Badger Industries

NUSIG www.NUSIG.com

Seismic Bracing Manual

All Trades Suspended
Mechanical / Plumbing / HVAC Ducts
Electrical / Fire Protection & Equipment Systems

2019 Edition
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CONCRETE SLAB --------------------------------------------------------------- (98 - 103)
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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.

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Continued:

Additional information on Anvil products, including warranties can be found at 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.

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.

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.

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.

\[ (F_{pc}) = \text{Seismic Vertical Compression, } (F_{pt}) = \text{Seismic Vertical Tension.} \]

\[ (F_{p}) = \text{Seismic Horizontal, } (ASD) = \text{Gravity Vertical Tension.} \]
(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.

End
RRK-X/X Kits

Badger Industries
(STW-3/8), (STW-1/2), (STW-5/8),
(STW-3/4), (STW-7/8) Or (STW-1)
Seismic Tabbed Washer Is Included
With Each Individual (RRK-XX) Kit.

RRK-3/8 Kit - Fits (3/8") Dia. Conn.
RRK-1/2 Kit - Fits (1/2") Dia. Conn.
RRK-5/8 Kit - Fits (5/8") Dia. Conn.
RRK-3/4 Kit - Fits (3/4") Dia. Conn.
Special Order Required For Sizes,
RRK-7/8 Kit - Fits (7/8") Dia. Conn.
RRK-1 Kit - iFits (1") Dia. Conn.

Badger SSC-RF Seismic Hardware End Connection Brackets
Can Be Double, Triple Or Quadruple Stacked

Badger Industries
Provided Screws For Conn., Of Pivot Arm
To Brace Member

Bolted / Threaded Conn.,
And Hex Nut Not Part Of
(RRK-X/X) Kit

Badger SSC-RF
Seismic Hardware Kits

RRK-X/X Kits Seismic Hardware - Design Demand Capacity Limits
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

<table>
<thead>
<tr>
<th>Badger Industries Seismic Hardware Kit Numbers</th>
<th>30º to 44º Maximum Fp (LRFD)</th>
<th>45º to 60º Maximum Fp (LRFD)</th>
<th>61º to 75º Maximum Fp (LRFD)</th>
<th>76º to 90º Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRK-3/8, RRK-1/2, RRK-5/8, RRK-3/4, RRK-7/8, RRK-1</td>
<td>1,469 lbs.</td>
<td>2,018 lbs.</td>
<td>1,812 lbs.</td>
<td>1,726 lbs.</td>
</tr>
</tbody>
</table>
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.

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.

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

- BADGER INDUSTRIES -

<table>
<thead>
<tr>
<th>BRADGER INDUSTRIES</th>
<th>Brace Angle From Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seismic Hardware Kit Number</strong></td>
<td><strong>30° to 44° Maximum Fp (LRFD)</strong></td>
</tr>
<tr>
<td>SRK</td>
<td>1,174 lbs.</td>
</tr>
</tbody>
</table>
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) Seismic Bracket Has (1) (1/2") Conn., Hole And (1) (5/8") Conn., Hole.

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.
- SRK-MD Kit

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES</th>
<th>Seismic Hardware Kit Number</th>
<th>Brace Angle From Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>BADGER INDUSTRIES</td>
<td>30° to 44° Maximum Fp (LRFD)</td>
<td>45° to 60° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>SRK-MD</td>
<td>1,574 lbs.</td>
<td>2,380 lbs.</td>
</tr>
</tbody>
</table>

SRK-MD Kit Seismic Hardware - Design Demand Capacity Limits
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.

**Notice:**

SRK-HD Kit

~BADGER INDUSTRIES~

**[SRK-HD]**

Seismic Hardware Kit

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Kit Number</th>
<th>Brace Angle From Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30° to 44° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>SRK-HD</td>
<td>2,626 lbs.</td>
</tr>
</tbody>
</table>

SRK-HD Kit

SRK-HD Kit Seismic Hardware - Design Demand Capacity Limits

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

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 (SWB) Patent Pending Seismic Hardware

With Badger Stake-Eye End Conn., Cable Brace Member (No Substitution), (TYP.)

Min. (3"

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

(SCC-x) Inspection Head Stamp

Washer Faced Slotted Hex Bolt

Washer Face Hex Nut

(SCC-1) Inspection Head Stamp

(SCC-2) Inspection Head Stamp

~ BADGER INDUSTRIES ~

Detail (SWB Kits)

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>Cable Brace Member Size, Construction Strands / Arrangement, And Material</th>
<th>(SCC-x)</th>
<th>(SCC-x) Installation Torque</th>
<th>(X) Maximum</th>
<th>Cable Brace Member Maximum Live Length</th>
<th>Brace Angle From Vertical 30º to 44º Maximum Fp (LRFD)</th>
<th>45º to 60º Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWBx116 - 10</td>
<td>Min. (1/16)&quot; Inch Dia. (7x7) Galvanized Steel</td>
<td>SCC-1</td>
<td>10 ft. lbs.</td>
<td>1-1/2&quot; Inch</td>
<td>10 Feet</td>
<td>112 lbs.</td>
<td>159 lbs.</td>
</tr>
<tr>
<td>SWBx116 - 10</td>
<td>Min. (1/8)&quot; Inch Dia. (7x7) Galvanized Steel</td>
<td>SCC-2</td>
<td>20 ft. lbs.</td>
<td>1-1/2&quot; Inch</td>
<td>10 Feet</td>
<td>219 lbs.</td>
<td>310 lbs.</td>
</tr>
<tr>
<td>SWBx118 - 10</td>
<td>Min. (1/16)&quot; Inch Dia. (7x19) Galvanized Steel</td>
<td>SCC-2</td>
<td>30 ft. lbs.</td>
<td>1-1/2&quot; Inch</td>
<td>10 Feet</td>
<td>528 lbs.</td>
<td>771 lbs.</td>
</tr>
</tbody>
</table>

Notice: "SEBO" = Seismic Engineering By Others


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
### 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.

---

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

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

~ BADGER INDUSTRIES ~
Detail (SHVT-CIPA) Anvil

<table>
<thead>
<tr>
<th>[1] ANVIL Fig. 212FP Size &amp; Clamp Part Number</th>
<th>[1] BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>[7] No Hub Cast-Iron Pipe Nominal Size</th>
<th>0° = Vert. Maximum FpV (LRFD)</th>
<th>30° to 44° Maximum Fp (LRFD)</th>
<th>45° to 60° Maximum Fp (LRFD)</th>
<th>61° to 75° Maximum Fp (LRFD)</th>
<th>90° Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2&quot; Fig. 212 SBEMT 1-1/2 in.</td>
<td>SBEMT</td>
<td></td>
<td>2,210 lbs.</td>
<td>1,105 lbs.</td>
<td>1,562 lbs.</td>
<td>1,913 lbs.</td>
<td>2,210 lbs.</td>
</tr>
<tr>
<td>2&quot; Fig. 212 SBEMT 2 in.</td>
<td>SBEMT</td>
<td></td>
<td>3,490 lbs.</td>
<td>1,745 lbs.</td>
<td>2,467 lbs.</td>
<td>3,022 lbs.</td>
<td>3,490 lbs.</td>
</tr>
<tr>
<td>3&quot; Fig. 212 SBEMT 3 in.</td>
<td>SBEMT</td>
<td></td>
<td>3,020 lbs.</td>
<td>1,510 lbs.</td>
<td>2,135 lbs.</td>
<td>2,615 lbs.</td>
<td>3,020 lbs.</td>
</tr>
<tr>
<td>4&quot; Fig. 212 SBEMT 4 in.</td>
<td>SBEMT</td>
<td></td>
<td>3,790 lbs.</td>
<td>1,895 lbs.</td>
<td>2,679 lbs.</td>
<td>3,282 lbs.</td>
<td>3,790 lbs.</td>
</tr>
<tr>
<td>5&quot; Fig. 212FP SBEMT 5 in.</td>
<td>SBEMT</td>
<td></td>
<td>3,870 lbs.</td>
<td>1,935 lbs.</td>
<td>2,736 lbs.</td>
<td>3,351 lbs.</td>
<td>3,870 lbs.</td>
</tr>
<tr>
<td>6&quot; Fig. 212FP SBEMT 6 in.</td>
<td>SBEMT</td>
<td></td>
<td>3,480 lbs.</td>
<td>1,740 lbs.</td>
<td>2,460 lbs.</td>
<td>3,013 lbs.</td>
<td>3,480 lbs.</td>
</tr>
<tr>
<td>8&quot; Fig. 212FP SBEMT 8 in.</td>
<td>SBEMT</td>
<td></td>
<td>2,615 lbs.</td>
<td>1,307 lbs.</td>
<td>1,848 lbs.</td>
<td>2,264 lbs.</td>
<td>2,615 lbs.</td>
</tr>
<tr>
<td>10&quot; Fig. 212FP SBEMT 10 in.</td>
<td>SBEMT</td>
<td></td>
<td>2,695 lbs.</td>
<td>1,347 lbs.</td>
<td>1,905 lbs.</td>
<td>2,333 lbs.</td>
<td>2,695 lbs.</td>
</tr>
<tr>
<td>12&quot; Fig. 212FP SBEMT 12 in.</td>
<td>SBEMT</td>
<td></td>
<td>2,105 lbs.</td>
<td>1,052 lbs.</td>
<td>1,488 lbs.</td>
<td>1,822 lbs.</td>
<td>2,105 lbs.</td>
</tr>
</tbody>
</table>

[1] No Substitution
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.
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.
### 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. lbs.) 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. lbs.) Torque Increases.

---

### Table: ANVIL Fig. 212 And FIG. 212FP Assembly

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Use Limited To Sch., 40 Or Thicker Steel Pipe Or RMC Conduit</th>
<th>Brace Angle From Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; Fig. 212</td>
<td>SBEMT 1 in. Use Limited To Sch., 40 Or Thicker Steel Pipe Or RMC Conduit</td>
<td>30° to 44° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>1-1/4&quot; Fig. 212</td>
<td>SBEMT 1-1/4 in.</td>
<td>45° to 60° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>1-1/2&quot; Fig. 212</td>
<td>SBEMT 1-1/2 in.</td>
<td>61° to 75° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>2&quot; Fig. 212</td>
<td>SBEMT 2 in.</td>
<td>90° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>2-1/2&quot; Fig. 212</td>
<td>SBEMT 2-1/2 in.</td>
<td>45° to 60° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>3&quot; Fig. 212</td>
<td>SBEMT 3 in.</td>
<td>61° to 75° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>3-1/2&quot; Fig. 212</td>
<td>SBEMT 3-1/2 in.</td>
<td>90° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>4&quot; Fig. 212</td>
<td>SBEMT 4 in.</td>
<td>61° to 75° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>5&quot; Fig. 212</td>
<td>SBEMT 5 in.</td>
<td>90° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>6&quot; Fig. 212</td>
<td>SBEMT 6 in.</td>
<td>45° to 60° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>8&quot; Fig. 212</td>
<td>SBEMT 8 in.</td>
<td>61° to 75° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>10&quot; Fig. 212</td>
<td>SBEMT 10 in.</td>
<td>90° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>12&quot; Fig. 212</td>
<td>SBEMT 12 in.</td>
<td>90° Maximum Fp (LRFD)</td>
</tr>
</tbody>
</table>

- No Substitution
- Per FM, (ASD) = (LRFD / 1.5).
- 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.
- (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.
- (1") Anvil Fig. 212 Or ANVIL Fig. 212FP Per Chart
<table>
<thead>
<tr>
<th>Part Number</th>
<th>Nominal Size</th>
<th>ANVIL Fig. 212</th>
<th>ANVIL Fig. 212FP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBEMT</td>
<td>1-1/2 in.</td>
<td>1,105 lbs.</td>
<td>1,339 lbs.</td>
</tr>
<tr>
<td></td>
<td>2 in.</td>
<td>1,745 lbs.</td>
<td>1,788 lbs.</td>
</tr>
<tr>
<td></td>
<td>3 in.</td>
<td>1,510 lbs.</td>
<td>1,918 lbs.</td>
</tr>
<tr>
<td></td>
<td>4 in.</td>
<td>1,124 lbs.</td>
<td>1,124 lbs.</td>
</tr>
<tr>
<td></td>
<td>5 in.</td>
<td>1,932 lbs.</td>
<td>2,004 lbs.</td>
</tr>
<tr>
<td></td>
<td>6 in.</td>
<td>1,740 lbs.</td>
<td>1,831 lbs.</td>
</tr>
<tr>
<td></td>
<td>8 in.</td>
<td>1,307 lbs.</td>
<td>1,470 lbs.</td>
</tr>
<tr>
<td></td>
<td>10 in.</td>
<td>1,347 lbs.</td>
<td>1,431 lbs.</td>
</tr>
<tr>
<td></td>
<td>12 in.</td>
<td>1,052 lbs.</td>
<td>1,226 lbs.</td>
</tr>
</tbody>
</table>

[1] No Substitution

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  
Single Hanger Longitudinal - Design Demand Capacity Limits  
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
### BADGER INDUSTRIES

**ANVIL Fig. 212** And FIG. 212FP Assembly:

ANVIL International LLC referred to as ANVIL

FOR BRACING OF COPPER PIPING:

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.

---

**Cushion Strip** Shall Be Installed Between The Copper Pipe And The Anvil Clamp. Cushion Strip Joint Shall Be Offset (20° to 160°) From (SBEMT). Cushion Strip Shall Not Overlap. Cushion Strip Shall Maintain A Gap (< 1/4")

---

**Bracing Angle Per Chart**

1. **Vertical**
2. **Horizontal**

---

**Single Hanger Longitudinal - Design Demand Capacity Limits**

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

---

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**Seismic Hardware**

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#### Detail (SHL-EMT5A) Anvil

<table>
<thead>
<tr>
<th>Size &amp; Clamp Part Number</th>
<th>1&quot;</th>
<th>1-1/4&quot;</th>
<th>1-1/2&quot;</th>
<th>2&quot;</th>
<th>2-1/2&quot;</th>
<th>3&quot;</th>
<th>3-1/2&quot;</th>
<th>4&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
<td>SBEMT</td>
<td>SBEMT</td>
<td>SBEMT</td>
<td>SBEMT</td>
<td>SBEMT</td>
<td>SBEMT</td>
<td>SBEMT</td>
<td>SBEMT</td>
</tr>
<tr>
<td>Nominal Conduit</td>
<td>1 in.</td>
<td>1-1/4 in.</td>
<td>1-1/2 in.</td>
<td>2 in.</td>
<td>2-1/2 in.</td>
<td>3 in.</td>
<td>3-1/2 in.</td>
<td>4 in.</td>
</tr>
<tr>
<td>Schedule 5 Pipe Nominal Size</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
</tr>
</tbody>
</table>

#### Brace Angle From Vertical

<table>
<thead>
<tr>
<th>Brace Angle From Vertical</th>
<th>30° to 44° Maximum Fp (LRFD)</th>
<th>45° to 60° Maximum Fp (LRFD)</th>
<th>61° to 75° Maximum Fp (LRFD)</th>
<th>90° Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Bracing</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>Horizontal Bracing</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
<td>N / A</td>
</tr>
</tbody>
</table>

#### Notes:

1. **No Substitution**
2. **Per FM, (ASD) = (LRFD / 1.5).**
3. **(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.**
4. **(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.-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.-lb.) Torque Increases.

---

### ~ 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
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 FP'C Tension Capacity Per "SEBO".

### Installation Detail

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

<table>
<thead>
<tr>
<th>Vertical Member No.</th>
<th>Vertical Member Nominal Size</th>
<th>Vertical Member Maximum Length</th>
<th>(3/8&quot;) Rod Dia. (X) Maximum</th>
<th>(1/2&quot;) Rod Dia. (X) Maximum</th>
<th>(5/8&quot;) Rod Dia. (X) Maximum</th>
<th>With Stiffener Maximum Compression Fpc (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[V-1]</td>
<td>(1&quot;) EMT</td>
<td>9 ft. - 9 in.</td>
<td>13 in.</td>
<td>18 in.</td>
<td>23 in.</td>
<td>440 lbs.</td>
</tr>
<tr>
<td>[V-2]</td>
<td>(1&quot;) EMT</td>
<td>8 ft. - 0 in.</td>
<td>13 in.</td>
<td>18 in.</td>
<td>23 in.</td>
<td>700 lbs.</td>
</tr>
<tr>
<td>[V-3]</td>
<td>(1&quot;) EMT</td>
<td>6 ft. - 4 in.</td>
<td>(3/8&quot;) Dia. Rod Size Not Usable</td>
<td>18 in.</td>
<td>23 in.</td>
<td>1,100 lbs.</td>
</tr>
<tr>
<td>[V-4]</td>
<td>(1&quot;) EMT</td>
<td>5 ft. - 5 in.</td>
<td>(3/8&quot;) Dia. Rod Size Not Usable</td>
<td>18 in.</td>
<td>23 in.</td>
<td>1,500 lbs.</td>
</tr>
</tbody>
</table>

**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 FP'C Tension Capacity Per "SEBO".

**EMT-RSC**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
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 $F_{pt}$ Tension Capacity Per "SEBO".

Notice: "SEBO"™ Seismic Engineering By Others

Vertical Rod Size Per "SEBO"
See Chart

Badger Industries (RS-1) Rod Stiffener Bolt
Tighten Until Bolt Head Breaks Off

Vertical Rod Size
Per "SEBO"
See Chart

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 $F_{pt}$ Tension Capacity Per "SEBO".

Various Seismic Vertical Hanger
To Building Structure Connections Per “SEBO”

<table>
<thead>
<tr>
<th>Vertical Member No.</th>
<th>Vertical Rod Size</th>
<th>(X) Maximum Length With Stiffener Member Sits On Top Of Hex Nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>[V-3]</td>
<td>3/8 in.</td>
<td>1,100 lbs.</td>
</tr>
<tr>
<td>[V-5]</td>
<td>1/2 in.</td>
<td>1,900 lbs.</td>
</tr>
<tr>
<td>[V-6]</td>
<td>5/8 in.</td>
<td>2,600 lbs.</td>
</tr>
<tr>
<td>[V-6]</td>
<td>3/4 in.</td>
<td>2,600 lbs.</td>
</tr>
<tr>
<td>[V-6]</td>
<td>7/8 in.</td>
<td>2,600 lbs.</td>
</tr>
</tbody>
</table>

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

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

Installation Detail
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2019 Edition
**Badger Industries**

**SHCA - Single Hanger Compression Assembly**

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

---

**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”.

---

**Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”**

---

**Badger Industries Kit**

Patent #10,281,062

Clamp Assembly

---

**Maximum Compression Fpc (LRFD)**

1,500 lbs.

<table>
<thead>
<tr>
<th>Vertical Member No.</th>
<th>Vertical Rod Size</th>
<th>Maximum Compression Fpc (LRFD)</th>
</tr>
</thead>
</table>

---

**Vertical Rod Size**

1/2 in. Thru 1 in.

---

**Max. Gap**

(1/4")

---

**Max. (6")**

---

**Maximum Length With Stiffener Member (12' - 10")**

---

**Maximum Length (Without) Stiffener Member Per “SEBO”**

See Notice

---

**To Resist Vertical Uplift Movement**

Strut Vertical Member With Inserted Badger (SVSS) Bracket Sits On Top Of The Pipe Or Conduit

---

**Single Hanger Sized To Fit Pipe Per “SEBO”**

---

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

---

**Badger Industries is Packaged As A “KIT”**

Each Single SHCA Kit Contains:

- (3) SVSS Brackets,
- (2) SVSU Brackets,
- (2) V-BOLTS,
- (4) Break-Off Hex Nuts.

---

Notice: “SEBO” is Seismic Engineering By Others

---

**Patent #10,281,062**

Clamp Assembly

---

**B ADGER INDUSTRIES ~**

**[SHCA] Kit**

**Clamp Assembly**

Patent #10,281,062

---

**BADGER INDUSTRIES ~**

~ SHCA - Single Hanger Compression Assembly ~

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
RIGID BRACING
INSTALLATION DETAILS
Brace Member Length

<table>
<thead>
<tr>
<th>Brace Member Steel Conduit Nominal Sizes</th>
<th>Brace Member Maximum Length</th>
<th>Brace Angle From Vertical</th>
<th>Brace Member Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3/4&quot;) EMT端 (1&quot;) EMT端 (1-1/4&quot;) EMT端 (1-1/2&quot;) EMT端 (2&quot;) EMT端</td>
<td>7 ft. - 5 in. 9 ft. - 9 in. 12 ft. - 9 in. 14 ft. - 9 in.</td>
<td>30° to 44°</td>
<td>152 lbs. 216 lbs. 264 lbs.</td>
</tr>
<tr>
<td>(3/4&quot;) EMT端 (1&quot;) EMT端 (1-1/4&quot;) EMT端 (1-1/2&quot;) EMT端 (2&quot;) EMT端</td>
<td>6 ft. - 0 in. 9 ft. - 7 in. 12 ft. - 9 in. 14 ft. - 9 in. 18 ft. - 10 in.</td>
<td>45° to 60°</td>
<td>220 lbs. 311 lbs. 381 lbs.</td>
</tr>
<tr>
<td>(3/4&quot;) EMT端 (1&quot;) EMT端 (1-1/4&quot;) EMT端 (1-1/2&quot;) EMT端 (2&quot;) EMT端</td>
<td>4 ft. - 4 in. 7 ft. - 3 in. 12 ft. - 0 in. 14 ft. - 9 in. 18 ft. - 10 in.</td>
<td>61° to 75°</td>
<td>350 lbs. 494 lbs. 606 lbs.</td>
</tr>
<tr>
<td>(3/4&quot;) EMT端 (1&quot;) EMT端 (1-1/4&quot;) EMT端 (1-1/2&quot;) EMT端 (2&quot;) EMT端</td>
<td>2 ft. - 8 in. 5 ft. - 4 in. 9 ft. - 1 in. 11 ft. - 8 in. 17 ft. - 2 in. 20 ft. - 0 in.</td>
<td>45° to 60°</td>
<td>550 lbs. 777 lbs. 952 lbs.</td>
</tr>
<tr>
<td>(1&quot;) EMT端 (1-1/4&quot;) EMT端 (1-1/2&quot;) EMT端 (2&quot;) EMT端 (2-1/2&quot;) EMT端</td>
<td>3 ft. - 11 in. 7 ft. - 5 in. 9 ft. - 6 in. 14 ft. - 2 in. 20 ft. - 0 in.</td>
<td>30° to 44°</td>
<td>750 lbs. 1,060 lbs. 1,299 lbs.</td>
</tr>
<tr>
<td>(1&quot;) EMT端 (1-1/4&quot;) EMT端 (1-1/2&quot;) EMT端 (2&quot;) EMT端 (2-1/2&quot;) EMT端</td>
<td>6 ft. - 2 in. 8 ft. - 1 in. 12 ft. - 2 in. 20 ft. - 0 in.</td>
<td>45° to 60°</td>
<td>950 lbs. 1,343 lbs. 1,645 lbs.</td>
</tr>
<tr>
<td>(1-1/4&quot;) EMT端 (1-1/2&quot;) EMT端 (2&quot;) EMT端 (2-1/2&quot;) EMT端</td>
<td>3 ft. - 9 in. 6 ft. - 0 in. 9 ft. - 9 in. 16 ft. - 8 in.</td>
<td>61° to 75°</td>
<td>1,300 lbs. 1,838 lbs. 2,251 lbs.</td>
</tr>
</tbody>
</table>

**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) 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 (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.
Brace Member Length
Per Chart

Badger Industries
(SSC-HD) Kit
Seismic Hardware
(No Substitution)

RBM-HD
Rigid Brace Member - Heavy Duty
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

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
www.NUSIG.com
Sales@NUSIG.com
2019 Edition
Badger Industries

(SSC) Material:
(0.185") Inch Thick, Min.
(33,000 psi) Yield Strength
Carbon Steel, With Zinc
Electrogalvanized Plating

**Vertical Member Length Per Chart**

1/4" 1/4" Fill 1/4" Fill

**Weld Conn., To Pipe Or Item Being Braced Per "SEBO"**

<table>
<thead>
<tr>
<th>Vertical Member No.</th>
<th>Vertical Member Steel Conduit Nominal Sizes</th>
<th>Maximum (Gravity (ASD))</th>
<th>Fpc (LRFD)</th>
<th>[Fpt (LRFD)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[V-4]</td>
<td>(2&quot;) EMT 15 ft. - 7 in.</td>
<td>(3,000 lbs.)</td>
<td>1,500 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
<tr>
<td>[V-5]</td>
<td>(2&quot;) EMT 13 ft. - 10 in.</td>
<td>(3,000 lbs.)</td>
<td>1,900 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
<tr>
<td>[V-6]</td>
<td>(2&quot;) EMT 11 ft. - 10 in.</td>
<td>(3,000 lbs.)</td>
<td>2,600 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
<tr>
<td>[V-7]</td>
<td>(2&quot;) EMT 11 ft. - 3 in.</td>
<td>(3,000 lbs.)</td>
<td>2,900 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
<tr>
<td>[V-8]</td>
<td>(2&quot;) EMT 10 ft. - 8 in.</td>
<td>(3,000 lbs.)</td>
<td>3,200 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
<tr>
<td>[V-9]</td>
<td>(2&quot;) EMT 10 ft. - 0 in.</td>
<td>(3,000 lbs.)</td>
<td>3,600 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
<tr>
<td>[V-10]</td>
<td>(2&quot;) EMT 8 ft. - 8 in.</td>
<td>(3,000 lbs.)</td>
<td>4,800 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
<tr>
<td>[V-11]</td>
<td>(2&quot;) EMT 7 ft. - 9 in.</td>
<td>(3,000 lbs.)</td>
<td>6,100 lbs.</td>
<td>[7,500 lbs.]</td>
</tr>
</tbody>
</table>

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.
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.

~ 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

(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 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 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 And Hex Nut 2, Every (1) Turn.

Installation Detail

Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

Various Seismic Brace To Building Structure Connections Per “SEBO”

Badger Industries (SRK) Kit Or (SRK-MD) Kit Seismic Hardware (No Substitution) Per “SEBO”

Badger SSC Vertical Uplift Resistance Assembly

Clevis Hanger, J-Hanger Or Other Hanger, Per “SEBO”

(TYP.) Badger Industries (SHCA) Vertical Uplift Resistance Assembly

Copper Pipe

Steel Pipe, Cast-Iron Pipe, EMT Or RMC Conduit

ANVIL Fig. 212 Or ANVIL Fig. 212FP (No Substitution) (TYP.)

ANVIL (AS 3792) Cushion Strip Shall Be Installed Between The Copper Pipe And The Anvil Clamp. Cushion Strip Joint Shall Be Offset (20º to 160º) From Cable. Cushion Strip Shall Not Overlap. Cushion Strip Shall Maintain A Gap (< 1/4") (TYP.) Each Clamp

Cushion Strip Joint Example. Offset Can Orientated Clockwise Or Counter Clockwise From Cable, (TYP.)

Nut 1

Nut 2

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 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 And Hex Nut 2, Every (1) Turn.
Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

SSC-HD Material:
- (0.185”) Inch Thick, Min.
- (33,000 psi) Yield Strength
- Carbon Steel, With Zinc Electrogalvanized Plating

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 Brace To Building Structure Connections Per “SEBO”

Badger Industries (SSC-HD) Kit Seismic Hardware (No Substitution) (TYP.) For All Brace Arm Connections Per “SEBO” And Detail (RBM-HD)

Badger SSC

(1 Of 1)
(2”) EMT Conduit
Rigid Brace Member Per “SEBO” And Detail (RBM-HD)

Brace Angle Per “SEBO”, (TYP.) For Heavy Duty Longitudinal Brace Assembly, Brace Angle Shall Be Limited To (30º- 60º)

Welded To Steel Pipe At Various Applicable Brace Angles Per “SEBO”

1/4”
Fill
Flush

badger industries
(3 of 1)
Rigid Brace Member Per “SEBO” And Detail (RBM-HD)

Rigid Vertical Member Per “SEBO” And Detail (RVM-HD)

1/4”
Fill
Flush

Steel Pipe

SSC-HD Kit Seismic Hardware (No Substitution) (TYP.) For Vertical Arm Connections Per “SEBO” And Detail (RVM-HD)

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 Transverse Bracing - Heavy Duty

SHT-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.

**SSC-HD** Material: (0.185") Inch Thick, Min. (33,000 psi) Yield Strength Carbon Steel, With Zinc Electrogalvanized Plating

**BADGER INDUSTRIES**

**SHT-HD2**

Single Hanger Transverse Bracing - Heavy Duty

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

**INSTALLATION DETAIL**

[Diagram of installation detail showing various seismic vertical hanger to building structure connections and seismic brace to building structure connections per “SEBO.”]
Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

(TYP.)
Badger Industries
(EMT-RSC)
Rod Stiffener Assembly

(1 Of 1)
EMT Conduit
Rigid Transverse Brace Member Per “SEBO”.
See Detail (RBM-1)

Badger Industries
(EMT-RSC)
Rod Stiffener Assembly

Badger SSC-RE

Clamp Hanger With Welded Vertical Support Rod Bracket Per “SEBO”

Steel Pipe, Cast-Iron Pipe, Copper Pipe, EMT, IMC & RMC Conduit

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

~ BADGER INDUSTRIES ~

Single Hanger Longitudinal Bracing

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Cushion Strip Shall Be Installed Between The Copper Pipe And The Anvil Clamp. Cushion Strip Joint Shall Be Offset (20º to 160º) From (SBEMT). Offset Can Be Orientated Clockwise Or Counter Clockwise From (SBEMT). Cushion Strip Shall Not Overlap. Cushion Strip Shall Maintain A Gap (< 1/4”).

Nut 1

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:

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.

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).

~ BADGER INDUSTRIES ~

Single Hanger Longitudinal Bracing

(Read General Notes Prior To Use)

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. lbs.) Torque Increases.
Badger SSC (HD, No Substitution) (TYP) Both Vertical End Connections

1/4" Fill
1/4" Flush

(Rigid Brace Member Per "SEBO" And Detail (RBM-HD))

Badger SSC (SSC-HD) Kit
Seismic Hardware (No Substitution) (TYP) All Brace Arm End Conn.

max. Brace Offset Of (x") Inches Between Seismic Brace And Seismic Vertical Per "SEBO"

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

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

Badger SSC
Seismic Hardware (No Substitution) (TYP.) Both Vertical End Connections

(1 Of 1)
(2") EMT Conduit Rigid Vertical Member Per “SEBO” And Detail (RVM-HD)

(2 Of 2)
(2") EMT Conduit Rigid Brace Members Per “SEBO” And Detail (RBM-HD)

(TYP.) Fill Flush

1/4"
1/4"

Max. Brace Offset Of (x") Inches Between Seismic Brace And Seismic Vertical Per “SEBO”

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 Brace To Building Structure Connections Per “SEBO”

Badger SSC
Seismic Hardware (No Substitution), (TYP.) All Brace Arm End Conn.

(1 Of 2)
(2") EMT Conduit Rigid Brace Member Per “SEBO” And Detail (RBM-HD)

(SSC-HD) Material: (0.185") Inch Thick, Min. (33,000 psi) Yield Strength Carbon Steel, With Zinc Electrogalvanized Plating

Badger Industries (SSC-HD) Kit Seismic Hardware (No Substitution) (TYP.) All Brace Arm End Conn.

Steel Pipe

Max. Brace Offset Of (x") Inches Between Seismic Brace And Seismic Vertical Per “SEBO”

Brace Angle Per “SEBO” (TYP.) For All Longitudinal Brace Assembly, Brace Angle Shall Be Limited To (30°- 60°)

Rigid Brace Members Per “SEBO” And Detail (RBM-HD)

Rigid Vertical Member Per “SEBO” And Detail (RVM-HD)

2") EMT Conduit

(TYP.) Fill Flush

1/4"
1/4"

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

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice: "SEBO"™ Seismic Engineering By Others
Transverse Brace Can Be Orientated In Plan About The
Seismic Vertical Conn., 180 Degrees From That Depicted.
Transverse Brace Can Be Located On Either Side Of The
Trapeze.

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

Minimum (2") Inches

(1 Of 2)
Seismic Vertical
Supports Per "SEBO"

(2 Of 2)
Seismic Vertical
Supports Per "SEBO"

(TYP.) Securement Of items To Trapeze
Per "SEBO"

(TYP.) Connection Of
Vertical Support Rod
To Strut Per "SEBO"

Maximum Trapeze Span Length Per "SEBO"

T-T1

~ BADGER INDUSTRIES ~
Trapeze - Transverse Brace

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Minimum (2") Inches

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

Upper Conn., Bracket From Badger Industries (RRK-X/X) Kit (No Substitution) (TYP.) All Brace Arms
(TYP.) Badger Industries (EMT-RSC) Rod Stiffener Assembly
(1 Of 1) EMT Conduit Rigid Transverse Brace Member Per “SEBO”. See Detail (RBM-1)
Badger Industries (RRK-X/X) Kit Sized To Fit Vertical Support Rod Diameter (No Substitution) (TYP.) All Brace Arms
(TYP.) Connection Of Vertical Support Rod To Strut 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 Trapeze Support.
The (2) Required Longitudinal Brace Badger Seismic Hardware Connections To Structure Not Shown For Clarity.

~ BADGER INDUSTRIES ~
Trapeze - Combination Transverse / Longitudinal Brace
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice: “SEBO™” Seismic Engineering By Others


Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

Various Seismic Brace To Building Structure Connections Per “SEBO”

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.

HVAC Duct Construction Per SMACNA Standards

SMACNA Type Bottom Support Member Sized Per SMACNA Standards

#10 ITW Buildex
Tek Screws (1” O.C.).
Off-Set Screws Across Strut Width (TYP.)

(TYP.) Round Hole Sized To Fit Vertical Support Rod Diameter

Plan View
Bracing Not Shown For Clarity

~ BADGER INDUSTRIES ~
HVAC Duct - Transverse Brace

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
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 To Building Structure Connections Per "SEBO".

Upper Conn., Bracket From Badger Industries (RRK-X/X) Kit (No Substitution) (TYP.) All Brace Arms

(TYP.) Badger Industries (EMT-RSC) Rod Stiffener Assembly

(TYP.) All Brace Arms

Badger SSC-RF

Badger Industries (RRK-X/X) Kit Sized To Fit Vertical Support Rod Diameter (No Substitution) (TYP.) All Brace Arms

HVAC Duct Construction Per SMACNA Standards

Min. (2") Inches

Max. (3") From Edge Of Duct To Center Support Rod (TYP.) Both Rods

(TYP.) Round Hole Sized To Fit Vertical Support Rod Diameter

Plan View Bracing 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)
Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

HVAC Duct Construction Per Project Spec.

(1 Of 2) Seismic Vertical Supports Per “SEBO”
(2 Of 2) Seismic Vertical Supports Per “SEBO”

(TYP.) Vertical Support Rod With Upper And Lower Hex Nuts

Min., (1”) Inch Max., (1-1/2”) Inch (TYP.)

(2) Screws, Side By Side. Evenly Spaced Across Duct Band Width (TYP.)
Screws Nearest Duct Band Closures

(TYP.) Min., (3”) Wide By Min., (8 Ga.) Thick, Min., (33 ksi) Steel Strip (TYP.)

(TYP.) Round Hole Sized To Fit Vertical Support Rod Diameter

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

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.

~ BADGER INDUSTRIES ~

Round HVAC Duct - Combination Transverse / Longitudinal Brace

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

(1 Of 4 Or More) Seismic Vertical Supports Per “SEBO”

(1 Of 4) Or (1 Of 8) EMT Conduit Rigid Brace Members Per “SEBO”. See Detail (RBM-1)

(2 Of 4 Or More) Seismic Vertical Supports Per “SEBO”

(4 Of 4) Or (4 Of 8) EMT Conduit Rigid Brace Members Per “SEBO”. See Detail (RBM-1)

(TYP.) Badger Industries (EMT-RSC) Rod Stiffener Assembly

(Badge SSC-RF) Badger Industries (RRK-X/X) Kit

(TYP.) (1 Of 4 Or More) Equipment Supports With Threaded Vertical Support Rods Sized And Installed Per Equipment Manufacturer. May Vary From That Depicted

Notice: “SEBO”™ Seismic Engineering By Others

Orientation Of Braces May Differ From That Depicted, See Badger Detail (ERBLP) For Equipment Rigid Brace Layout Pattern Options Using (4) Rigid Brace Members.
The (4) Depicted Rigid Brace Members May Be Increased To (8) Rigid Brace Members, Per “SEBO” Application Specific (8) Rigid Brace Member Layout Pattern Design.

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.

E-R4 E-R8

(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.

~ BADGER INDUSTRIES ~

Equipment Rigid Bracing Layout Pattern

(Read General Notes Prior To Use)
CABLE BRACING
INSTALLATION DETAILS
### Badger Industries Seismic Hardware Part Number

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

Notice: "SEBO" = Seismic Engineering By Others


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 Be 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**

Seismic Hardware With

Badger (SCC-x) Field Assembly Cable End Connection Per Chart (No Substitution), (TYP.)

---

**Badger Industries**

Patent Pending Seismic Hardware With

Badger Stake-Eye End Conn., Cable Brace Member (No Substitution), (TYP.)

---

**Badger Industries**

Patent Pending Seismic Hardware

With Badger Stake-Eye End Conn., Cable Brace Member (No Substitution), (TYP.)

---

**Badger Industries**

(1 Of 1) Badger Industries (SCC-x) Cable Clamp At Loop 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**

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)

---

**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 Cable Bracing Installed Taught To Remove Slack.

~ BADGER INDUSTRIES ~
Single Hanger Transverse Bracing

(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 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").

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.
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:
Anvill 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 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.
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.
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.

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.

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.
Notice: "SEBO"™ Seismic Engineering By Others

All Cables Shall Be Installed Taut 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.

Min., (1") Inch.
Max., (1-1/2") Inch
(TYP.)

Both Sides

Max. (12")
(TYP.) (T&B)

Max. (12")
(TYP.) (T&B)

Max. (12")
(TYP.) (T&B)

Max. (12")
(TYP.) (T&B)

(2 Of 2) Duct Band Halves. Min., (3") Wide By Min., (8 Ga.) Thick, Min., (33 ksi) Steel Strip (TYP.)

(TYP.) Round Hole
 Sized To Fit
Vertical Support Rod Diameter

Plan View
Bracing Not Shown For Clarity

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

Various Seismic Brace To Building Structure Connections Per "SEBO"

BADGER INDUSTRIES
www.NUSIG.com
Sales@NUSIG.com
2019 Edition
Notice: “SEBO”™ Seismic Engineering By Others
Application Specific Orientation Of Braces Shall Be Per “SEBO”.

~ BADGER INDUSTRIES ~
Duct Cable Bracing Layout Pattern
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
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 (SWB Kit) Patent Pending With Badger Stake Eye Cable Brace Per “SEBO”. (TYP.) All Braces
(4 Of 4) Or (4 Of 8) Badger Industries Cable Brace Members Per “SEBO”. See Detail (SWB Kits)

(2 Of 4 Or More) Seismic Vertical Supports Per “SEBO” (TYP.) All Braces
Seismic Hardware Conn., Hex Nut With Washer, Min., Hand Tight Plus (1/4) Turn, Or As Required By Equipment MFG. (TYP.)

Badger Industries (SWB Kit) Patent Pending Seismic Hardware Per “SEBO”. (TYP.)

(1 Of 4 Or More) Seismic Vertical Supports Per “SEBO”

(3 Of 4) Or (3 Of 8) Badger Industries Cable Brace Members Per “SEBO”. See Detail (SWB Kits)

Seismic Hardware Per “SEBO” (TYP.) All Braces

Badger Industries (SCC-X) Cable Clamp Seismic Hardware. (TYP.) All Braces
(3 Of 4) Or (3 Of 8) Badger Industries Cable Brace Members Per “SEBO”. See Detail (SWB Kits)

Badger Industries (EMT-RSC) Rod Stiffener Assembly

(1 Of 4 Or More) Equipment Supports With Threaded Vertical Support Rods Sized And Installed Per Equipment Manufacturer. May Vary From That Depicted

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

~ BADGER INDUSTRIES ~
Equipment Cable Bracing Layout Pattern
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
VIBRATION ISOLATION BRACING
INSTALLATION DETAILS
SWB Kits

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.

Vibration Isolated Spring Hanger Supported Single Hanger Transverse Bracing
(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. lbs.) 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 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.
Notice: "SEBO"™ Seismic Engineering By Others

All Cables Shall Be Installed Slack To Allow Operational Movement Of Spring Hangers. Proper Amount Of Slack Shall Be As Determined By Vibration Isolation Design Engineer.

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 Item Being Braced Conn., And All Required Vertical Supports With Vibration Isolation Spring Hangers Not Shown For Clarity.

### Badger Industries

Vibration Isolated Spring Hanger Supported Equipment Combination Transverse / Longitudinal Bracing

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

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor (IC-ES ESR-1917)</th>
<th>Concrete Over Metal &quot;W&quot; Decking</th>
<th>Concrete Over Metal &quot;B&quot; Decking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>3/8 in.</td>
<td>3/8 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>2-5/16 in.</td>
<td>2-5/16 in.</td>
</tr>
<tr>
<td>Min. hnom Depth</td>
<td>2-5/8 in.</td>
<td>2-5/8 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>3-1/4 in.</td>
<td>3-1/4 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>5 in.</td>
<td>5 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>6-3/4 in.</td>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
<td>4-1/2 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>25 ft-lbs.</td>
<td>25 ft-lbs.</td>
</tr>
</tbody>
</table>

Seismic Vertical Maximum Fp (LRFD) 355 lbs. 403 lbs.
Includes (2.0) Omega Per ASCE 7-16 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


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 ~
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.

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor (IC-ES) (ESR-1917)</th>
<th>Concrete Over Metal &quot;W&quot; Decking</th>
<th>Concrete Over Metal &quot;B&quot; Decking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>1/2 in.</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>3-5/8 in.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. hnom Depth</td>
<td>4 in.</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>4-5/8 in.</td>
<td>4-5/8 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
<td>4-1/2 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>40 ft.-lbs.</td>
<td>40 ft.-lbs.</td>
</tr>
<tr>
<td>Seismic Vertical Maximum</td>
<td>637 lbs.</td>
<td>732 lbs.</td>
</tr>
<tr>
<td>FpT (LRFD) Values Include (2.0) Omega Per ASCE 7-16</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
</tr>
<tr>
<td>For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notice: “SEBO”™ Seismic Engineering By Others
- Installation, Testing And Inspection: Per Current Hilti
- 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].

SVC14H
Seismic Vertical Connection - 1 Anchor
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Lower Flute Install Hilti Kwik Bolt TZ Anchors Per Detail (SVC14H)

Sand-Lightweight Or Normal Weight Concrete (f'c Min = 3,000 psi)

Min. (5/8") (TYP.)

(TYP.) Install Anchor With Anchor Round Washer And Anchor Hex Nut Into Underside Of Concrete Filled Metal Decking Prior To Installation Of Strut Span Member. Torque Set Anchor Prior To Installation Of Strut Span Member

(TYP.) Square Strut Washer Strut Span Member, Another Strut Washer And Hex Nut Sized To Fit Anchor Threads To Be Installed After Anchor Has Been Properly Installed And Torque Set

Anchor Length Notice: Recommend Use Of (1/2x7) Hilti KB-TZ Anchor.

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). Do Not Use This Detail For Badger Detail SVC13H 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.

~ BADGER INDUSTRIES ~

SVC-FSA

Seismic Vertical Connection - Flute Span Assembly Double Anchors

(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 (SVC58) Seismic Hardware. Recommend Use Of (5/8x6) Hilti KB-TZ Anchor.

---

### BADGER INDUSTRIES Detail (SVC15H)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Concrete Over Metal &quot;W&quot; Decking</th>
<th>Concrete Over Metal &quot;B&quot; Decking</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>5/8 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>4-7/16 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. hole Depth</td>
<td>4-3/16 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>5-3/8 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>8-3/4 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>12 in.</td>
<td></td>
<td></td>
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<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
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<td></td>
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<tr>
<td>Installation Torque</td>
<td>60 ft.-lbs.</td>
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</table>

**Seismic Vertical Maximum Fp (LRFD)**

<table>
<thead>
<tr>
<th>Value</th>
<th>1,131 lbs.</th>
</tr>
</thead>
</table>

*Includes (2.0) Omega Per ASCE 7-16*

---

**Notice: “SEBO”™ Seismic Engineering By Others**

- 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].

---

**SVC15H**

Seismic Vertical Connection - 1 Anchor

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Normal Weight Concrete
(f'c Min = 3,000 psi)

Notice: “SEBO”™ Seismic Engineering By Others

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 (5/8x5) 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. φnom Embed. 2-5/16 in.
Min. 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.

600 lbs.
Seismic Vertical Maximum Fpt (LRFD)
Includes (2.0) Omega Per ASCÉ 7-16

For ASCE 7-10, Fpt (LRFD) Values, Multiply Listed Value By (0.80).

Notice: "SEBO"™ Seismic Engineering By Others

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

(f'c Min = 3,000 psi)

Notice: "SEBO"™ Seismic Engineering By Others
Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.

### 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)

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor</th>
<th>Concrete Slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Min. ñnom Embed.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. ñhole Depth</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>9-3/4 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>40 ft• lbs.</td>
</tr>
<tr>
<td>Seismic Vertical Maximum Fpt (LRFD)</td>
<td>1,295 lbs.</td>
</tr>
<tr>
<td></td>
<td>Includes (2.0) Omega Per ASCÉ 7-16</td>
</tr>
</tbody>
</table>

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: Seismic Vertical Connection - 1 Anchor
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice: "SEBO™" Seismic Engineering By Others

~ NUSIG ~
Detail (SVC15HCS)
Hilti Kwik Bolt - TZ Carbon Steel Anchor
ICC-ES (ESR-1917) Concrete Slab
Anchor O.D. da 5/8 in.
Min. hnom Embed. 4-7/16 in.
Min. hhole 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.-lfs.
Seismic Vertical Maximum Fpt (LRFD) 1,795 lbs.
Includes (2.0) Omega Per ASCÉ 7-16

For ASCE 7-10, Fpt (LRFD) Values, Multiply Listed Value By (0.80).

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

- 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.

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

**TABLE:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158</td>
<td>3/8”</td>
<td>730 lbs.</td>
<td>2,040 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>1/2”</td>
<td>1,350 lbs.</td>
<td>2,160 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>5/8”</td>
<td>2,160 lbs.</td>
<td></td>
</tr>
</tbody>
</table>

**ELEVATION VIEW:**

- Beam Clamp Bolt Shall Be In Full Contact With Beam Flange Steel. (TYP.)
- Torque-Off Badger Industries Beam Clamp Bolt Prior To Installation Of Vertical Support Rod. (TYP.)
- Upper And Lower Strut Nuts Sized To Fit Vertical Support Rod. Installed Hand Turn Plus (1/4) (TYP.)
- FpT / FpC Per Chart
- Gravity Per Chart
- ASTM A36 Or Better Per Chart

**DETAIL:**

Badger Industries SVC51-EF - Seismic Vertical Connection - Single Beam Clamp Attachment

(Read General Notes Prior To Use)
Seismic Vertical Connection - Single Beam Clamp Attachment

**SVC51L-EF**

(TYP.) For Beam Flange Thickness (1.300") To (3.00") Use Badger Beam Clamp (SBC158L-C).

(TYP.) For Beam Flange Thickness (2.125") To (3.00") Use Badger Beam Clamp (SBC158L) Or Beam Clamp (SBC158L-C)

**Notice:**
- 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.

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>Vertical Support Rod Size</th>
<th>ANSI / MSS SP-58 Maximum Allowable Tension</th>
<th>ANSI / FM 1950-2016 Maximum SEISMIC Fpt / Fpc (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158L Or SBC158L-C</td>
<td>3/8&quot;</td>
<td>730 lbs.</td>
<td>2,040 lbs.</td>
</tr>
<tr>
<td>See Flange Thickness Notes</td>
<td>1/2&quot;</td>
<td>1,350 lbs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5/8&quot;</td>
<td>2,160 lbs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/4&quot;</td>
<td>2,160 lbs.</td>
<td></td>
</tr>
</tbody>
</table>

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

**INSTALLATION DETAIL**

**BADGER INDUSTRIES**

Seismic Vertical Connection - Single Beam Clamp Attachment

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

Threaded Rod Conn., To Strut

Threaded Rod With Hex Nut, Anvil Square Strut Washer And Anvil Strut Nut Tighten Hand Tight Plus (1/4) Turn

ASTM A36 Or Better

Anvil (AS 200), (AS 200H) Or (AS 200EH) (12 ga. 1-5/8"x1-5/8") Single Strut Member, (TYP.)

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

Badger Industries (SBC158)

Beam Clamp Bolt Shall Be In Full Contact With Inside Back Of Strut Metal, (TYP.)

End Of Strut Shall Be Flush With Or Extend Beyond Beam Clamp, (TYP.)

ASTM A36 Or Better Vertical Support Rod

Anywhere Between Clamps

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

Badger Industries (SBC158)

Patent Pending Beam Clamp. See Thick Flange Notice (No Substitution)

Min. (0.1875") Max. (1.260") Beam Flange Thickness. See Thick Flange Notice

(1-5/8")

(18") Maximum

SVC52
Seismic Vertical Connection - Double Beam Clamp Attachment

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

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.

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>Maximum Beam Flange Width</th>
<th>Maximum Allowable Tension</th>
<th>ANSI / FM 1950-2016 Maximum SEISMIC Fpt / Fpc (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158L</td>
<td>18&quot;</td>
<td>2,100 lbs.</td>
<td>2,152 lbs.</td>
</tr>
</tbody>
</table>

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

Seismic Vertical Connection - Double Beam Clamp Attachment (Elev. View) (Not To Scale) (Read General Notes Prior To Use)
Notice:

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.

ASTM A36 Or Better Threaded Rod With Hex Nut, Anvil Square Strut Washer And Anvil Strut Nut Tighten Hand Tight Plus (1/4) Turn

Anvil (AS 200), (AS 200H) Or (AS 200EH) (12 ga. 1-5/8"x1-5/8") Single Strut Member, (TYP.)

~ Badger Industries ~
Seismic Vertical Connection - Double Beam Clamp Attachment

Detail (SVC52-C4)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158</td>
<td>6&quot;</td>
<td>337 lbs.</td>
<td>703 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>9&quot;</td>
<td>254 lbs.</td>
<td>468 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>12&quot;</td>
<td>195 lbs.</td>
<td>350 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>15&quot;</td>
<td>155 lbs.</td>
<td>279 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>18&quot;</td>
<td>128 lbs.</td>
<td>221 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>21&quot;</td>
<td>109 lbs.</td>
<td>166 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>24&quot;</td>
<td>94 lbs.</td>
<td>130 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>27&quot;</td>
<td>83 lbs.</td>
<td>103 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>30&quot;</td>
<td>74 lbs.</td>
<td>84 lbs.</td>
</tr>
</tbody>
</table>
**Notice:**


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.

### ANSI/MSS SP-58

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158L</td>
<td>6&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>9&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>12&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>15&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>18&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>21&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>24&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>27&quot;</td>
</tr>
<tr>
<td>SBC158L</td>
<td>30&quot;</td>
</tr>
</tbody>
</table>

### ANSI / FM 1950-2016

<table>
<thead>
<tr>
<th>SBC158L</th>
<th>6&quot;</th>
<th>372 lbs.</th>
<th>1,169 lbs.</th>
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</thead>
<tbody>
<tr>
<td>SBC158L</td>
<td>9&quot;</td>
<td>281 lbs.</td>
<td>884 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>12&quot;</td>
<td>226 lbs.</td>
<td>710 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>15&quot;</td>
<td>189 lbs.</td>
<td>594 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>18&quot;</td>
<td>162 lbs.</td>
<td>510 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>21&quot;</td>
<td>142 lbs.</td>
<td>447 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>24&quot;</td>
<td>126 lbs.</td>
<td>398 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>27&quot;</td>
<td>114 lbs.</td>
<td>358 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>30&quot;</td>
<td>104 lbs.</td>
<td>326 lbs.</td>
</tr>
</tbody>
</table>

### Beams And Joists

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

### Threaded Rod

- With Hex Nut, Anvil Square Strut Washer And Anvil Strut Nut Tighten Hand Tight Plus (1/4) Turn

### Anvil (AS 200 BTB) (12 ga. 3-1/4"x1-5/8")

- Double Back-To-Back Manufacturer Spot Welded Single (12 ga. 1-5/8"x1-5/8") Strut Members, Both Having Solid Backs (Without)

- Holes Or Slotted Openings, (TYP.)

### ASTM A36

- Or Better Vertical Support Rod
**INSTALLATION DETAIL**

**BADGER INDUSTRIES**

**Seismic Vertical Connection - Double Beam Clamp Attachment**

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

---

**Notice:**
- 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.

---

**BADGER INDUSTRIES ~**

**Detail (SVC52-EF1T)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158 1'-0&quot;</td>
<td>1,572 lbs.</td>
<td>785 lbs.</td>
<td>2,817 lbs.</td>
<td>1,407 lbs.</td>
<td>701 lbs.</td>
</tr>
<tr>
<td>SBC158 2'-0&quot;</td>
<td>783 lbs.</td>
<td>390 lbs.</td>
<td>1,405 lbs.</td>
<td>701 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 3'-0&quot;</td>
<td>519 lbs.</td>
<td>257 lbs.</td>
<td>934 lbs.</td>
<td>464 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 4'-0&quot;</td>
<td>386 lbs.</td>
<td>189 lbs.</td>
<td>697 lbs.</td>
<td>345 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 5'-0&quot;</td>
<td>306 lbs.</td>
<td>148 lbs.</td>
<td>555 lbs.</td>
<td>273 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 6'-0&quot;</td>
<td>252 lbs.</td>
<td>120 lbs.</td>
<td>459 lbs.</td>
<td>224 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 7'-0&quot;</td>
<td>212 lbs.</td>
<td>100 lbs.</td>
<td>390 lbs.</td>
<td>189 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 8'-0&quot;</td>
<td>183 lbs.</td>
<td>84 lbs.</td>
<td>338 lbs.</td>
<td>162 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 9'-0&quot;</td>
<td>159 lbs.</td>
<td>72 lbs.</td>
<td>297 lbs.</td>
<td>141 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 10'-0&quot;</td>
<td>140 lbs.</td>
<td>61 lbs.</td>
<td>235 lbs.</td>
<td>123 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 11'-0&quot;</td>
<td>124 lbs.</td>
<td>52 lbs.</td>
<td>178 lbs.</td>
<td>109 lbs.</td>
<td></td>
</tr>
<tr>
<td>SBC158 12'-0&quot;</td>
<td>110 lbs.</td>
<td>45 lbs.</td>
<td>137 lbs.</td>
<td>86 lbs.</td>
<td></td>
</tr>
</tbody>
</table>

---

**INSTALLATION DETAIL**

** Beam Clamp Bolt**
- Hidden Behind Depicted Threaded Rod, Shall Be In Full Contact With Beam Flange Steel, (TYP.)

**Threaded Rod With Hex Nuts And Square Strut Washers**
- (TYP.) ASTM A36 Or Better Vertical Support Rod, Engineered By Others

**Torque-Off**
- Badger Industries Beam Clamp Bolt Prior To Installation Of Vertical Support Rod, (TYP.)

---

**Uniform Loading Per Chart**
- And - Not Depicted Center Concentrated Loading Per Chart

---

**Notice:**
- 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.

---

**BADGER INDUSTRIES ~**

**Seismic Vertical Connection - Double Beam Clamp Attachment**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
**Anvil (AS 200 BTB), (AS 200H BTB) Or (AS 200EH BTB) 12 ga. 1-5/8"x1-5/8"
Double Back-To-Back Manufacturer Spot Welded Strut Member**

**Notice:**

- 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.

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

**Beam Clamp Bolt Hidden Behind Depicted Threaded Rod. Shall Be In Full Contact With Beam Flange Steel, (TYP.)**

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

- **Uniform Loading Per Chart - And - Not Depicted Center Concentrated Loading Per Chart**

**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.

**~ BADGER INDUSTRIES ~**

**Badger Industries (SBC158) Patent Pending Beam Clamp. See Thick Flange Notice (No Substitution)**

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

**Beams And Joists By Others**

**Uniform Load Concentrated Center Load**

**Uniform Load**

**Maximum Allowable Tension GRAVITY**

**Maximum Allowable Tension GRAVITY**

**SEISMIC Fpt / Fpc (LRFD)**

**SEISMIC Fpt / Fpc (LRFD)**

**Vertical Support Rod Placement Off-Set At Edge Of Beam Flange Allows For Full Beam Depth Vertical Adjustment, (TYP.)**

**Torque-Off Badger Industries Beam Clamp Bolt Prior To Installation Of Vertical Support Rod, (TYP.)**

**Beam Clamp Bolt Shall Be In Full Contact With Beam Flange Steel, (TYP.)**

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

**Beam Clamp Bolt Hidden Behind Depicted Threaded Rod. Shall Be In Full Contact With Beam Flange Steel, (TYP.)**

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

**Uniform Loading Per Chart - And - Not Depicted Center Concentrated Loading Per Chart**

**[X] Maximum Per Chart**

**Notice:**

- 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.

**Uniform Load Concentrated Center Load**

**Uniform Load**

**Maximum Allowable Tension GRAVITY**

**Maximum Allowable Tension GRAVITY**

**SEISMIC Fpt / Fpc (LRFD)**

**SEISMIC Fpt / Fpc (LRFD)**

**Vertical Support Rod Placement Off-Set At Edge Of Beam Flange Allows For Full Beam Depth Vertical Adjustment, (TYP.)**

**Torque-Off Badger Industries Beam Clamp Bolt Prior To Installation Of Vertical Support Rod, (TYP.)**

**Beam Clamp Bolt Shall Be In Full Contact With Beam Flange Steel, (TYP.)**

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

**Beam Clamp Bolt Hidden Behind Depicted Threaded Rod. Shall Be In Full Contact With Beam Flange Steel, (TYP.)**

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

**Uniform Loading Per Chart - And - Not Depicted Center Concentrated Loading Per Chart**

**[X] Maximum Per Chart**

**Notice:**

- 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.

**Uniform Load Concentrated Center Load**

**Uniform Load**

**Maximum Allowable Tension GRAVITY**

**Maximum Allowable Tension GRAVITY**

**SEISMIC Fpt / Fpc (LRFD)**

**SEISMIC Fpt / Fpc (LRFD)**

**Vertical Support Rod Placement Off-Set At Edge Of Beam Flange Allows For Full Beam Depth Vertical Adjustment, (TYP.)**

**Torque-Off Badger Industries Beam Clamp Bolt Prior To Installation Of Vertical Support Rod, (TYP.)**

**Beam Clamp Bolt Shall Be In Full Contact With Beam Flange Steel, (TYP.)**

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

**Beam Clamp Bolt Hidden Behind Depicted Threaded Rod. Shall Be In Full Contact With Beam Flange Steel, (TYP.)**

**Threaded Rod With Hex Nuts And Square Strut Washers. (TYP.) For Suspended Trapeze Supports**

**Uniform Loading Per Chart - And - Not Depicted Center Concentrated Loading Per Chart**

**[X] Maximum Per Chart**

**Notice:**

- 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.
**Description:**

The document contains an installation detail for a seismic vertical connection using a double beam clamp attachment. The detail is focused on the installation of beam clamps, specifying their usage with various thicknesses of flanges and bolts. It includes tables for uniform and concentrated loads, and provides instructions on how to install the clamps, including the tightening of bolts.

**Extraction:**

1. **Bolts:**
   - Beam Clamp Bolt Head: (TYP.)
   - Upper And Lower Strut Nuts Sized To Fit Vertical Support Rod: ASTM A36 Or Better Vertical Support Rod, Engineered By Others
   - Torque-Off: Badger Industries Beam Clamp Bolt Head, (TYP.)

2. **Threads and Nuts:**
   - Threaded Rod With Hex Nuts And Square Strut Washers: (TYP.)
   - For Suspended Trapeze Supports: (TYP.)

3. **Support Rod:**
   - Vertical Support Rod Placement: (TYP.)
   - Uniform Load: (TYP.)
   - Allowable Tension: (TYP.)

4. **Anchoring:**
   - Uniform Loading Per Chart: And - Not Depicted Center Concentrated Loading Per Chart
   - (TYP.) ASTM A36 Or Better Vertical Support Rod, Engineered By Others

5. **Installation Notes:**
   - Notice:

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

**Table: Beam Clamp Specifications**

<table>
<thead>
<tr>
<th>Beam Clamp Type</th>
<th>Minimum (X)</th>
<th>Maximum (X)</th>
<th>Uniform Load</th>
<th>Concentrated Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158 5(^\circ)</td>
<td>5(^\circ) 0(^\prime)</td>
<td>865 lbs.</td>
<td>424 lbs.</td>
<td>1,563 lbs.</td>
</tr>
<tr>
<td>SBC158 6(^\circ)</td>
<td>6(^\circ) 0(^\prime)</td>
<td>714 lbs.</td>
<td>347 lbs.</td>
<td>1,296 lbs.</td>
</tr>
<tr>
<td>SBC158 7(^\circ)</td>
<td>7(^\circ) 0(^\prime)</td>
<td>606 lbs.</td>
<td>291 lbs.</td>
<td>1,104 lbs.</td>
</tr>
<tr>
<td>SBC158 8(^\circ)</td>
<td>8(^\circ) 0(^\prime)</td>
<td>524 lbs.</td>
<td>248 lbs.</td>
<td>960 lbs.</td>
</tr>
<tr>
<td>SBC158 9(^\circ)</td>
<td>9(^\circ) 0(^\prime)</td>
<td>459 lbs.</td>
<td>214 lbs.</td>
<td>847 lbs.</td>
</tr>
<tr>
<td>SBC158 10(^\circ)</td>
<td>10(^\circ) 0(^\prime)</td>
<td>407 lbs.</td>
<td>186 lbs.</td>
<td>755 lbs.</td>
</tr>
<tr>
<td>SBC158 11(^\circ)</td>
<td>11(^\circ) 0(^\prime)</td>
<td>363 lbs.</td>
<td>162 lbs.</td>
<td>680 lbs.</td>
</tr>
<tr>
<td>SBC158 12(^\circ)</td>
<td>12(^\circ) 0(^\prime)</td>
<td>326 lbs.</td>
<td>142 lbs.</td>
<td>617 lbs.</td>
</tr>
</tbody>
</table>

**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 or 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.

**Diagram:**
- Deployed individual beam clamps can be installed on upper or lower flange.
- Beam clamp bolt shall be in full contact with beam flange steel.
- Torque-off Badger Industries beam clamp bolt head.
- Vertical support rod placement off-set at edge of beam flange allows for full beam depth vertical adjustment.
- Use Badger Industries (SBC158L-C) beam clamp for flange thickness (1.300") inch, to a maximum thickness of (3.00") inch.
- Use Badger Industries (SBC158L-C) beam clamp for flange thickness (1.300") inch, to a maximum thickness of (3.00") inch.
- Use Badger Industries (SBC158L-C) beam clamp for flange thickness (1.300") inch, to a maximum thickness of (3.00") inch.
- Use Badger Industries (SBC158L-C) beam clamp for flange thickness (1.300") inch, to a maximum thickness of (3.00") inch.

**Aluminum:**
- (AS 200 BTB), (AS 200H BTB) or (AS 200EH BTB) (1/2 ga. 1-5/8"x1-5/8") double-back-to-back manufactured spot welded strut member.

**Dimensions:**
- (3-1/4")
- (1-5/8")
- (2") min.
- (8") max.
- (0.1875") min.
- (1.260") max.

**Material:**
- (TYP.) ASTM A36 or better vertical support rod, engineered by others.
- (TYP.) 1-5/8"x1-5/8" double-back-to-back.

**Contact:**
- www.NUSIG.com
- Sales@NUSIG.com

**Notes:**
- Listed capacities based on testing and engineered analysis. Testing performed without restraining strap. Beam clamp was not tested for use on beams with "S" section shapes. Weaker components or 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.
Badger Industries

Seismic Vertical Connection - Double Beam Clamp Attachment

**SVC52-LF**

**Badger Industries**

www.NUSIG.com

Sales@NUSIG.com

2019 Edition

---

### INSTALLATION DETAIL

<table>
<thead>
<tr>
<th><strong>BADGER INDUSTRIES</strong> Hardware Part Number</th>
<th><strong>ANSI/MSS SP-58</strong></th>
<th><strong>ANSI / FM 1950-2016</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158</td>
<td>Uniform Load</td>
<td>Uniform Load</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>Maximum</td>
</tr>
<tr>
<td></td>
<td>Allowable Tension</td>
<td>SEISMIC</td>
</tr>
<tr>
<td></td>
<td>GRAVITY</td>
<td>Fpt / Fpc (LRFD)</td>
</tr>
<tr>
<td></td>
<td>[X] Maximum</td>
<td>Maximum</td>
</tr>
<tr>
<td></td>
<td>Allowable Tension</td>
<td>SEISMIC</td>
</tr>
<tr>
<td></td>
<td>GRAVITY</td>
<td>Fpt / Fpc (LRFD)</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>463 lbs.</td>
<td>837 lbs.</td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>383 lbs.</td>
<td>694 lbs.</td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td>325 lbs.</td>
<td>592 lbs.</td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>281 lbs.</td>
<td>514 lbs.</td>
</tr>
<tr>
<td>9'-0&quot;</td>
<td>246 lbs.</td>
<td>454 lbs.</td>
</tr>
<tr>
<td>10'-0&quot;</td>
<td>219 lbs.</td>
<td>405 lbs.</td>
</tr>
<tr>
<td>11'-0&quot;</td>
<td>195 lbs.</td>
<td>365 lbs.</td>
</tr>
<tr>
<td>12'-0&quot;</td>
<td>176 lbs.</td>
<td>331 lbs.</td>
</tr>
</tbody>
</table>

---

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

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

---

**Installing Each Beam Clamp**
- 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.
Notice:


- 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.
~ BADGER INDUSTRIES ~
Detail (SVC52-LFa)

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Hardware Part Number</th>
<th>SBC158</th>
<th>SBC158</th>
<th>SBC158</th>
<th>SBC158</th>
<th>SBC158</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniform Load</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>7'-0&quot;</td>
<td>8'-0&quot;</td>
<td>9'-0&quot;</td>
</tr>
<tr>
<td>Maximum</td>
<td>463 lbs.</td>
<td>383 lbs.</td>
<td>325 lbs.</td>
<td>281 lbs.</td>
<td>246 lbs.</td>
</tr>
<tr>
<td>Concentrated Center Load</td>
<td>306 lbs.</td>
<td>252 lbs.</td>
<td>212 lbs.</td>
<td>183 lbs.</td>
<td>159 lbs.</td>
</tr>
<tr>
<td>Uniform Load</td>
<td>Max.</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>7'-0&quot;</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td>Allowable Tension</td>
<td>837 lbs.</td>
<td>694 lbs.</td>
<td>592 lbs.</td>
<td>514 lbs.</td>
<td>454 lbs.</td>
</tr>
<tr>
<td>GRAVITY</td>
<td>555 lbs.</td>
<td>459 lbs.</td>
<td>390 lbs.</td>
<td>338 lbs.</td>
<td>297 lbs.</td>
</tr>
<tr>
<td>Maximum</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>7'-0&quot;</td>
<td>8'-0&quot;</td>
<td>9'-0&quot;</td>
</tr>
<tr>
<td>Allowable Tension</td>
<td>Max.</td>
<td>140 lbs.</td>
<td>124 lbs.</td>
<td>110 lbs.</td>
<td>105 lbs.</td>
</tr>
</tbody>
</table>

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

**Anvil (AS 200), (BS 200H) Or (AS 200EH) (12 ga. 1-5/8"x1-5/8") Single Strut Member**

**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 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:**

**Section Steel Beams And Joists By Others**

**Seismic Vertical Connection - Double Beam Clamp Attachment**

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

Notice:

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.

**BADGER INDUSTRIES**

Seismic Vertical Connection - Double Beam Clamp Attachment

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

---

**Anvil (AS 200 BTB) (12 ga. 3-1/4"x1-5/8")**

Double Back-To-Back Manufacturer Spot Welded Single (12 ga. 1-5/8"x1-5/8") Strut Members, Both Having Solid Backs (Without) Holes Or Slotted Openings

---

**BADGER INDUSTRIES**

Seismic Hardware

Part Number

SBC158L

---

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158L</td>
<td>5'-0&quot;</td>
<td>1,306 lbs.</td>
<td>865 lbs.</td>
<td>2,152 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>6'-0&quot;</td>
<td>1,082 lbs.</td>
<td>714 lbs.</td>
<td>1,954 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>7'-0&quot;</td>
<td>921 lbs.</td>
<td>606 lbs.</td>
<td>1,669 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>8'-0&quot;</td>
<td>799 lbs.</td>
<td>524 lbs.</td>
<td>1,454 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>9'-0&quot;</td>
<td>704 lbs.</td>
<td>459 lbs.</td>
<td>1,286 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>10'-0&quot;</td>
<td>627 lbs.</td>
<td>407 lbs.</td>
<td>1,150 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>11'-0&quot;</td>
<td>564 lbs.</td>
<td>363 lbs.</td>
<td>1,039 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>12'-0&quot;</td>
<td>510 lbs.</td>
<td>326 lbs.</td>
<td>946 lbs.</td>
</tr>
</tbody>
</table>

---

**Uniform Loading Per Chart**

**Concentrated Center Loading Per Chart**

---

**Seismic Vertical Connection - Double Beam Clamp Attachment**

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

---

**BADGER INDUSTRIES**

Seismic Vertical Connection - Double Beam Clamp Attachment

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

---

**BADGER INDUSTRIES**

Seismic Hardware

Part Number

SBC158L

---

**Notice:**

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.

---

**BADGER INDUSTRIES**

Seismic Hardware

Part Number

SBC158L

---

**Notice:**

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.

---

**BADGER INDUSTRIES**

Seismic Hardware

Part Number

SBC158L

---

**Notice:**

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.
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”.

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES</th>
<th>Max. Gravity Load (ASD)</th>
<th>Max. Combined Gravity + Seismic Load Fpt / Fpc (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSC-HD</td>
<td>3,000 lbs.</td>
<td>5,250 lbs.</td>
</tr>
</tbody>
</table>

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

Steel Beam
By Others

Badger Industries
(SSC-HD)
Seismic Hardware
Is (SSC) With Double
(SEMT) Pivot Arms
(No Substitution).
(TYP.) Can Be Rotated
In Plan View, 360º
About Its Connection
To Underside Of Beam

Badger Industries
(SVC50-HD)
Seismic Vertical Connection - Welded Beam Attachment
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

Fpt / Fpc
Per Chart
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 (3/8x3.1/4) Hilti KB-TZ Anchor.

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor</th>
<th>Concrete Over Metal &quot;W&quot; Decking</th>
<th>Concrete Over Metal &quot;B&quot; Decking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>3/8 in.</td>
<td>3/8 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>2-5/16 in.</td>
<td>2-5/16 in.</td>
</tr>
<tr>
<td>Min. Flute Depth</td>
<td>2-5/8 in.</td>
<td>2-5/8 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>3-1/4 in.</td>
<td>3-1/4 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>5 in.</td>
<td>5 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>6-3/4 in.</td>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
<td>4-1/2 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>25 ft. lbs.</td>
<td>25 ft. lbs.</td>
</tr>
<tr>
<td>Brace Angle From Vertical 30º to 44º</td>
<td>57 lbs.</td>
<td>66 lbs.</td>
</tr>
<tr>
<td>Maximum Fp (LRFD)</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
<tr>
<td>Brace Angle From Vertical 45º to 60º</td>
<td>113 lbs.</td>
<td>133 lbs.</td>
</tr>
<tr>
<td>Maximum Fp (LRFD)</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
</tbody>
</table>

For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).

**Badger Industries**

**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 Praying. 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].

---

**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 (SWB14H)**

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)</th>
<th>Concrete Over Metal &quot;W&quot; Decking</th>
<th>Concrete Over Metal &quot;B&quot; Decking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>1/2 in.</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>3-5/8 in.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>4-5/8 in.</td>
<td>4-5/8 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
<td>4-1/2 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>40 ft.- lbs.</td>
<td>40 ft.- lbs.</td>
</tr>
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</table>

**Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)**

<table>
<thead>
<tr>
<th></th>
<th>107 lbs.</th>
<th>120 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Brace Angle From Vertical 45° to 60° Maximum Fp (LRFD)**

<table>
<thead>
<tr>
<th></th>
<th>211 lbs.</th>
<th>231 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).
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)**

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC-ES (ESR-1917)</td>
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<table>
<thead>
<tr>
<th>Concrete Over Metal &quot;W&quot; Decking</th>
<th>Concrete Over Metal &quot;B&quot; Decking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>4-5/8 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>9-3/4 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>40 ft.-lbs.</td>
</tr>
<tr>
<td>Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)</td>
<td>190 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>218 lbs.</td>
</tr>
<tr>
<td>Brace Angle From Vertical 45° to 75° Maximum Fp (LRFD)</td>
<td>547 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>558 lbs.</td>
</tr>
</tbody>
</table>

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

Notice: “SEBO”™ Seismic Engineering By Others

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)
**LOWER FLUTE - TO - LOWER FLUTE SPACING**

For Type “W” Decking:  
Maximum (14")
Minimum (10")

For Type “B” Decking:  
Maximum (7-1/2")
Minimum (4-1/2")

**Optional Weld Conn.**

**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.

**Anchor Length Notice:**  
Includes (2.0) Omega Per ASCE 7-16

**Seismic Brace Anchorage - 2 Anchors**

- Brace Angle Per Chart
- Brace Angle Per Chart
- Brace Angle Per Chart
- Brace Angle Per Chart

**INSTALLATION DETAIL**

<table>
<thead>
<tr>
<th>Anchor O.D. da</th>
<th>1/2 in.</th>
<th>1/2 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. hnom Embed.</td>
<td>3-5/8 in.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. hhole Depth</td>
<td>4 in.</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>4-5/8 in.</td>
<td>4-5/8 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
<td>4-1/2 in.</td>
</tr>
</tbody>
</table>

**Installation Torque**

<table>
<thead>
<tr>
<th>Brace Angle From Vertical</th>
<th>607 lbs.</th>
<th>561 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° to 44° Maximum FP (LRFD)</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
<tr>
<td>45° to 75° Maximum FP (LRFD)</td>
<td>858 lbs.</td>
<td>728 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
</tr>
</tbody>
</table>

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

**Notice:** “SEBO”™ Seismic Engineering By Others


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 ~**

**Detail (SBA24H)**

Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)

**Brace Angle Per Chart**

**Notice:**

- Installer / Assembler Required To Sign OSS Form (SSC) Or NUSIG (SB1258) Material:
- Min. (0.130") Inch Thick, Min. (33,000 psi) Yield Strength Carbon Steel, With Zinc Electroplated Plating
- ASTM A36 Steel Plate (1/2") Inch Thick By Min., (4-1/2") Inch Wide With Drilled Round Holes No Greater Than (1/16") Of And Inch Larger Than The Diameter Of The Anchor. Holes Shall Be Centered On Plate Width, (TYP.)
- Centered On Plate Width And Centered Between Anchors
- Minimum 20 GA. Steel Decking
- Sand-Lightweight Or Normal Weight Concrete (f’c Min = 3,000 psi)
- Minimum (5/8")

**Optional Weld Conn.**

**Seismic Brace Anchorage - 2 Anchors**

- Brace Angle Per Chart
- Brace Angle Per Chart
- Brace Angle Per Chart
- Brace Angle Per Chart

**INSTALLATION DETAIL**

<table>
<thead>
<tr>
<th>Anchor O.D. da</th>
<th>1/2 in.</th>
<th>1/2 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. hnom Embed.</td>
<td>3-5/8 in.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. hhole Depth</td>
<td>4 in.</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>4-5/8 in.</td>
<td>4-5/8 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
<td>4-1/2 in.</td>
</tr>
</tbody>
</table>

**Installation Torque**

<table>
<thead>
<tr>
<th>Brace Angle From Vertical</th>
<th>607 lbs.</th>
<th>561 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° to 44° Maximum FP (LRFD)</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
<tr>
<td>45° to 75° Maximum FP (LRFD)</td>
<td>858 lbs.</td>
<td>728 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>~ BADGER INDUSTRIES ~</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detail (SBA15H)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)</th>
<th>Concrete Over Metal &quot;W&quot; Decking</th>
<th>Concrete Over Metal &quot;B&quot; Decking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. dia</td>
<td>5/8 in.</td>
<td></td>
</tr>
<tr>
<td>Min..randnEmbed.</td>
<td>4-7/16 in.</td>
<td></td>
</tr>
<tr>
<td>Min..randnDepth</td>
<td>4-3/4 in.</td>
<td></td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>5-3/8 in.</td>
<td></td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>8-3/4 in.</td>
<td></td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>12 in.</td>
<td></td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
<td>10 in.</td>
<td></td>
</tr>
<tr>
<td>Installation Torque</td>
<td>60 ft.- lbs.</td>
<td></td>
</tr>
<tr>
<td>Brace Angle From Vertical 30º to 44º Maximum Fp (LRFD)</td>
<td>337 lbs.</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
<tr>
<td>Brace Angle From Vertical 45º to 75º Maximum Fp (LRFD)</td>
<td>841 lbs.</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
</tbody>
</table>

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

Notice: "SEBO™" Seismic Engineering By Others
Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360º 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
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
**LOWER FLUTE - TO - LOWER FLUTE SPACING**

For Type “W” Decking:  
Minimum (14”)

For Type “B” Decking:  
Not Usable

Minimum (10”)

---

**DOUBLE ANCHORS IN THE SAME LOWER FLUTE SPACING**

Maximum (14”), To Minimum (12”) For Badger Detail (SSC25H)

(SSC) / (SB1258)

Steel Decking

Min. (5/8”)

(TYP.)

hhole

hnom

Min. (2”)

(5/8”-11) ASTM A307, Grade A Bolt With Round Washers And Locking Hex Nut, Installed Through A (5/8” to 11/16”) Inch Diameter Drilled Hole Centered On Plate Width And Centered Between Anchors. Tightened Hand Tight Plus (1/4) Turn. See Weld Connection Option

For Type “W” Decking:

Maximum (14”)

Minimum (10”)

For Type “B” Decking:

Not Usable

---

**Lower Flute Anchors**

(TYP.) Lower Flute Anchors

1/4” Centered On Plate Width And Centered Between Anchors

Optional Weld Conn.

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.

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**~ BADGER INDUSTRIES ~**

Badger Industries (SSC) Or NUSIG (SB1258)

Seismic Hardware With Badger RIGID Or CABLE Bracing Per “SEBO” (No Substitution)

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**INSTALLATION DETAIL**

---

**SBA25H**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Normal Weight Concrete (f'c Min = 3,000 psi)

Notice: "SEBO"™ Seismic Engineering By Others

~ BADGER INDUSTRIES ~

Detail (SWB13HCS)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hilti Kwik Bolt - TZ</td>
<td></td>
</tr>
<tr>
<td>Carbon Steel Anchor</td>
<td></td>
</tr>
<tr>
<td>ICC-ES (ESR-1917)</td>
<td></td>
</tr>
<tr>
<td>Anchor O.D. da</td>
<td>3/8 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>2-5/16 in.</td>
</tr>
<tr>
<td>Min. hhole Depth</td>
<td>2-5/8 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>4-3/8 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>5 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>25 ft. • lbs.</td>
</tr>
<tr>
<td>Brace Angle From Vertical</td>
<td></td>
</tr>
<tr>
<td>30º to 44º Maximum Fp (LRFD)</td>
<td>88 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCÉ 7-16</td>
<td></td>
</tr>
<tr>
<td>Brace Angle From Vertical</td>
<td></td>
</tr>
<tr>
<td>45º to 60º Maximum Fp (LRFD)</td>
<td>160 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCÉ 7-16</td>
<td></td>
</tr>
<tr>
<td>For ASCÉ 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).</td>
<td></td>
</tr>
</tbody>
</table>

Notice: "SEBO"™ Seismic Engineering By Others

~ BADGER INDUSTRIES ~

Seismic Brace Connection - 1 Anchor
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
**Normal Weight Concrete**

(f'c Min = 3,000 psi)

---

**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)

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)</th>
<th>Concrete Slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. hhole Depth</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>9-3/4 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>40 ft. • lbs.</td>
</tr>
</tbody>
</table>

| Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)       | 194 lbs. |
|                                                             | Includes (2.0) Omega Per ASCÉ 7-16 |

| Brace Angle From Vertical 45° to 60° Maximum Fp (LRFD)       | 345 lbs. |
|                                                             | Includes (2.0) Omega Per ASCÉ 7-16 |

For ASCE 7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).

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


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**INSTALLATION DETAIL**

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**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) |

<table>
<thead>
<tr>
<th>Concrete Slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
</tr>
<tr>
<td>1/2 in.</td>
</tr>
<tr>
<td>Min. Thnom Embed.</td>
</tr>
<tr>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. Thole Depth</td>
</tr>
<tr>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
</tr>
<tr>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
</tr>
<tr>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
</tr>
<tr>
<td>9-3/4 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
</tr>
<tr>
<td>40 ft.- lbs.</td>
</tr>
<tr>
<td>Brace Angle From Vertical</td>
</tr>
<tr>
<td>30º to 44º Maximum</td>
</tr>
<tr>
<td>336 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
<tr>
<td>Brace Angle From Vertical</td>
</tr>
<tr>
<td>45º to 75º Maximum</td>
</tr>
<tr>
<td>683 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
</tbody>
</table>

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

Notice: "SEBO"™ Seismic Engineering By Others

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

SBA14HCS
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.

---

<table>
<thead>
<tr>
<th><del>BADGER INDUSTRIES</del> Detail (SBA24HCS)</th>
<th>Concrete Slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hilti Kwik Bolt - TZ Carbon Steel Anchor</td>
<td>ICC-ES (ESR-1917)</td>
</tr>
<tr>
<td>Anchor O.D. da</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. hnom Depth</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>7-1/2 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>9-3/4 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>40 ft.-lbs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)</th>
<th>916 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brace Angle From Vertical 45° to 75° Maximum Fp (LRFD)</td>
<td>1,170 lbs.</td>
</tr>
</tbody>
</table>

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

Notice: "SEBO"™ Seismic Engineering By Others
Notice: "SEBO"™ Seismic Engineering By Others
Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360º Degrees About Its Connection To The Anchor.

---

### INSTALLATION DETAIL

#### BADGER INDUSTRIES

**Detail (SBA15HCS)**

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor ICC-ES (ESR-1917)</th>
<th>Concrete Slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. ( \text{da} )</td>
<td>5/8 in.</td>
</tr>
<tr>
<td>Min. ( h_{\text{nom}} ) Embed.</td>
<td>4-7/16 in.</td>
</tr>
<tr>
<td>Min. ( h_{\text{hole}} ) Depth</td>
<td>4-3/4 in.</td>
</tr>
<tr>
<td>Min. ( [\text{TC}] ) Thickness</td>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>8-3/4 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>12 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>60 ft.- lbs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brace Angle From Vertical</th>
<th>Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30º to 44º Maximum</td>
<td>458 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brace Angle From Vertical</th>
<th>Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45º to 75º Maximum</td>
<td>916 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor</th>
<th>Concrete Slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>5/8 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>4-7/16 in.</td>
</tr>
<tr>
<td>Min. hnom Depth</td>
<td>4-3/4 in.</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
<td>6 in.</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
<td>8-3/4 in.</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing</td>
<td>12 in.</td>
</tr>
<tr>
<td>Installation Torque</td>
<td>60 ft.-lbs.</td>
</tr>
</tbody>
</table>

Brace Angle From Vertical 30° to 44°
Maximum Fp (LRFD) 1,241 lbs.
Includes (2.0) Omega Per ASCE 7-16

Brace Angle From Vertical 45° to 75°
Maximum Fp (LRFD) 1,575 lbs.
Includes (2.0) Omega Per ASCE 7-16

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

~BADGER INDUSTRIES~
Seismic Brace Anchorage - 2 Anchors
(SBA25HCS)
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice:

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 (+ / -) 90º Degrees.
INSTALLATION DETAIL

Notice:

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.

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

SBC-51J

(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.

Max., (1/3) Beam Depth

WARNING: No Rotation From That Depicted Without Project S.E.O.R. Approval.

SSC50  ~ BADGER INDUSTRIES ~ Seismic Brace Connection - Welded

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

BADGER INDUSTRIES
www.NUSIG.com
Sales@NUSIG.com

2019 Edition
**INSTALLATION DETAIL**

**BADGER INDUSTRIES**
www.NUSIG.com
Sales@NUSIG.com

2019 Edition

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**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.

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**~ BADGER INDUSTRIES ~**

Detail (SSC50HD)

Brace Angle From Vertical

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>0° Maximum Fp / Fpc / Fp (LRFD)</th>
<th>30° to 44° Maximum Fp (LRFD)</th>
<th>45° to 60° Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSC-HD</td>
<td>5,250 lbs.</td>
<td>2,625 lbs.</td>
<td>3,710 lbs.</td>
</tr>
</tbody>
</table>

See Notice

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**SSC50HD**

Elev. View - (Not To Scale) - (Read General Notes Prior To Use)
Integrated Lean Construction Through Innovation