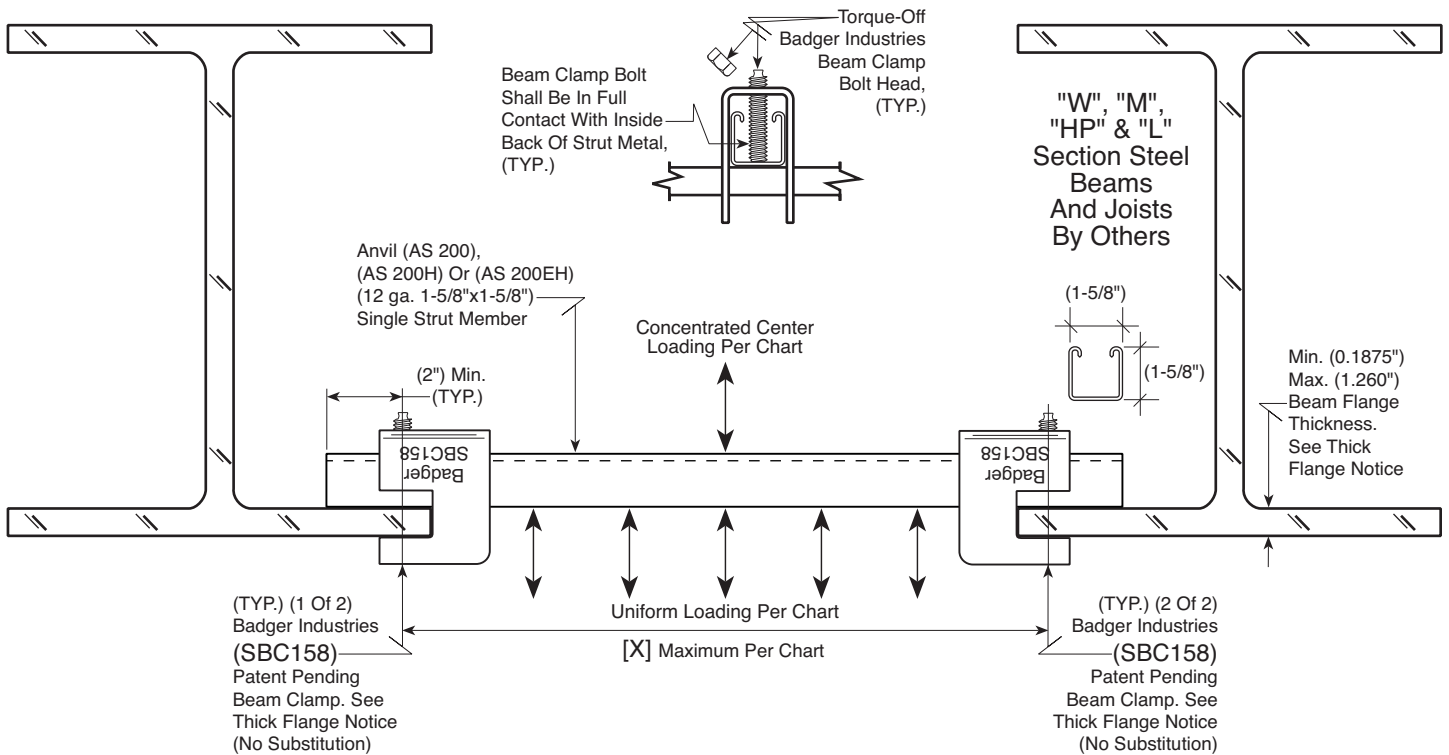
Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Each Beam Clamp Bolt Until Strut Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

(Non-Uniform) Load Or Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.

**Thick Flange Notice:**

Use Badger Industries (SBC158L-C) Beam Clamp For Flange Thickness (1.300") Inch, To A Maximum Thickness Of (3.00") Inch.



SVC52-LFa

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





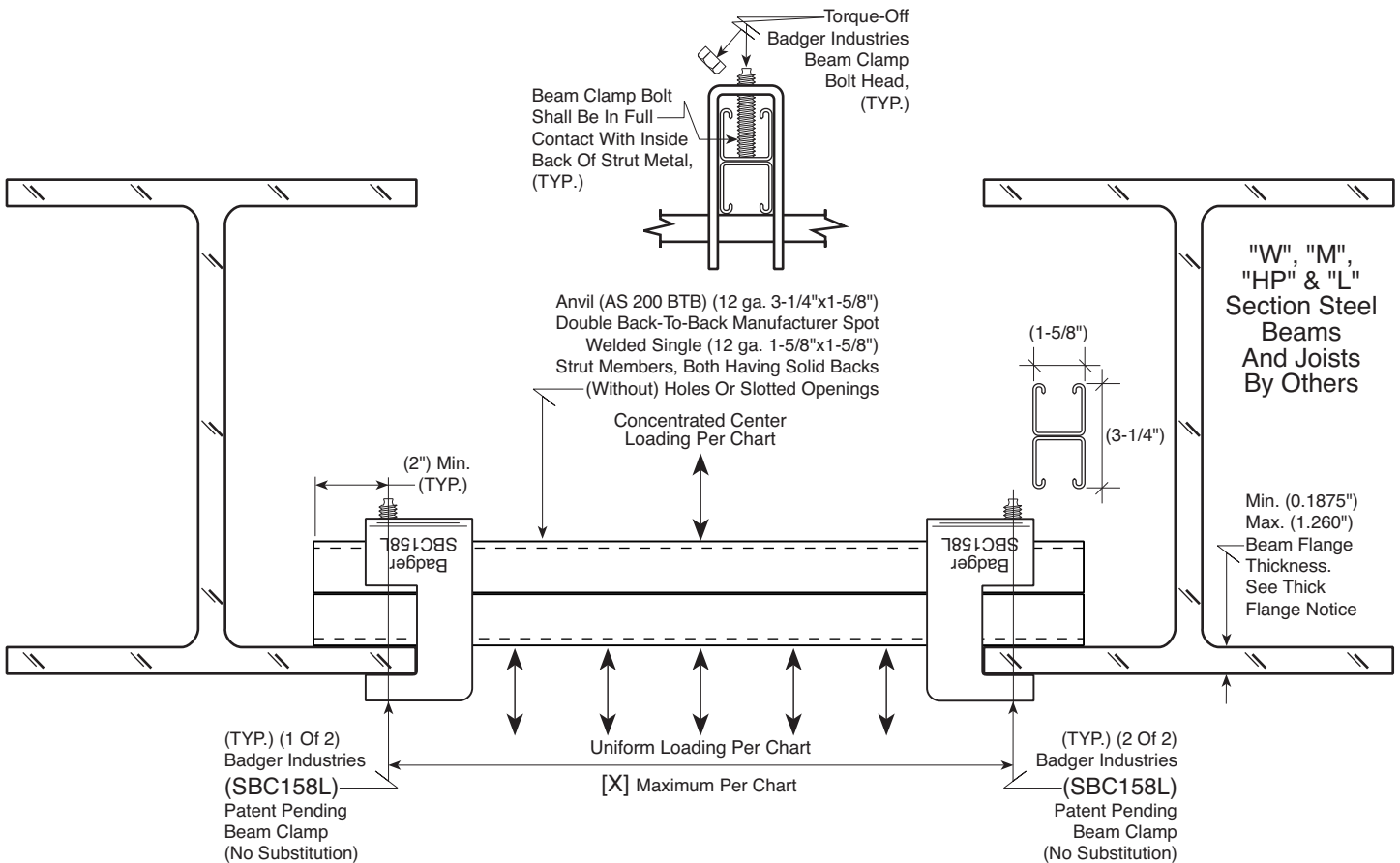
~ BADGER INDUSTRIES ~ Detail (SVC52L-LFa)		ANSI/MSS SP-58		ANSI / FM 1950-2016	
BADGER INDUSTRIES Seismic Hardware Part Number	[X] Maximum	Uniform Load Maximum Allowable Tension GRAVITY	Concentrated Center Load Maximum Allowable Tension GRAVITY	Uniform Load Maximum SEISMIC FpT / Fpc (LRFD)	Concentrated Center Load Maximum SEISMIC FpT / Fpc (LRFD)
SBC158L	5'- 0"	1,306 lbs.	865 lbs.	2,152 lbs.	1,563 lbs.
SBC158L	6'- 0"	1,082 lbs.	714 lbs.	1,954 lbs.	1,296 lbs.
SBC158L	7'- 0"	921 lbs.	606 lbs.	1,669 lbs.	1,104 lbs.
SBC158L	8'- 0"	799 lbs.	524 lbs.	1,454 lbs.	960 lbs.
SBC158L	9'- 0"	704 lbs.	459 lbs.	1,286 lbs.	847 lbs.
SBC158L	10'- 0"	627 lbs.	407 lbs.	1,150 lbs.	755 lbs.
SBC158L	11'- 0"	564 lbs.	363 lbs.	1,039 lbs.	680 lbs.
SBC158L	12'- 0"	510 lbs.	326 lbs.	946 lbs.	617 lbs.

**Notice:**

Listed Capacities Based On Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Each Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Each Beam Clamp Bolt Until Strut Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away. Use Of An Alternate Strut Shall Be Engineered By Others.

(Non-Uniform ) Load Or Loads Can Be Placed Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.



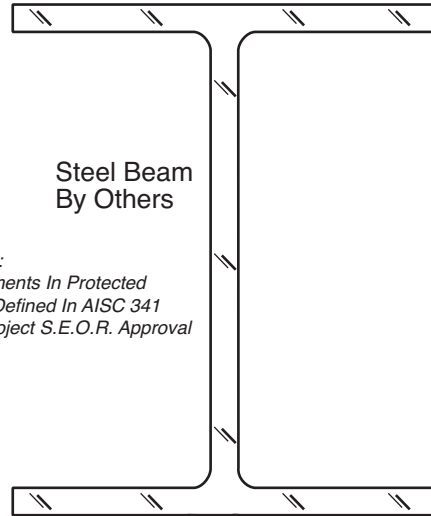
**SVC52L-LFa**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



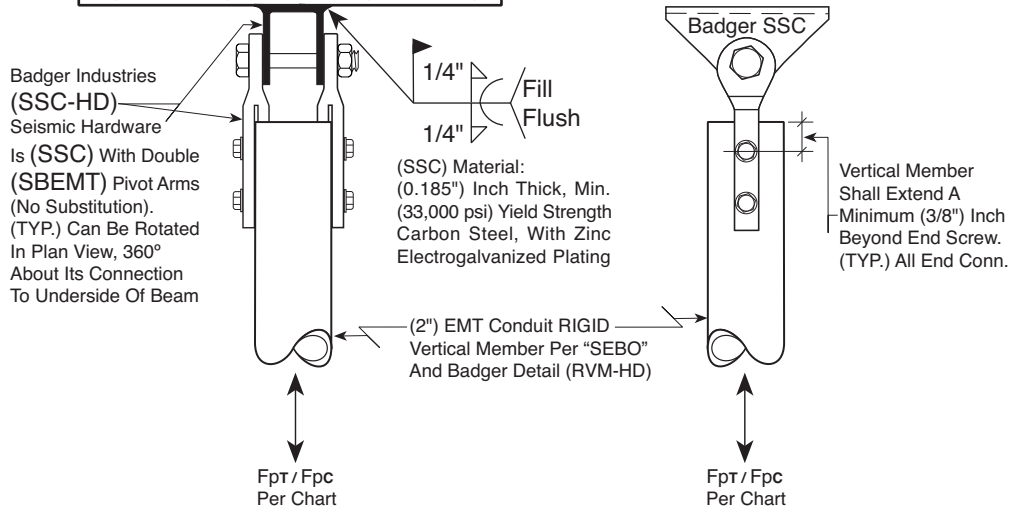
**WARNING:**  
No Attachments In Protected Zones As Defined In AISC 341 Without Project S.E.O.R. Approval



Notice: "SEBO"™ Seismic Engineering By Others  
Installation, Testing And Inspection: Per Project Structural Engineer Of Record And Jurisdictional Requirements. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Badger (SSC-HD) Shall Be Centered On Beam Flange Width (+ / -) (1").  
Fpc Capacity May Be Controlled By Size And Length Of Rigid Vertical Member "SEBO".

~ BADGER INDUSTRIES ~  
Detail (SVC50-HD)

BADGER INDUSTRIES Seismic Hardware Part Number	Maximum Gravity Load (ASD)	Maximum Combined Gravity + Seismic Load FpT / Fpc (LRFD)
<b>SSC-HD</b>	<b>3,000 lbs.</b>	<b>5,250 lbs.</b>



**SVC50-HD**

~ BADGER INDUSTRIES ~  
**Seismic Vertical Connection - Welded Beam Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

**SEISMIC BRACE CONN.,  
TO STRUCTURE  
INSTALLATION DETAILS**



**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (3/8x3-3/4) Hilti KB-TZ Anchor.

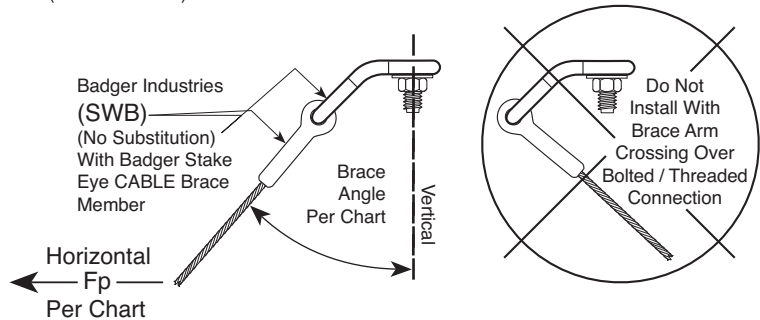
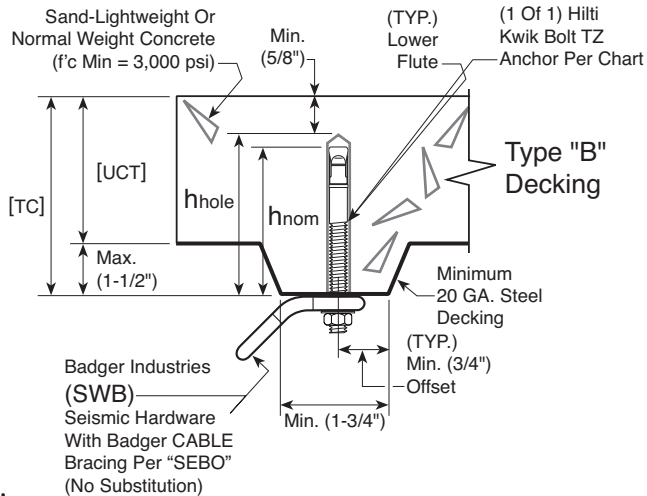
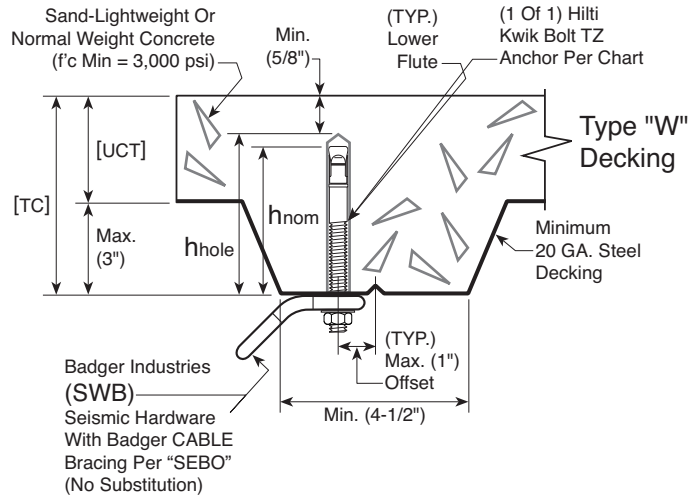
~ BADGER INDUSTRIES ~ Detail (SWB13H)		
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da	3/8 in.	3/8 in.
Min. $h_{nom}$ Embed.	2-5/16 in.	2-5/16 in.
Min. $h_{hole}$ Depth	2-5/8 in.	2-5/8 in.
Min. [TC] Thickness	3-1/4 in.	3-1/4 in.
Min. Edge Distance	5 in.	5 in.
Min. Between Anchor Spacing	6-3/4 in.	6 in.
Min. Between Anchor Spacing Across Lower Flutes	10 in.	4-1/2 in.
Installation Torque	25 ft. • lbs.	25 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)	<b>57 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>66 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 60° Maximum Fp (LRFD)	<b>113 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>133 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).		

**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. Fp Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].



**SWB13H**

~ BADGER INDUSTRIES ~  
**Seismic Brace Connection - 1 Anchor**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (1/2x5-1/2) Hilti KB-TZ Anchor.

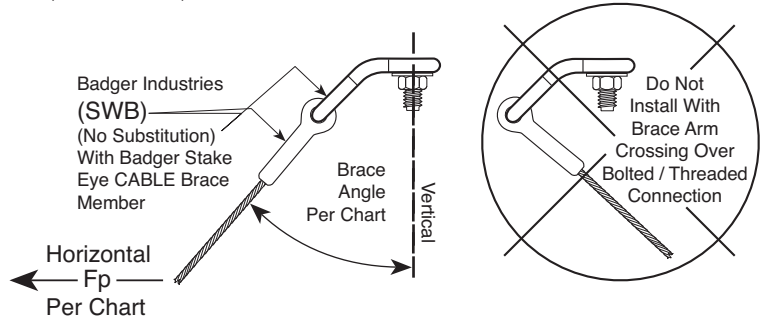
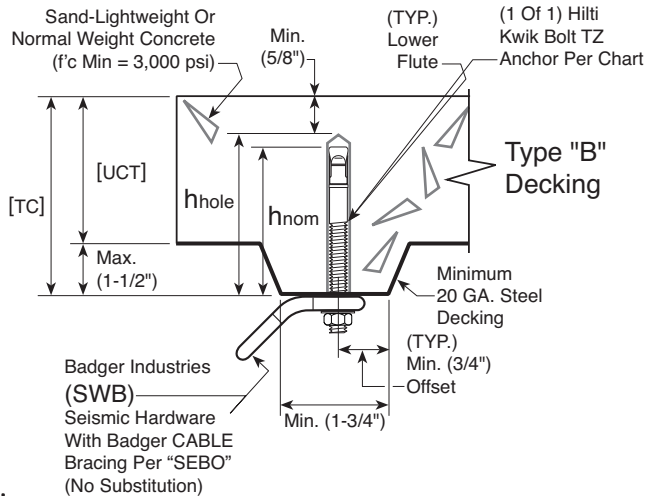
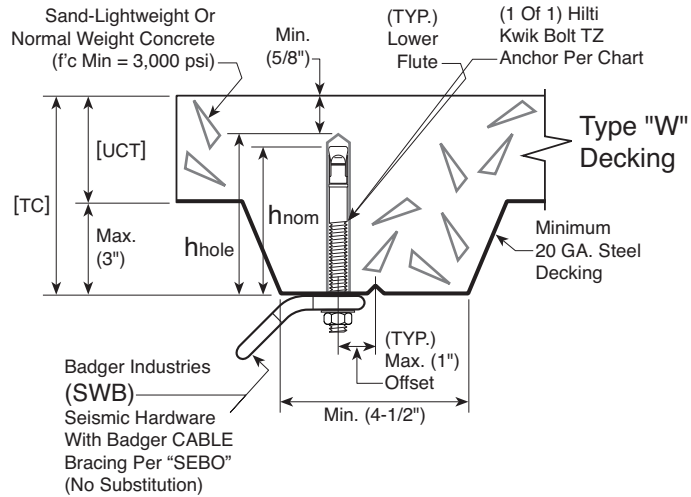
~ BADGER INDUSTRIES ~ Detail (SWB14H)		
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da	1/2 in.	1/2 in.
Min. $h_{nom}$ Embed.	3-5/8 in.	3-5/8 in.
Min. $h_{hole}$ Depth	4 in.	4 in.
Min. [TC] Thickness	4-5/8 in.	4-5/8 in.
Min. Edge Distance	7-1/2 in.	7-1/2 in.
Min. Between Anchor Spacing	9-3/4 in.	9-3/4 in.
Min. Between Anchor Spacing Across Lower Flutes	10 in.	4-1/2 in.
Installation Torque	40 ft. • lbs.	40 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)	<b>107 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>120 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 60° Maximum Fp (LRFD)	<b>211 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>231 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).		

**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. Fp Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].



~ BADGER INDUSTRIES ~  
**SWB14H**  
Seismic Brace Connection - 1 Anchor  
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (1/2x5-1/2) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~  
**Detail (SBA14H)**

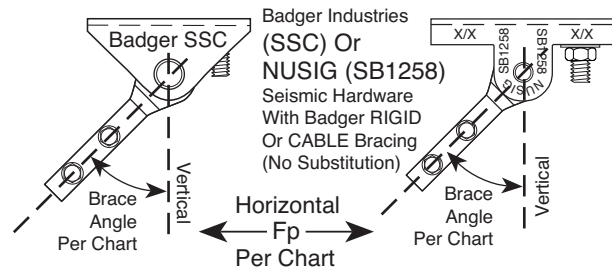
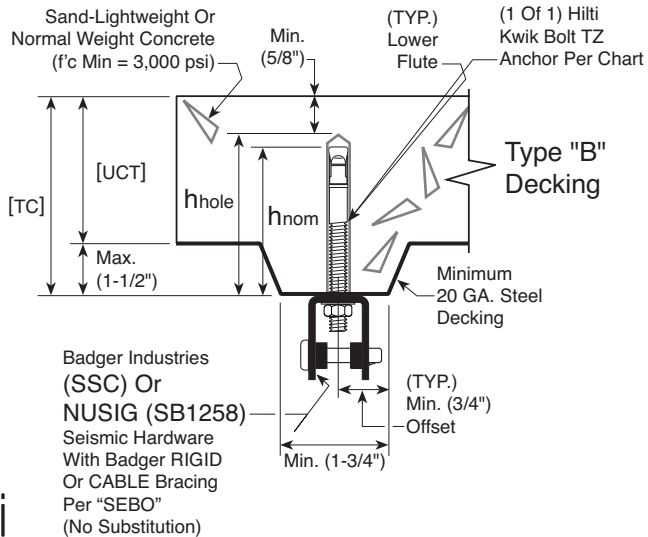
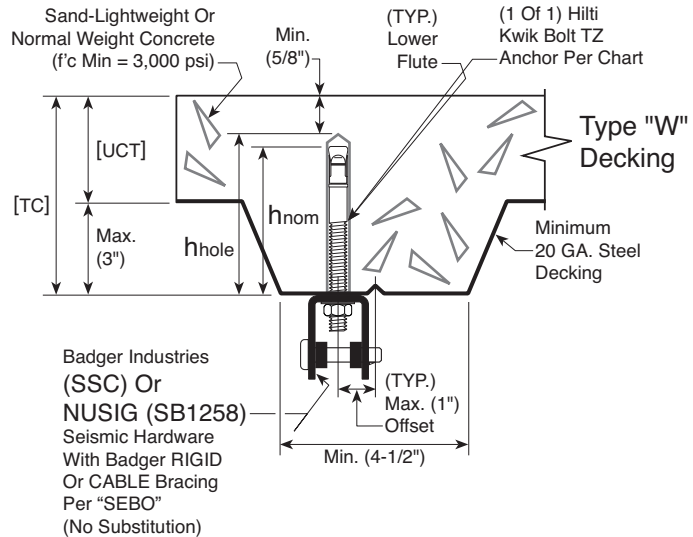
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da	1/2 in.	1/2 in.
Min. $h_{nom}$ Embed.	3-5/8 in.	3-5/8 in.
Min. $h_{hole}$ Depth	4 in.	4 in.
Min. [TC] Thickness	4-5/8 in.	4-5/8 in.
Min. Edge Distance	7-1/2 in.	7-1/2 in.
Min. Between Anchor Spacing	9-3/4 in.	9-3/4 in.
Min. Between Anchor Spacing Across Lower Flutes	10 in.	4-1/2 in.
Installation Torque	40 ft. • lbs.	40 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum $F_p$ (LRFD)	<b>190 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>218 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 75° Maximum $F_p$ (LRFD)	<b>547 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>558 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, $F_p$ (LRFD) Values. Multiply Chart Listed Values By (0.8).		

**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements.  $F_p$  Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Do Not Install Brace Arm Crossing Over Bolted / Threaded Connection.

Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

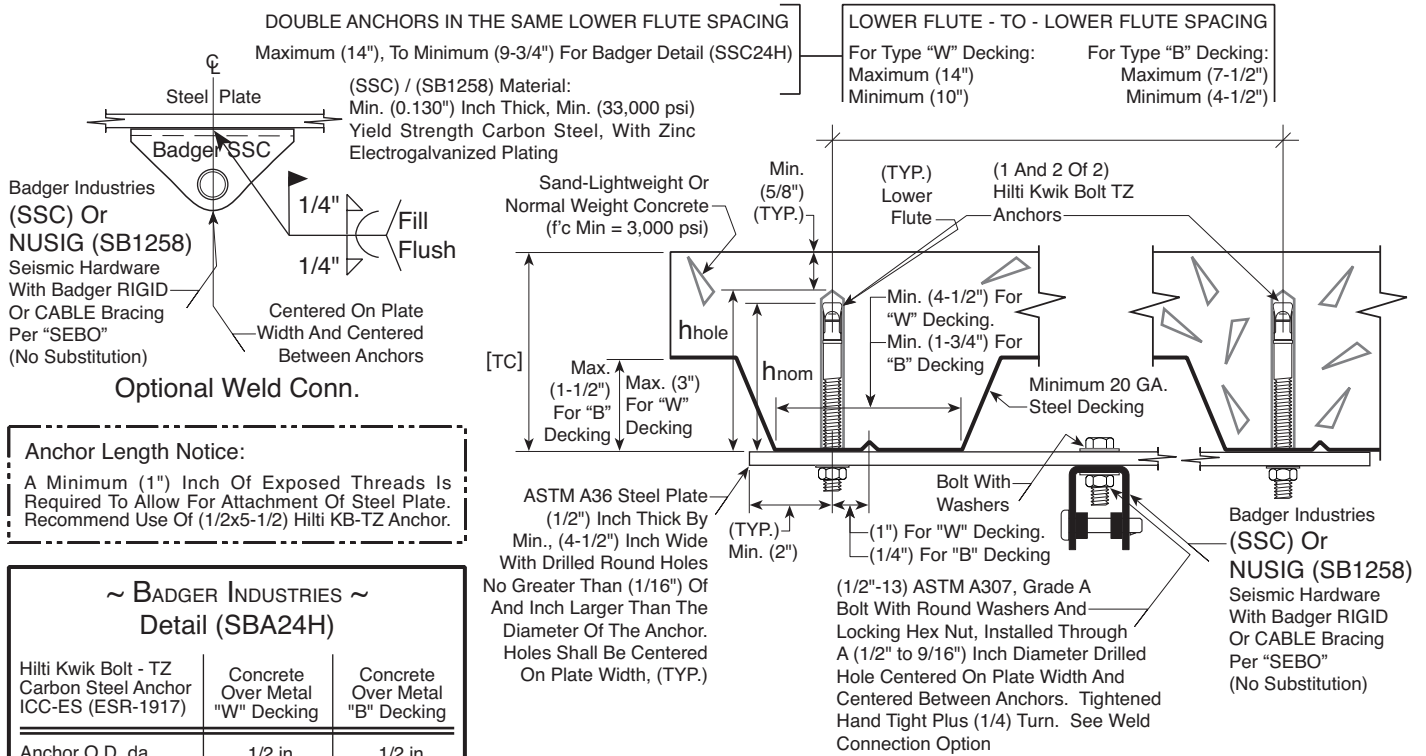
Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].



~ BADGER INDUSTRIES ~  
**Seismic Brace Anchorage - 1 Anchor**

**SBA14H**

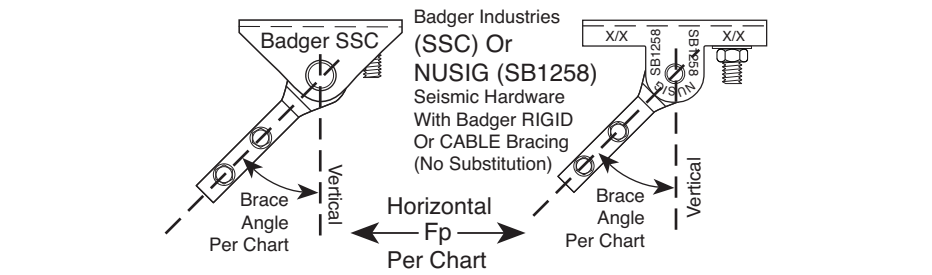
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~  
Detail (SBA24H)

	Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da		1/2 in.	1/2 in.
Min. h <sub>nom</sub> Embed.		3-5/8 in.	3-5/8 in.
Min. h <sub>hole</sub> Depth		4 in.	4 in.
Min. [TC] Thickness		4-5/8 in.	4-5/8 in.
Min. Edge Distance		7-1/2 in.	7-1/2 in.
Min. Between Anchor Spacing		9-3/4 in.	9-3/4 in.
Min. Between Anchor Spacing Across Lower Flutes		10 in.	4-1/2 in.
Installation Torque		40 ft. • lbs.	40 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum F <sub>p</sub> (LRFD)		<b>607 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>561 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 75° Maximum F <sub>p</sub> (LRFD)		<b>858 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	<b>728 lbs.</b> Includes (2.0) Omega Per ASCE 7-16

For ASCE 7-10, F<sub>p</sub> (LRFD) Values. Multiply Chart Listed Values By (0.8).



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. F<sub>p</sub> Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Do Not Install Brace Arm Crossing Over Bolted / Threaded Connection.

Prior To Proper Tightening Or Welding The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Plate.

Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].

~ BADGER INDUSTRIES ~  
**SBA24H**

~ BADGER INDUSTRIES ~  
**Seismic Brace Anchorage - 2 Anchors**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



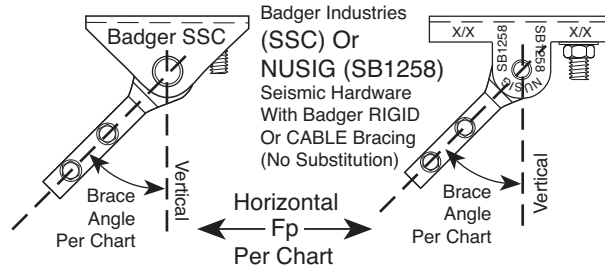
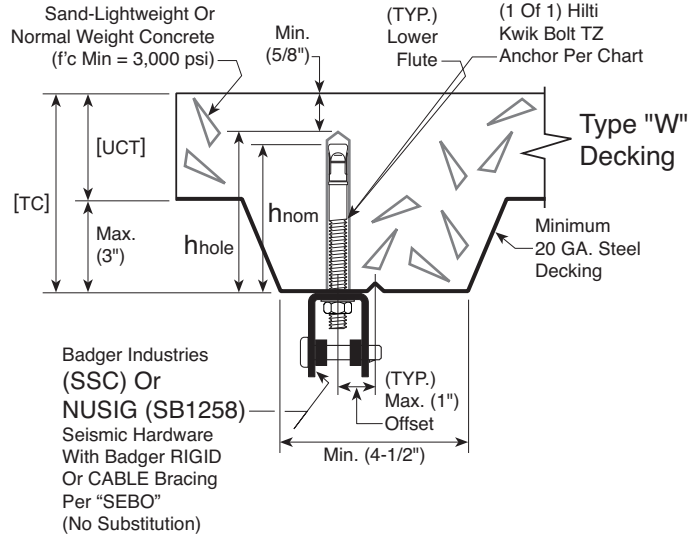
**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (5/8x6) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~  
**Detail (SBA15H)**

Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking	Not Usable
Anchor O.D. da	5/8 in.		
Min. $h_{nom}$ Embed.	4-7/16 in.		
Min. $h_{hole}$ Depth	4-3/4 in.		
Min. [TC] Thickness	5-3/8 in.		
Min. Edge Distance	8-3/4 in.		
Min. Between Anchor Spacing	12 in.		
Min. Between Anchor Spacing Across Lower Flutes	10 in.		
Installation Torque	60 ft. • lbs.		
Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)	<b>337 lbs.</b> Includes (2.0) Omega Per ASCE 7-16		
Brace Angle From Vertical 45° to 75° Maximum Fp (LRFD)	<b>841 lbs.</b> Includes (2.0) Omega Per ASCE 7-16		

For ASCE 7-10, Fp (LRFD) Values. Multiply Chart Listed Values By (0.8).



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. Fp Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Do Not Install Brace Arm Crossing Over Bolted / Threaded Connection.

Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

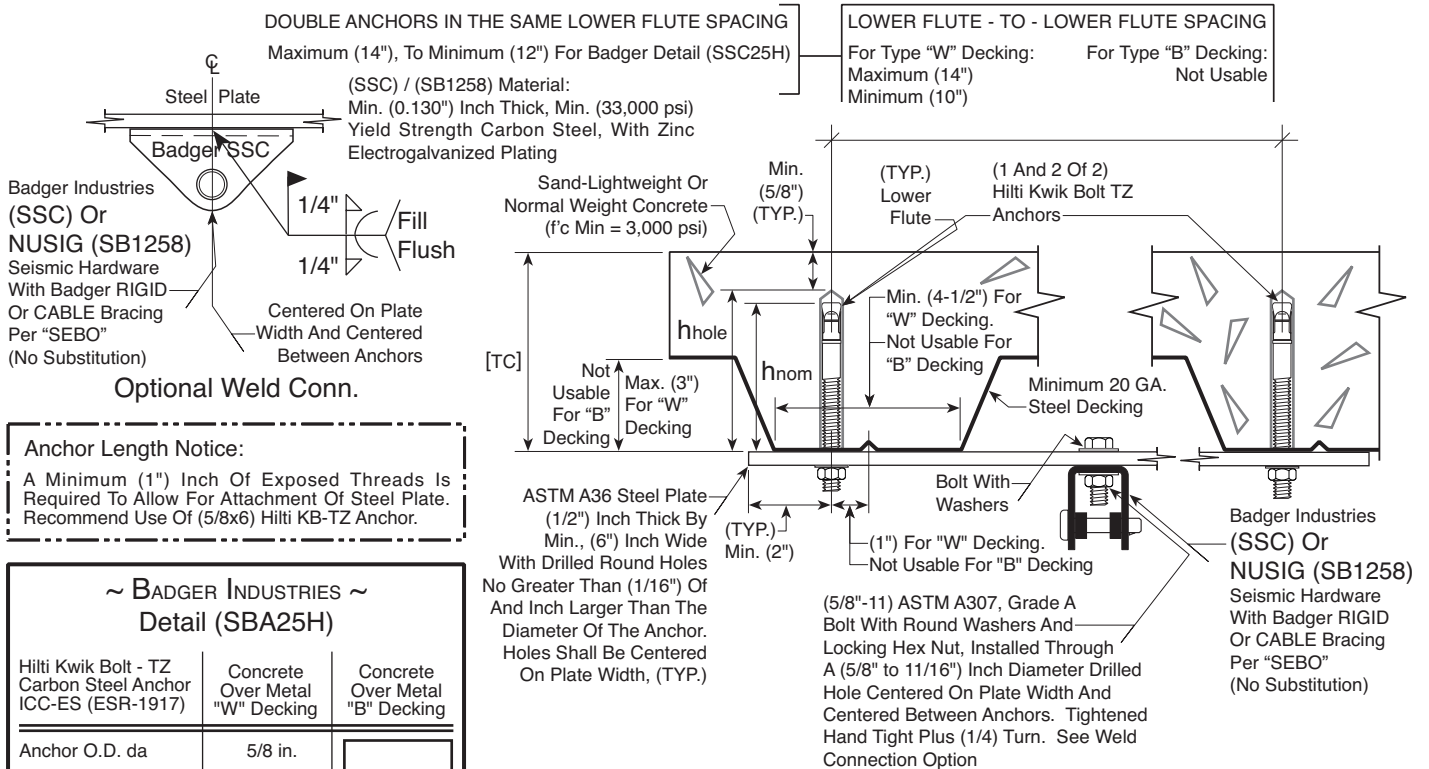
Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].

~ BADGER INDUSTRIES ~  
**Seismic Brace Anchorage - 1 Anchor**

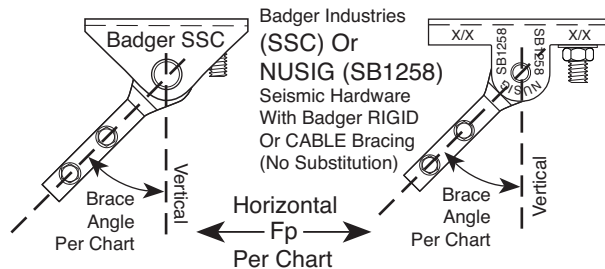
**SBA15H**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





~ BADGER INDUSTRIES ~ Detail (SBA25H)		
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Over Metal "W" Decking	Concrete Over Metal "B" Decking
Anchor O.D. da	5/8 in.	Not Usable
Min. $h_{nom}$ Embed.	4-7/16 in.	
Min. $h_{hole}$ Depth	4-3/4 in.	
Min. [TC] Thickness	5-3/8 in.	
Min. Edge Distance	8-3/4 in.	
Min. Between Anchor Spacing	12 in.	
Min. Between Anchor Spacing Across Lower Flutes	10 in.	
Installation Torque	60 ft. • lbs.	
Brace Angle From Vertical 30° to 44° Maximum $F_p$ (LRFD)	<b>933 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	
Brace Angle From Vertical 45° to 75° Maximum $F_p$ (LRFD)	<b>1,357 lbs.</b> Includes (2.0) Omega Per ASCE 7-16	
For ASCE 7-10, $F_p$ (LRFD) Values. Multiply Chart Listed Values By (0.8).		



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements.  $F_p$  Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Do Not Install Brace Arm Crossing Over Bolted / Threaded Connection.

Prior To Proper Tightening Or Welding The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Plate.

Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].

**SBA25H**

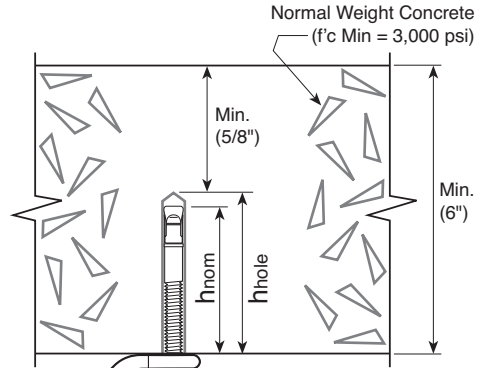
### ~ BADGER INDUSTRIES ~ Seismic Brace Anchorage - 2 Anchors

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



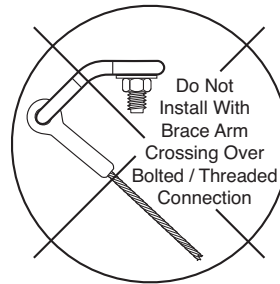
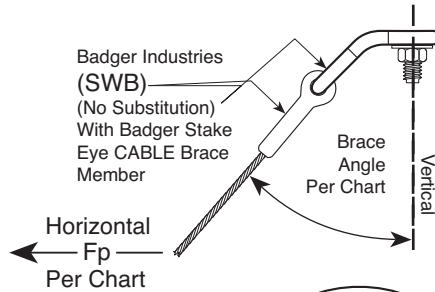
**Anchor Length Notice:**  
A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (3/8x3-3/4) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~ Detail (SWB13HCS)	
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	3/8 in.
Min. $h_{nom}$ Embed.	2-5/16 in.
Min. $h_{hole}$ Depth	2-5/8 in.
Min. [TC] Thickness	4 in.
Min. Edge Distance	4-3/8 in.
Min. Between Anchor Spacing	5 in.
Installation Torque	25 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)	<b>88 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 60° Maximum Fp (LRFD)	<b>160 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).	



Badger Industries (SWB) Seismic Hardware With Badger CABLE Bracing Per "SEBO" (No Substitution)

(1 Of 1) Hilti Kwik Bolt TZ Anchor Per Chart



**Notice: "SEBO"™ Seismic Engineering By Others**  
Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. Fp Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

**SWB13HCS**

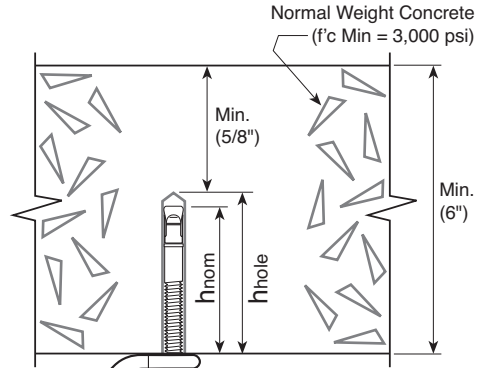
~ BADGER INDUSTRIES ~  
**Seismic Brace Connection - 1 Anchor**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



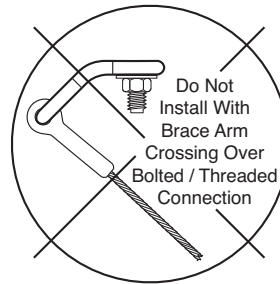
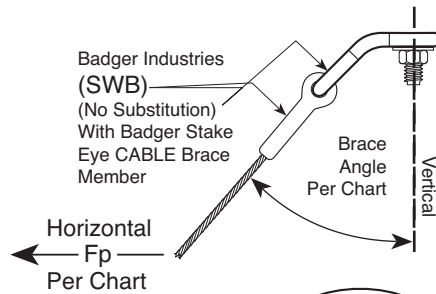
**Anchor Length Notice:**  
A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (1/2x5-1/2) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~ Detail (SWB14HCS)	
Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	1/2 in.
Min. $h_{nom}$ Embed.	3-5/8 in.
Min. $h_{hole}$ Depth	4 in.
Min. [TC] Thickness	6 in.
Min. Edge Distance	7-1/2 in.
Min. Between Anchor Spacing	9-3/4 in.
Installation Torque	40 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)	<b>194 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 60° Maximum Fp (LRFD)	<b>345 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).	



Badger Industries (SWB) Seismic Hardware With Badger CABLE Bracing Per "SEBO" (No Substitution)

(1 Of 1) Hilti Kwik Bolt TZ Anchor Per Chart



**Notice: "SEBO"™ Seismic Engineering By Others**  
Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. Fp Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.  
Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

**SWB14HCS**

~ BADGER INDUSTRIES ~  
**Seismic Brace Connection - 1 Anchor**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

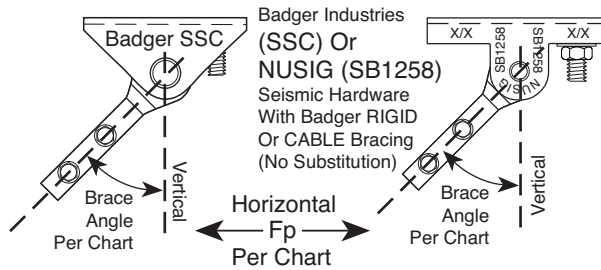
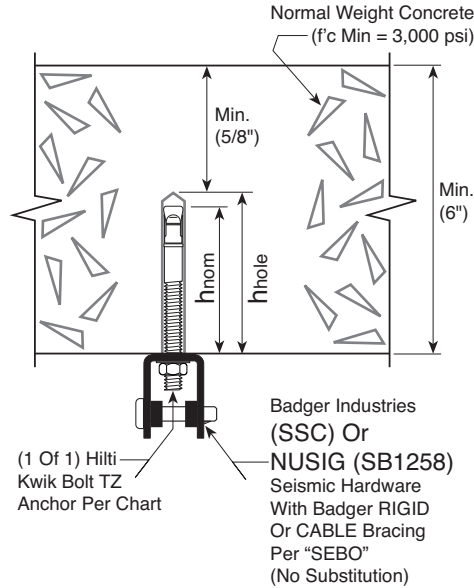


**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (1/2x5-1/2) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~  
**Detail (SBA14HCS)**

Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	1/2 in.
Min. h <sub>nom</sub> Embed.	3-5/8 in.
Min. h <sub>hole</sub> Depth	4 in.
Min. [TC] Thickness	6 in.
Min. Edge Distance	7-1/2 in.
Min. Between Anchor Spacing	9-3/4 in.
Installation Torque	40 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)	<b>336 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 75° Maximum Fp (LRFD)	<b>683 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, Fp (LRFD) Values. Multiply Chart Listed Values By (0.8).	



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. Fp Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Do Not Install Brace Arm Crossing Over Bolted / Threaded Connection.

Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

**SBA14HCS**

~ BADGER INDUSTRIES ~  
**Seismic Brace Anchorage - 1 Anchor**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

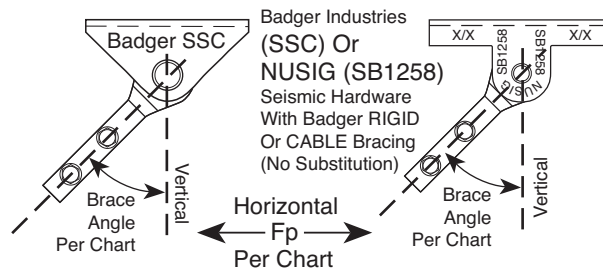
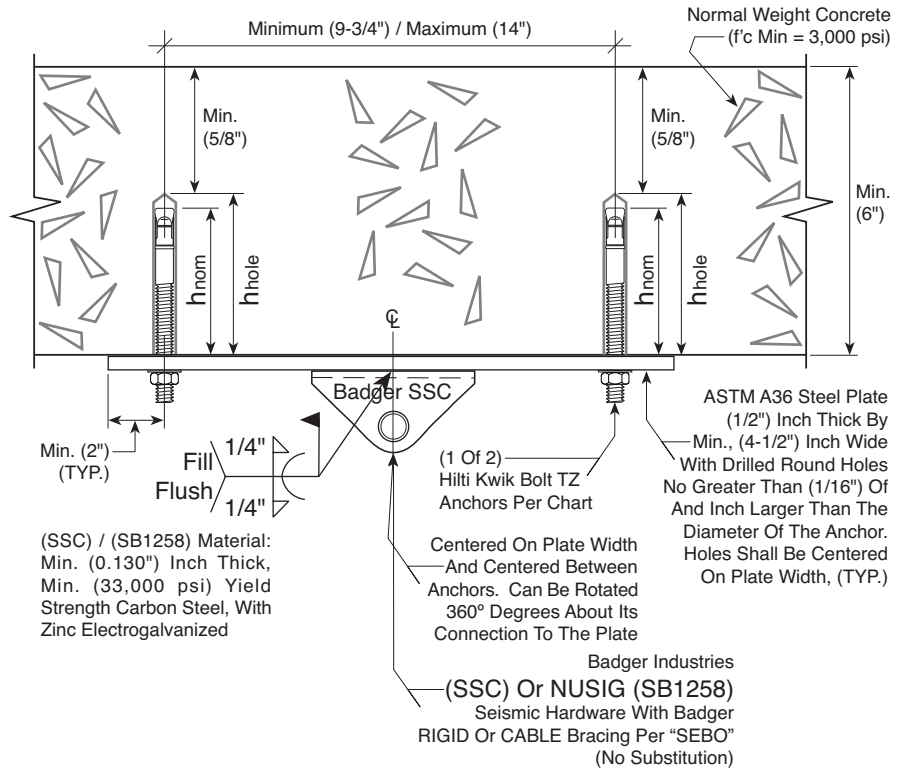


**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Steel Plate. Recommend Use Of (1/2x5-1/2) Hilti KB-TZ Anchor.

~ **BADGER INDUSTRIES** ~  
**Detail (SBA24HCS)**

Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	1/2 in.
Min. $h_{nom}$ Embed.	3-5/8 in.
Min. $h_{hole}$ Depth	4 in.
Min. [TC] Thickness	6 in.
Min. Edge Distance	7-1/2 in.
Min. Between Anchor Spacing	9-3/4 in.
Installation Torque	40 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum $F_p$ (LRFD)	<b>916 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 75° Maximum $F_p$ (LRFD)	<b>1,170 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, $F_p$ (LRFD) Values. Multiply Chart Listed Values By (0.8).	



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements.  $F_p$  Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

**SBA24HCS**

~ **BADGER INDUSTRIES** ~  
**Seismic Brace Anchorage - 2 Anchors**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

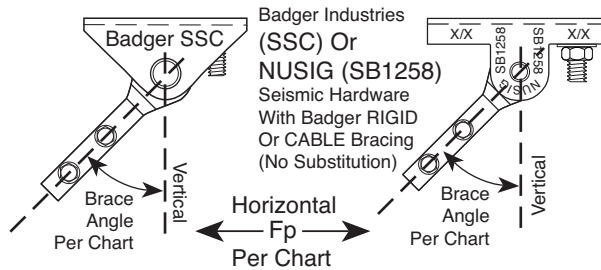
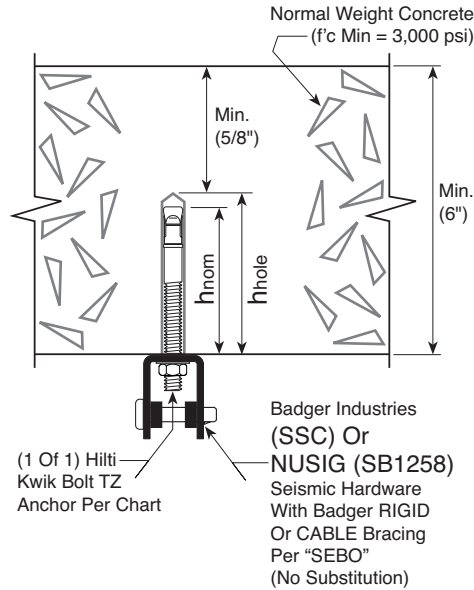


**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (5/8x6) Hilti KB-TZ Anchor.

~ BADGER INDUSTRIES ~  
**Detail (SBA15HCS)**

Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	5/8 in.
Min. h <sub>nom</sub> Embed.	4-7/16 in.
Min. h <sub>hole</sub> Depth	4-3/4 in.
Min. [TC] Thickness	6 in.
Min. Edge Distance	8-3/4 in.
Min. Between Anchor Spacing	12 in.
Installation Torque	60 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum F <sub>p</sub> (LRFD)	<b>458 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 75° Maximum F <sub>p</sub> (LRFD)	<b>916 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, F <sub>p</sub> (LRFD) Values. Multiply Chart Listed Values By (0.8).	



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. F<sub>p</sub> Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Do Not Install Brace Arm Crossing Over Bolted / Threaded Connection.

Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor.

**SBA15HCS**

~ BADGER INDUSTRIES ~  
**Seismic Brace Anchorage - 1 Anchor**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

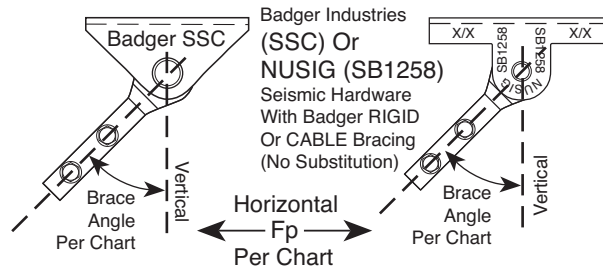
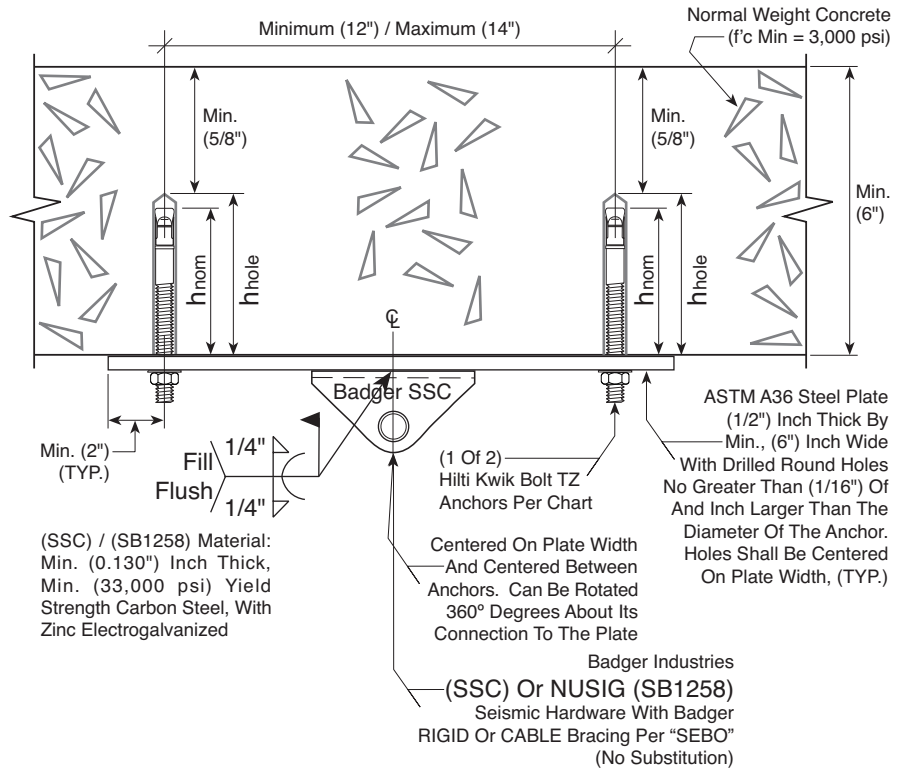


**Anchor Length Notice:**

A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Steel Plate. Recommend Use Of (5/8x6) Hilti KB-TZ Anchor.

~ **BADGER INDUSTRIES** ~  
**Detail (SBA25HCS)**

Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)	Concrete Slab
Anchor O.D. da	5/8 in.
Min. $h_{nom}$ Embed.	4-7/16 in.
Min. $h_{hole}$ Depth	4-3/4 in.
Min. [TC] Thickness	6 in.
Min. Edge Distance	8-3/4 in.
Min. Between Anchor Spacing	12 in.
Installation Torque	60 ft. • lbs.
Brace Angle From Vertical 30° to 44° Maximum $F_p$ (LRFD)	<b>1,241 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45° to 75° Maximum $F_p$ (LRFD)	<b>1,575 lbs.</b> Includes (2.0) Omega Per ASCE 7-16
For ASCE 7-10, $F_p$ (LRFD) Values. Multiply Chart Listed Values By (0.8).	



**Notice: "SEBO"™ Seismic Engineering By Others**

Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements.  $F_p$  Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

**SBA25HCS**

~ **BADGER INDUSTRIES** ~  
**Seismic Brace Anchorage - 2 Anchors**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



~ BADGER INDUSTRIES ~ <b>Detail (SBC-51)</b> ANSI / FM 1950-2016	
BADGER INDUSTRIES Steel Beam Clamp Part # [SBC158-C]	Brace Angle From Vertical 30° to 75° Maximum Horz. Fp (LRFD)
Maximum (LRFD) Capacity	<b>435 lbs.</b>

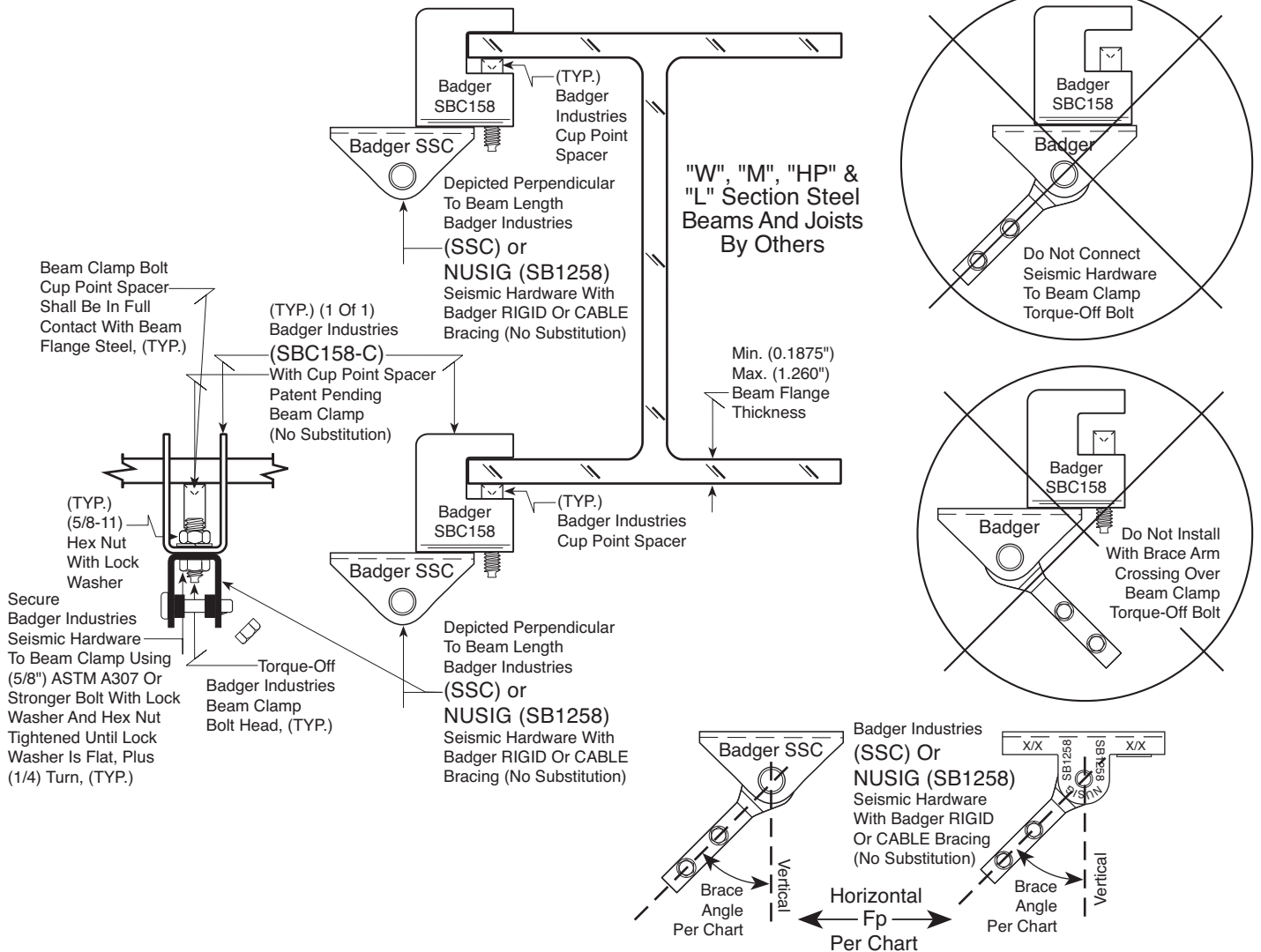
**Notice:**

Listed Capacities Based On FM Global Seismic Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Beam Clamp Bolt Until Cup Point End Of Spacer Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away.

-C Or C Which Indicates Cup Point Spacer Required To Be Installed At Threaded End Of Torque-Off Beam Clamp Bolt, May Or May Not Be Stamped Into Beam Clamp.

Depicted Perpendicular Seismic Assembly Can Be Rotated About Their Depicted Bolted Conn. To Various Orientations (+ / -) 90° Degrees.



**SBC-51**

~ BADGER INDUSTRIES ~  
**Seismic Brace Connection - Single Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)





~ BADGER INDUSTRIES ~ Detail (SBC-51J) ANSI / FM 1950-2016	
BADGER INDUSTRIES Steel Beam Clamp Part # [SBC158-C]	Brace Angle From Vertical 30° to 75° Maximum Horz. Fp (LRFD)
Maximum (LRFD) Capacity	<b>435 lbs.</b>

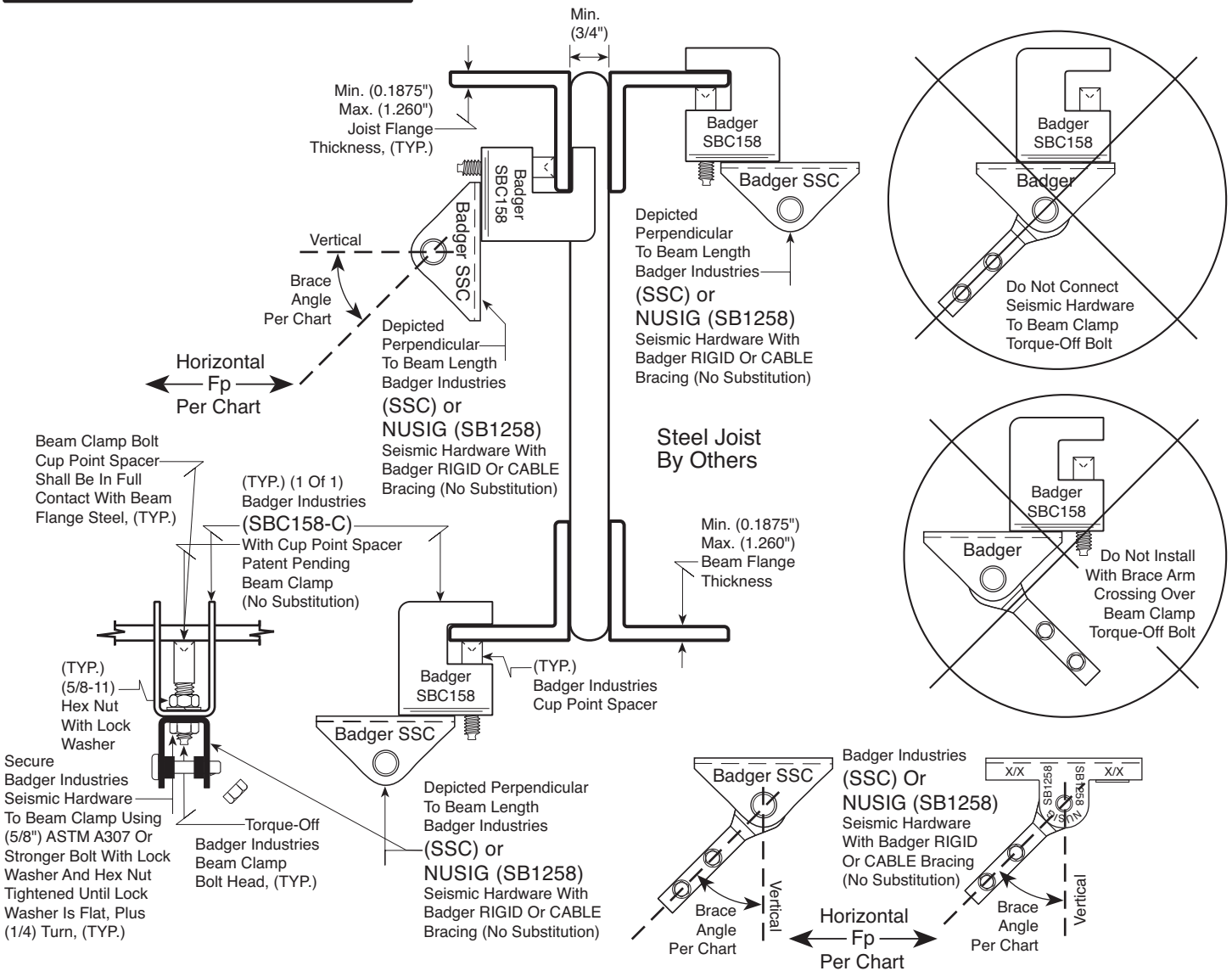
**Notice:**

Listed Capacities Based On FM Global Seismic Testing And Engineered Analysis. Testing Was Performed (Without) Restraining Strap. Beam Clamp Was Not Tested For Use On Beams With "S" Section Shapes. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

Install Beam Clamp Throat Steel-To-Steel Tight To Flange Of Beam. Tighten Beam Clamp Bolt Until Cup Point End Of Spacer Is Tight Against Beam Flange And Torque-Off Head Of Bolt Breaks Away.

-C Or C Which Indicates Cup Point Spacer Required To Be Installed At Threaded End Of Torque-Off Beam Clamp Bolt, May Or May Not Be Stamped Into Beam Clamp.

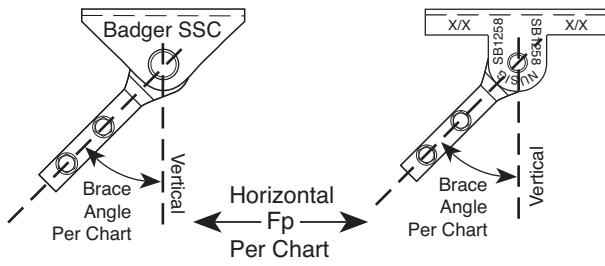
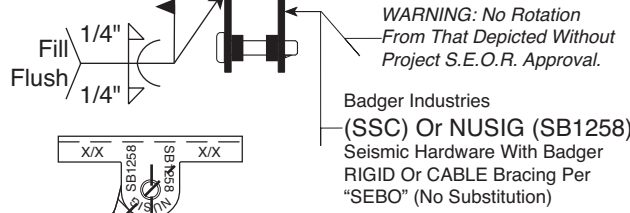
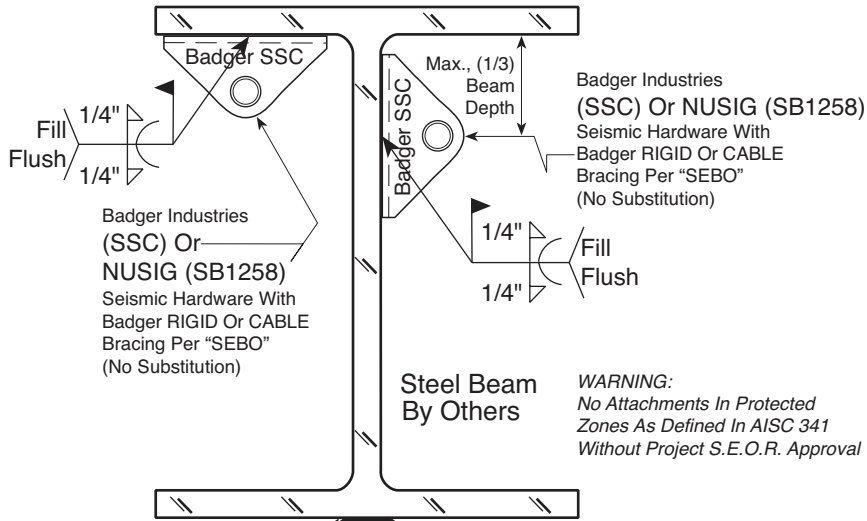
Depicted Perpendicular Seismic Assembly Can Be Rotated About Their Depicted Bolted Conn. To Various Orientations (+ / -) 90° Degrees.



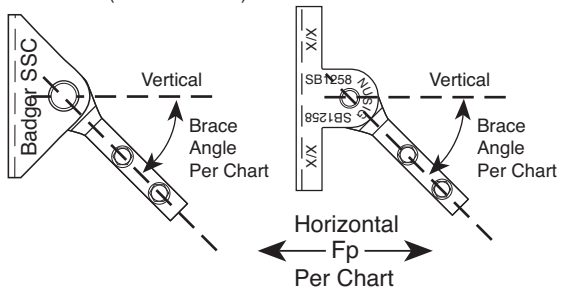
**SBC-51J**

~ BADGER INDUSTRIES ~  
**Seismic Brace Connection - Single Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Badger Industries (SSC) Or NUSIG (SB1258) Seismic Hardware With Badger RIGID Or CABLE Bracing (No Substitution)

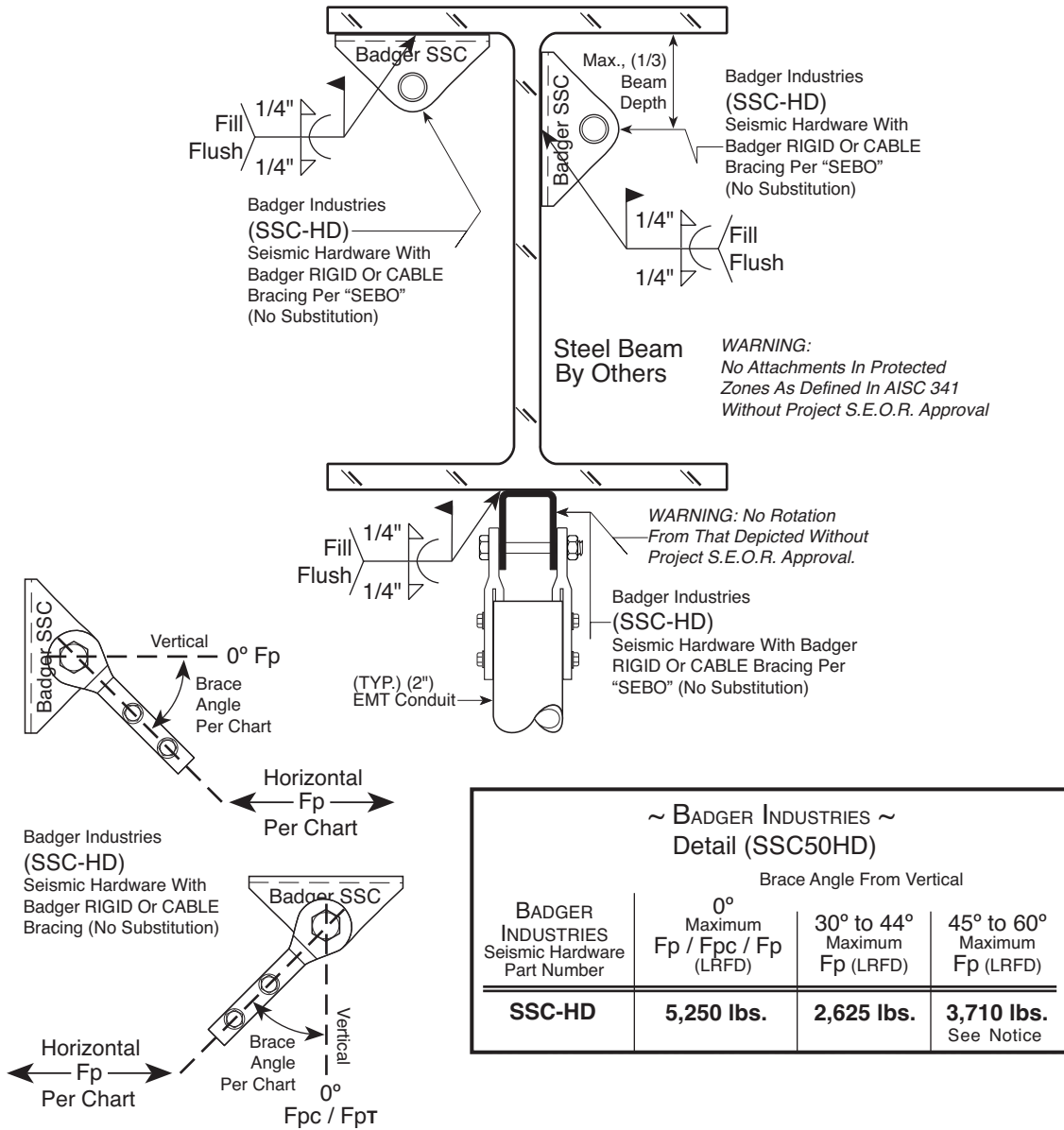


~ BADGER INDUSTRIES ~  
Detail (SSC50)

BADGER INDUSTRIES Seismic Hardware Part Number	Brace Angle From Vertical		
	30° to 44° Maximum Fp (LRFD)	45° to 60° Maximum Fp (LRFD)	61° to 75° Maximum Fp (LRFD)
<b>NUSIG SB1258</b>	<b>1,174 lbs.</b>	<b>1,145 lbs.</b>	<b>1,102 lbs.</b>
<b>SSC</b>	<b>1,574 lbs.</b>	<b>2,380 lbs.</b>	<b>2,436lbs.</b>

**Notice: "SEBO"™ Seismic Engineering By Others**  
Installation, Testing And Inspection: Per Project Structural Engineer Of Record And Jurisdictional Requirements. Listed Capacities Based On Capacity Of Badger Seismic Hardware.  
Badger Seismic Hardware Can Be Rotated Other Than That Depicted. See Warning Note For Conn., To Bottom Flange.

~ BADGER INDUSTRIES ~  
**SSC50 Seismic Brace Connection - Welded**  
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)



Notice: "SEBO"™ Seismic Engineering By Others  
Installation, Testing And Inspection: Per Project Structural Engineer Of Record And Jurisdictional Requirements.  
Listed Capacities Based On Capacity Of Badger (SSC-HD) Seismic Hardware. Badger (SSC-HD) Can Be Rotated Other Than That Depicted.  
Badger (SSC-HD) Seismic Hardware Not Conducive To Brace Angles Greater Than 60° Degrees, Due To Fitment Of (2") Inch EMT Conduit Brace Member.

**SSC50HD**

~ BADGER INDUSTRIES ~  
**Seismic Brace Connection - Welded**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

**BADGER No-DRILL™  
HANGERS**

City of Los Angeles Approved COLA Report LARR 26090

NO KNOWN EQUAL

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**BADGER INDUSTRIES  
STEEL BEAM CLAMPS**

City of Los Angeles Approved COLA Report LARR 26090

NO KNOWN EQUAL

ANSI / FM 1950 Seismic Tested  
— STEEL BEAM CLAMPS —

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**BADGER INDUSTRIES**

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March 2019

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